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SCREEN Cut	Text 3: Question A, I Throughout the text, the author Belinda Mc Keown, suggest many reasons why Grand Central Station has gripped people's imaginations. The author points out that the scale of Grand Central Station mesmerizes people. She describes the station as an "architectural marvel". She explains how the huge station is truly at its best when it s full of people, who give the site form. Mc Keown details how the station has inspired many photographers, writers and <u>film-makers</u> . She claims that the stations, "has proved irresistible" for content creators. According to the texts are based, photographs and films have been shot here and she lists specific texts to illustrate her point. Finally, Mc Keown conveys her own fascination with the text. She states, "we may all of us seem linked for a moment".	
	How to watch a math video Some helfpul tips 1) Pause and rewind whenever you want.	
N.	Work out the answer to 6714	



The Ultimate Cheatsheet for Critical Thinking

Want to exercise critical thinking skills? Ask these questions whenever you discover or discuss new information. These are broad and versatile questions that have limitless applications!

Who	benefits from this? is this harmful to? makes decisions about this? is most directly affected?	have you also heard discuss this? would be the best person to consult? will be the key people in this? deserves recognition for this?
What	are the strengths/weaknesses? is another perspective? is another alternative? would be a counter-argument?	is the best/worst case scenario? is most/least important? can we do to make a positive change? is getting in the way of our action?
Where	would we see this in the real wor are there similar concepts/situa is there the most need for this? in the world would this be a prob	rld? can we get more information? tions? do we go for help with this? will this idea take us? are the areas for improvement?
When	is this acceptable/unacceptable? would this benefit our society? would this cause a problem? is the best time to take action?	will we know we've succeeded? has this played a part in our history? can we expect this to change? should we ask for help with this?
Why	is this a problem/challenge? is it relevant to me/others? is this the best/worst scenario?	should people know about this? has it been this way for so long? have we allowed this to happen?





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MathsWatch Worksheets HIGHER Questions and Answers © MathsWatch www.mathswatch.com © MathsWatch Clip No 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 Name of clip Factors, Multiples and Primes Evaluate powers Understand squares, cubes, roots Equivalent fractions Simplification of fractions Put fractions Put fractions of an amount with a calculator Change to a percentage with a calculator Percentage of an amount Addition and subtraction of fractions Multiply and divide fractions Change fractions to decimals BODMAS Long Multiplication of Decimals Ratio Recipe type ratio questions Generate a sequence from the nth term Substitution Alternate angles of regular polygons Area of circle Circumference of circle Area of compound shapes Rotations Reflections Enlargements Translations Find the mid-point of a line Measuring and data collection Two-way tables Pie charts Scatter graphs Frequency diagrams Stem and leaf diagrams List of outcomes Mutually Exclusive Events Tier F and H F and F and H F and 72 73 74 75 76 77 78 79 80 81 82 83 84 85 85 © MathsWatch Clip No 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 Name of clip Overview of percentages Increase/decrease by a percentage Ratio Products of prime factors LCM and HCF Standard form Recurring decimals into fractions Four rules of negatives Division by 2-digit decimals Estimate answers Algebraic simplifying brackets Factorisation Solving equations Forming equations Forming the subject of a formula Inequalities Trial and improvement Index Notation for Multiplication & Division Find the Nth term Drawing straight line graphs Equations of a straight line Simultaneous Equations of a straight line Simultaneous Equations of a straight line Simultaneous Equation of a straight line Si measures Bisecting a line Drawing a perpendicular to a line Bisecting an angle Loci Bearings Experimental probabilities Averages from a table Questionnaires Tier F and H F an HF and HF 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122-123 124 125 126 127 © MathsWatch Clip No 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 Name of clip Standard form calculation Percentage increase/decrease Compound interest/depreciation Reverse percentage Four rules of fractions Solving quadratics by factorising Difference of two squares Simultaneous linear equations Understanding y = mx + c Regions Graphs of cubic and reciprocal functions Recognise the shapes of functions Trigonometry Bearings by Trigonometry Similar shapes Circle theorems Cumulative frequency Boxplots Moving quadratics by and negative indices Surds Rationalising the denominator Direct and inverse proportion Upper and lower bounds Solving quadratics by completing the square Algebraic fractions Rearranging difficult formulae Sim. equations involving a quadratic Gradients of parallel and perpendicular lines Transformation of trigonometric functions Graphs of trigonometric functions and perpendicular lines and perpendicu 142 143 144 145 146 147 148 149 150 150 151 152 153 154 155 156 157 158 159 160-161 162 163 164 165 166 167 168 169 170 171 172 173-174 175 176 177 © Mathswatch Factors, Multiples and Primes Clip 44 1) Write the factors of a) 6 1, 2, 3, 6 b) 16 1, 2, 4, 8, 16 c) 18 d) 30 1, 2, 3, 6, 9, 18 1, 2, 3, 5, 6, 10, 15, 30 2) In a pupil's book the factors of a) 6 1, 2, 3, 6 b) 16 1, 2, 4, 8, 16 c) 18 d) 30 1, 2, 3, 6, 9, 18 1, 2, 3, 5, 6, 10, 15, 30 2) In a pupil's book the factors of a) 6 1, 2, 3, 6 b) 16 1, 2, 4, 8, 16 c) 18 d) 30 1, 2, 3, 6, 9, 18 1, 2, 3, 5, 6, 10, 15, 30 2) In a pupil's book the factors of a) 6 1, 2, 3, 6 b) 16 1, 2, 4, 8, 16 c) 18 d) 30 1, 2, 3, 6 b) 16 1, 2, 4, 8, 16 c) 18 d) 30 1, 2, 3, 6 b) 16 1, 2, 4, 8, 16 c) 18 d) 30 1, 2, 3, 6 b) 16 1, 2, 4, 8, 16 c) 18 d) 30 1, 2, 3, 6 b) 16 1, 2, 4, 8, 16 c) 18 d) 30 1, 2, 3, 6 b) 16 1, 2, 4, 8, 16 c) 18 d) 30 1, 2, 3, 6 b) 16 1, 2, 4, 8, 16 c) 18 d) 16 1, 2, 16 d) 16 d) 16 1, 2, 4, 8, 16 c) 18 d of 12 are listed as 4 X 5 12 6 The above list contains a mistake. 1 2 3 Cross it out from the list and replace it with the correct number. 3) The factors of 30 and 40 (the numbers that are factors of 30 and 40). 1, 2, 5, 10 4) Write the first four multiples of a) 3 3, 6, 9, 12 b) 5 5, 10, 15, 20 c) 10 10, 20, 30, 40 d) 15 15, 30, 45, 60 5) In a pupil's book the first 7 multiples of 8 are listed as 22 X 32 40 48 54 X 24 56 The above list contains 2 mistakes. Cross them out and replace them with the correct numbers. 8 16 6) The first five multiples of 4 and 10 are listed 4: 4, 8, 12, 16, 20 10: 10, 20, 30, 40, 50 From the two lists above, write the common multiple of 4 and 10. 20 7) List the first five prime numbers 2, 3, 5, 7, 11 8) Using just this list of numbers 2, 3, 11, 19 b) The factors of 18 1, 2, 3, 9, 18 c) The multiples of 3 3, 9, 12, 18, 21, 24 Page 44 Evaluate Powers, Squares, Cubes & Roots © Mathswatch Clips 45, 46 1. Evaluate a) 72 49 b) 24 16 7 × 7 = 49 c) 52 25 2 × 2 × 2 × 2 = 16 5 × 5 = 25 2. Work out the square of a) 1 1 b) 3 27 1 = 1 3 = 27 3 5. Work out a) 23 8 2×2×2=8 4 × 4 × 4 = 64 6. Work out the square root of a) 1 1 b) 9 3 1×1=1 7. Work out the square root of a) 1 1 b) 3 27 1 = 1 3 = 27 3 5. Work out a) 32 9 3×3=9 9 × 9 = 81 4. Work out the square of a) 1 1 b) 3 27 1 = 1 3 = 27 3 5. Work out a) 23 8 2×2×2=8 4 × 4 × 4 = 64 6. Work out the square root of a) 1 1 b) 9 3 1×1=1 7. Work out the square of a) 1 1 b) 3 27 1 = 1 3 = 27 3 5. Work out a) 23 8 2×2×2=8 4 × 4 × 4 = 64 6. Work out the square root of a) 1 1 b) 3 27 1 = 1 3 = 27 3 5. Work out a) 23 8 2×2×2=8 4 × 4 × 4 = 64 6. Work out the square root of a) 1 1 b) 3 27 1 = 1 3 = 27 3 5. Work out a) 23 8 2×2×2=8 4 × 4 × 4 = 64 6. Work out the square root of a) 1 1 b) 3 27 1 = 1 3 = 27 3 5. Work out a) 23 8 2×2×2=8 4 × 4 × 4 = 64 6. Work out the square root of a) 1 2 9 3 1×1=1 7. Work out a) 23 8 2×2×2=8 4 × 4 × 4 = 64 6. Work out the square root of a) 1 2 9 3 1×1=1 7. Work out a) 23 8 2×2×2=8 4 × 4 × 4 = 64 6. Work out the square root of a) 1 2 9 3 1×1=1 7. Work out a) 23 8 2×2×2=8 4 × 4 × 4 = 64 6. Work out the square root of a) 1 2 9 3 1×1=1 7. Work out a) 23 8 2×2×2=8 4 × 4 × 4 = 64 6. Work out the square root of a) 1 2 9 3 1×1=1 7. Work out a) 23 8 2×2×2=8 4 × 4 × 4 = 64 6. Work out the square root of a) 1 2 9 3 1×1=1 7. Work out a) 23 8 2×2×2=8 4 × 4 × 4 = 64 6. Work out a) 23 8 2×2×2=8 4 × 4 × 4 = 64 6. 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Work out a) 23 8 2×2×2 b) $6 = 36 \ 3 \ b) 43 \ 64 \ e) 11 \ 121 \ 25 = 125 \ 3 \ d) 6 \ 36 \ 4 = 16 \ 2 \ b) 92 \ 81 \ e) 16 \ 13 \ \times 3 \ \times 3 = 27 \ c) 4 \ 16 \ 2 = 4 \ 2 \ d) 33 \ 27 \ c) 125 \ 5 \ 13 = 1 \ 9.$ From the following numbers 4 \ 64 \ 16 \ 100 \ b) The cube numbers 4 \ 64 \ 16 \ 100 \ b) The cube numbers 4 \ 64 \ 16 \ 100 \ b) The cube numbers 4 \ 27 \ 8 \ 64 \ c) The square number $102 = 100\ 33 = 27, 23 = 8, 43 = 64\ 82 = 64\ 32 = 27\ 10.$ Match together cards with the same answer 92 9 81 53 25 125 32 3 Page 45 Equivalent Fractions, Simplifying and Ordering Fractions, Simplifying and O 72 99 24
48 1 2 b) 8 2 20 5 c) 45 63 5 7 d) 39 13 45 15 e) 72 9 104 13 Write these fractions in order of size (smallest first) 3 9 1 5 1 5 5 4 3 7 3 3 9 c) 8 16 4 16 4 16 8 6 24 12 24 6 9 4 5 15 16 3 14 16 16 16 24 24 24 24 2 7 3 5 7 2 6 4 5 16 5 3 5 b) d) 3 12 4 6 12 3 10 5 12 30 12 4 6 36 48 25 32 8 7 9 10 60 60 60 12 12 12 12 12 12 6) Ben spent his pocket money this way: a) 7 on magazines; 20 7 20 4 on chocolates; 10 8 20 1 on games. 4 5 20 Order the items Ben bought by value (largest first). Show all working 7 12 5 8 16 6 30 10 4 6 4 5 chocolates; magazines, games Page 46 © Mathswatch Value for Money Clip 50 1) Which of the following offer better value for money? Working must be shown a) 200ml of toothpaste for 50p or 400ml of toothpaste for 90p Without a calculator, please, for question 1. × 2 400ml of toothpaste for 22p × 3 600g of bananas for 66p c) 2 litres of paint for £1.60 or 5 litres of paint for £3.50 ÷ 2 ÷ 5 1 litre of paint for 80p or 1 litre of paint for 70p d) 60 teabags for £1.62 or 40 teabags for £0.96 \times 2 \times 3 120 teabags for £2.88 2) Which of these is the best buy? Working must be shown 20 exercise books for £4.00 35 exercise books for £2.88 2) Which of these is the best buy? Working must be shown 20 exercise books for £4.00 35 exercise books for £4.00 and £ the shop he gets two choices: 500ml for £2.55 or 1 litre of paint for £4.79 b) How much does he save if he buys the 'best buy' rather than the 'worst buy'. £0.31 or 31p You must show all your working. £5.10 - £4.79 £0.31 4) Honey pots are sold in two sizes. A small pot costs 45p and weighs 450g. A large pot at 80p for 850g. 45 ÷ 450 = 0.1p per g 80 ÷ 850 = 0.09p per g Which pot of honey? You must show all your working. Large pot at 80p for 850g Page 47 © Mathswatch 1) 2) 3) © Mathswatch 1) 2) Find a Percentage with a Calculator Clip 51 Work out a) 21% of 340 71.4 d) 3.5% of 78.6 2.751 b) 9% of 2700 243 e) 80.5% of 3200 2576 c) 17.5% VAT plus 17.5% of 3200 2576 c) 17.5% of 3200 2576 c) 17.5% of 420 73.5 f) 117.5% of 3200 2576 c) 17.5% of 420 73.5 f) 117.5% of 35 41.125 Work out the total cost (including VAT) of the following items. Trainers £45.50 Tennis racquet £28.99 Football boots £57 plus 17.5% VAT plus 17.5% VAT plus 17.5% VAT plus 17.5% of 3200 2576 c) 17.5% of 420 73.5 f) 117.5% of 3200 2576 c) 17.5% of 3200 2576 c) 17.5% of 420 73.5 f) 117.5% of 3200 2576 c) 17.5% of 3200 2576 c) 17 16% of the people were children. Work out the number of children at the festival. Find a Percentage Without a Calculator Clip 52 Work out (i) 10% and (ii) 15% of: 3 45 d) 54 (i) 5.4 20 a) 200 (i) b) 30 (i) c) 450 (i) (ii) 1.5 (ii) 2.5 (ii) 2.7 (iii) 30 (iii) 4.5 (iii) 67.5 (iii) 8.1 Work out a) 30% of 280 84 b) 80% of 3500 2800 c) 15% of 540 100 % + 10% + 5% + 2.5% 136 children 81 d) 17.5% of 300 52.5 e) 55\% of 700 385 f) 17.5% of 180 31.5 3) Work out the total cost (including VAT) of the following items. 200 60 1200 + 20 + 120 + 6 Video recorder Tape player + 10 £200 + 17.5\% VAT + 3 + 60 £60 + 17.5\% VAT + 5 + 30 + 1.5 £235 £70.50 235 70.5 1410 4) There are 1300 students at MathsWatch College. 45% of these students are boys. Work out the number of boys. 585 boys Laptop £1200 + 17.5% VAT £1410 10 % = 130 \div 2 = 65 520 + 65 = 585 Page 48 © Mathswatch 1) 2) Clip 53 Change to a Percentage With a Calculator In a class of 37 pupils, 22 are boys. 22 × 100 = 59.5% a) What percentage of the class are boys? 59.5% 37 b) What percentage of the class are girls? 40.5% 15 × 100 = 40.5% 37 Sarah sat a mock examination and gained the following marks: Subject Mark English 82 94 Maths 79 123 Science 38 46 82 × 100 = 87.2% 94 79 × 100 = 87.2% 94 79 × 100 = 87.2% 94 79 × 100 = 87.2% 82.6% 46 87.2% a) Write each of Sarah's marks as a percentage. b) Which is Sarah's best subject in terms of percentage score? 3) MathsWatch 1) A brand new car costs £16 500. 2227.5 × 100 = 13.5% A discount? 13.5% Clip 54 Change to a Percentage Without a Calculator Write the following as percentages 26 13 a) 13 out of 50 26% 50 ×=2 100 b) 6 out of 20 30% 6 = 30 20 × 5 100 c) 17 out of 25 68% 68 17 = $25 \times 4 100 2$) 3) English d) 34 out of 40 e) 12 out of 80 f) 27 out of 60 17 34 = $40 \div 2 20 \times 5 3 12 = 80 \div 4 20 \times 5 85\% 15\% 45\% 15$ 100 9 45 27 = $60 \div 3 20 \times 5 100 c$) 17 out of 20 30% 6 = $30 20 \times 5 100 c$) 17 out of 20 30% 6 = $30 20 \times 5 100 c$) 17 out of 20 45 27 = $60 \div 3 20 \times 5 100 c$) 17 out of 20 45 27 = $80 \div 4 20 \times 5 85\% 15\% 45\% 15$ 100 9 45 27 = $80 \div 4 20 \times 5 85\% 15\% 45\% 15$ 100 9 45 27 = $80 \div 4 20 \times 5 85\% 15\% 45\% 15$ Team A Team B whilst team B won 19 of their 25 games. 19 76 16 80 What percentage of their games did they each win? = = 80% 76% 25 100 20 100 Team A: 80% Team B: 76% × 4 × 5 60 participants were invited to a conference. 36 12 60 36 of the participants were invited to a conference. 36 12 60 36 of the participants were invited to a conference. 36 12 60 36 of the participants were females. = = 60% 76% 25 100 20 100 Team A: 80% Team B: 76% × 4 × 5 60 participants were invited to a conference. 36 12 60 36 of the participants were invited to a conferenc b) What is the percentage of male participants? 4) 85 100 40% \times 5 100% - 60% = 40% A company has 800 employees are under 25 years old. a) What percentages of males are employees are under 25 years old. a) What percentages of males are employees are under 25 years old. a) What percentages of males are employees are under 25 years old. a) What percentages of males are employees are under 25 years old. a) What percentages of males are employees are under 25 years old. a) What percentages of males are employees are under 25 years old. a) What percentages of males are employees are under 25 years old. a) What percentages of males are employees are under 25 years old. a) What percentages of males are employees are under 25 years old. a) What percentages of males are employees are under 25 years old. a) What percentages of males are employees are under 25 years old. a) What percentages of males are employees are under 25 years old. a) What percentages of males are employees are under 25 years old. a) What percentages of males are employees are under 25 years old. a) What percentages of males are employees are under 25 years old. a) What percentages of males are employees are under 25 years old. a) What percentages of males are employees are under 25 years old. a) What percentages of males are employees are under 25 years old. a) What percentages of males are employees are under 25 years old. a) What percentages of males are employees are under 25 years old. a) What percentages of males are employees are under 25 years old. a) What percentages of males are employees are under 25 years old. a) What percentages of males are employees are under 25 years old. a) What percentages of males are employees are under 25 years old. a) What percentages of males are employees are under 25 years old. a) What percentages of males are employees are under 25 years old. a) What percentages of males are employees are under 25 years old. a) What percentages of males are employees are under 25 years old. a) What percentages are employee $176\ 22\ \div 8 = 800\ 100\ \div 8\ Page\ 49\ \odot$ Mathswatch Find a Fraction of an Amount Clip 55 1. Work out these amounts. a) 3 of £20 4 d) $150\ \times g$) $60\ \times 2\ 3\ 1\ 4\ 3\ \times 24\ 8\ f\ 50$ 9 4 7 i) $4000\ \times 28\ 7\ 8\ 3\ 500\ 3\ of\ them$. 5 $360\ apples\ 2$. There are $600\ apples\ on\ a\ tree\ and\ there\ are$ maggots in How many apples have maggots in them? 3. Liz and Lee are travelling in a car from Glasgow to Poole (770 km). 5 of the total distance. 7 What distance. 7 What distance, in km, had they travelled by midday? 550 km At midday they had already travelled 4. A digital camera that cost £49 was sold on eBay for What was the selling price? £21 5. Yesterday Thomas travelled a total of 175 miles. 3 of the original price. 7 2 of 175 miles is 70 miles 5 175 - 70 = 105 2 of this distance in the morning. 5 How many miles did he travelled 6. Debra received her £15 pocket money on Saturday. She spent 1 of her pocket money on magazines. 3 She spent 2 of her pocket money on a necklace. 5 How much of the £15 did she have left? 1 of £15 is £5 3 2 of £15 is £5 3 2 of £15 is £6 5 15 - 5 - 6 = 4 £4 Page 50 @ Mathswatch Addition and Subtraction of Fractions Clip 56 1. Work out the following giving your
answer as a fraction in its simplest form a) 3 1 4 + 5 5 5 b) 3 2 + 7 7 5 7 c) 1 4 5 3 - 8 8 d) 3 13 7 4 - 13 13 2. Work out the the following giving your answer as a fraction in its simplest form 2 1 3 1 1 1 5 4 5 3 19 8 a) 15 + 6 5 7 b) 2 4 + 15 3 c) 4 6 - 33 d) 7 9 - 2 9 4 5 20 6 9 6. Work out the following giving your answer as a fraction in its simplest form a) 3 1 11 - 4 5 20 4 2 e) 2 5 + 9 5 12 51 5 b) 5 3 8 + 11 11 11 c) 52 - f) 2 1 11 + 7 2 14 g) 9 4 - 55 1 1 46 2 3 2 17 320 1 13 d) 7 3 + 12 4 h) 12 7 - 15 15 1 3 7. Ted received his pocket money on Friday. He spent 3 of his pocket money on magazines. 5 1 of his pocket money did he have left? 3 1 = 7 + 5 10 10 1 He spent 3 10 - 7 = 3 10 10 8. Maisie buys a bag of flour. 1 2 to bake a cake and to make a loaf. 4 5 a) What fraction of the bag of flour was used? 13 b) What fraction of the bag of flour is left? 7 20 20 She uses 9. Work out the following qiving your answer as a fraction in its simplest form. 1) 41 × 5341511) 15 ÷ 36252) 32 × 431212) 210 ÷ 721353) 34 × 10921513) 4 ÷ 851104) 35 × 7651414) 44 ÷ 11115) 615 × 25181515) 48 ÷ 599106) 43 × 151612016) 510 ÷ 8191167) 25 × 3423917) 13 ÷ 222351218) 35 ÷ 2331319) 25 ÷ 277128) 35 ÷ 277128) 3 20) 8) 13 × 310 2 9) 4 3 × 10) 5 7 1 3 × 12 2 5 1 3 2 3 2 1 1 2 15 1 11 2 2 ÷ 29 3 1 2 3 3 10 Page 52 © Mathswatch Change a Fraction to a Decimal Clip 58 Write the following fractions as decimals 1) 3 10 0.3 2) 7 10 0.7 3) 9 100 0.09 4) 1 2 0.5 5) 3 4 0.75 6) 2 5 0.4 7) 7 20 0.35 8) 1 3 9) 1 8 0.125 10) 5 8 0.625 0.3 10 3 0 . 0.3 Page 53 © Mathswatch Change a Fraction to a Decimal Clip 58 Write the following fractions as decimals 1) 3 10 0.3 2) 7 10 0.7 3) 9 100 0.09 4) 1 2 0.5 5) 3 4 0.75 6) 2 5 0.4 7) 7 20 0.35 8) 1 3 9) 1 8 0.125 10) 5 8 0.625 0.3 10 3 0 . 0.3 Page 53 © Mathswatch Change a Fraction to a Decimal Clip 58 Write the following fractions as decimals 1) 3 10 0.3 2) 7 10 0.7 3) 9 100 0.09 4) 1 2 0.5 5) 3 4 0.75 6) 2 5 0.4 7) 7 20 0.35 8) 1 3 9) 1 8 0.125 10) 5 8 0.625 0.3 10 3 0 . 0.3 Page 53 © Mathswatch Change a Fraction to a Decimal Clip 58 Write the following fractions as decimals 1) 3 10 0.3 2) 7 10 0.7 3) 9 100 0.09 4) 1 2 0.5 5) 3 4 0.75 6) 2 5 0.4 7) 7 20 0.35 8) 1 3 9) 1 8 0.125 10) 5 8 0.625 0.3 10 3 0 . 0.3 Page 53 © Mathswatch Change a Fraction to a Decimal Clip 58 Write the following fractions as decimals 1) 3 10 0.3 2) 7 10 0.7 3) 9 100 0.09 4) 1 2 0.5 5) 3 4 0.75 6) 2 5 0.4 7) 7 20 0.35 8) 1 3 9) 1 8 0.125 10) 5 8 0.625 0.3 10 3 0 . 0.3 Page 53 © Mathswatch Change a Fraction to a Decimal Clip 58 Write the following fractions as decimals 1) 3 10 0.3 2) 7 10 0.7 3) 9 100 0.09 4) 1 2 0.5 5) 3 4 0.75 6) 2 5 0.4 7) 7 20 0.35 8) 1 3 9) 1 8 0.125 10) 5 8 0.625 0.3 10 3 0 . 0.3 Page 53 © Mathswatch Change a Fraction to a Decimal Clip 58 Write the following fractions as decimals 1) 3 10 0.3 2) 7 10 0.7 3) 9 100 0.09 4) 1 2 0.5 5) 3 4 0.75 6) 2 5 0.4 7) 7 20 0.35 8) 1 3 9 10 0.09 4) 1 2 0.5 5) 3 4 0.75 6) 2 5 0.4 7) 7 20 0.35 8) 1 3 9 10 0 0.9 4) 1 2 0.5 5) 3 4 0.75 6) 2 5 0.4 7) 7 20 0.35 8) 1 3 9 10 0.09 4) 1 2 0.5 5) 3 4 0.75 6) 2 5 0.4 7) 7 20 0.35 8) 1 3 9 10 0.09 4) 1 2 0.5 5) 3 4 0.75 6) 2 5 0.4 7) 7 20 0.35 8) 1 3 9 10 0.09 4) 1 2 0.5 7) 1 2 0.5 7) 1 2 0.5 7) 1 2 0.5 7) 1 2 0.5 7) 1 2 0 BODMAS Clip 59 Work out 1) $6 \times 5 + 2 = 32 30 + 2 = 32 2$) $2 + 6 \times 5 = 32 2 + 30 = 32 3$) $35 - 4 \times 3 = 23 35 - 12 = 23 4$) $48 \div (14 - 2) = 4 48 \div 12 = 4 5$) $27 \div 9 = 3 6$) $27 \div 3 + 6 = 15 7$) $(9 + 2) \times 2 + 5 = 27 11 \times 2 + 5$, 22 + 5 = 27 8) $4 \times (1 + 4) - 6 = 14 4 \times 5 - 6$, 20 - 6 = 14 9) $6 \times 4 - 3 \times 5 = 9 24 - 15 = 9 10$) 9 + 3 = 24+2 12 = 2 6 11) 23 + 9 = 8 7 - 3 32 = 8 4 12) 7 - 22 = 3 2 4 - 15 7 4 16 - 15 , 3 = 3 1 13) 52 + 3 = 2 2 × 7 25 + 3 14 , 28 = 2 14 14) 5 × 6 - 4 = 2 13 30 - 4 13 , 26 = 2 13 15) 8 × 2 - 4 = 3 3 + 12 16 - 4 3 + 1 , 12 = 3 4 16) 12 - 3 × 2 = 3 14 ÷ 7 12 - 6 2 , 6 = 3 2 17) 20 - 3 = 11 10 - (5 + 4) 20 - 9 10 - 9 , 11 = 11 1 18) 3 + 9 × 8 = 3 1 + 6 × 4 3 + 72 1 + 24 , 75 =3 25 2 Page 54 © Mathswatch Long Multiplication of Decimals Clip 60 1. Work out 30.1 b) 5 × 3.16 d) 7.2 × 42.5 306 e) 12.5 × 0.59 7.375 f) 0.652 × 0.37 0.24124 130.83 i) 1.56 × 0.059 0.09204 g) 5.62 × 9 50.58 15.8 2.76 a) 7 × 4.3 h) 26.7 × 4.9 c) 2.3 × 1.2 2. David buys 5 books for £8.75 each. How much does he pay? £43.75 3. A DVD costs £12.25. Work out the cost of 9 of these DVDs. £110.25 4. John takes 27 boxes out of his van. The weight of each box is 41.7 kg. Work out the total amount she paid. £402.05 6. Elliott goes shopping. He buys 0.5 kg of pears at £0.84 per kg. 2.5 kg of grapes at £1.89 per kg. 6 kg of potatoes at £0.25 per kg. 100 much does he pay? £0.42 £4.73 + £1.50 £119.80 £44.80 for the first day and £37.50 For each extra day. How much does he pay? £0.42 £4.73 + £1.50 £119.80 £44.80 for the first day and £37.50 For each extra day. How much does he pay? £0.42 £4.73 + £1.50 £119.80 £44.80 for the first day and £37.50 For each extra day. How much does he pay? £0.42 £4.73 + £1.50 £119.80 £44.80 for the first day and £37.50 For each extra day. How much does he pay? £0.42 £4.73 + £1.50 £119.80 £44.80 for the first day and £37.50 For each extra day. form a) 6:9 b) 10:5 c) 7:21 2:3 2:1 1:3 e) 12:40 3: 10 f) 18:27 2:3 d) 4:24 1:6 g) 4:2:8 2:1:4 h) 18:63:9 2:7:1 2. Complete the missing value in these equivalent ratios: 3:4 10:5 50:100 2:1 5:2 15:20 15:6 1:2 4. The ratio of girls to boys in a class is 4 : 5. 4 a) What fraction of the class are girls? 9 b) What fraction of the wings of the model in metres? 5m 6. A model of a plane is made using a scale of 1 : 5. a) If the real length of the wings of the model in metres? 5m 6. A model of a plane is 20m, what is the real length of the wings in metres? 5m 6. A model of a plane is 20m, what is the real length of the wings in metres? 5m 6. A model of a plane is 20m, what is the real length of the wings of the model in metres? 5m 6. A model of a plane is 20m, what is the real length of the wings of the wings of the wings in metres? 5m 6. A model of a plane is 20m, what is the real length of the wings in metres? 5m 6. A model of a plane is 20m, what is the real length of the wings of the wings of the wings of the wings in metres? 5m 6. A model of a plane is 20m, what is the real length of the wings in metres? 5m 6. A model of a plane is 20m, what is the real length of the wings in metres? 5m 6. A model of a plane is 20m, what is the real length of the wings in metres? 5m 6. A model of a plane is 20m, what is the real length of the wings of the wi Share out £250 in the following ratios: a) 1: 4 £50 and £200 b) 2: 3 £100 and £150 c) 7: 3 d) 9: 12: 4 £90 and £120 and £40 £175 and £75 7. Share out £80 between Tom and Jerry in the ratio 3: 2. Tom gets £32 3+2=5 80 \div 5 = 16 $3 \times 16 = 32$ 8. A box of chocolates has 3 milk chocolates for every 2 white chocolates. There are 60 chocolates in the box. Work out how many white chocolates are in the box. 24 white chocolates 3+2=5 60 ÷ 5 = 12 2 × 12 = 24 9. In a bracelet, the ratio of silver beads to gold beads is 5 : 2. The bracelet has 25 silver beads to gold beads is 5 : 2. The bracelet has 25 silver beads to gold beads is 5 : 2. The bracelet has 25 silver beads to gold beads is 5 : 2. The bracelet has 25 silver beads to gold beads is 5 : 2. The bracelet has 25 silver beads to gold beads is 5 : 2. The bracelet has 25 silver beads to gold beads is 5 : 2. The bracelet has 25 silver beads to gold beads is 5 : 2. The bracelet has 25 silver beads to gold beads is 5 : 2. The bracelet has 25 silver beads to gold beads is 5 : 2. The bracelet has 25 silver beads to gold beads is 5 : 2. The bracelet has 25 silver beads is 5 : 2. The bracelet has 25 silver beads to gold beads is 5 : 2. The bracelet has 25 silver beads to gold beads is 5 : 2. The bracelet has 25 silver beads to gold beads is 5 : 2. The bracelet has 25 silver beads is 5 : 2. The bracelet has 25 silver beads to gold beads is 5 : 2. The bracelet has 25 silver beads is 5 : 2. The bracelet has 25 silver beads to gold beads is 5 : 2. The bracelet has 25 silver beads is 5 : 2. The bracelet has 25 silver beads is 5 : 2. The bracelet has 25 silver beads is 5 : 2. The bracelet
has 25 silver beads is 5 : 2. The bracelet has 25 silver beads is 5 : 2. The bracelet has 25 silver beads is 5 : 2. The bracelet has 25 silver beads is 5 : 2. The bracelet has 25 silver beads is 5 : 2. The bracelet has 25 silver beads is 5 : 2. The bracelet has 25 silver beads is 5 : 2. The bracelet has 25 silver beads is 5 : 2. The bracelet has 25 silver beads is 5 : 2. The bracelet has 25 silver beads is 5 : 2. The bracelet has 25 silver beads is 5 : 2. The bracelet has 25 silver beads is 5 : 2. The bracelet has 25 silver beads is 5 : 2. The bracelet has 25 silver beads is 5 : 2. The bracelet has 25 silver beads is 5 : 2. The bracelet has 25 silver beads is 5 : 2. The bracelet has 25 silver beads is 5 : of cement with 5 shovels of sand. How much sand do you need to make 30 shovels of mortar? 25 shovels of sand 1+5=6 30 ÷ 6 = 5 5 × 5 = 25 Page 56 © Mathswatch 1) Clip 62 Recipe Type Ratio Questions Here are the ingredients for making a vegetable soup for 6 people: 2 carrots 1 onion 800ml stock 50g lentils 4g thyme Work out the amount of each ingredient for a) 12 people a) For 12 people: 3 carrots 2 onions b) 9 people: 3 carrots 5 onions 4000ml stock 250g lentils c) 30 people: 3 carrots 5 onions 4000ml stock 250g lentils c) 30 people: 3 carrots 5 onions 4000ml stock 250g lentils c) and a people country b) For 9 people: 3 carrots 5 onions 4000ml stock 250g lentils c) and a people country b) For 9 people: 3 carrots 5 onions 4000ml stock 250g lentils c) and a people country b) For 9 people: 3 carrots 5 onions 4000ml stock 250g lentils c) and a people country b) For 9 people: 3 carrots 5 onions 4000ml stock 250g lentils c) and a people country b) For 9 people plain flour 60g ground almonds 90g sugar 60g butter 4 apples Work out the amount of each ingredient for a) 2 people: 30g butter 2 apples 3) b) For 6 people: 120g plain flour 90g ground almonds 135g sugar c) 18 people: 360g plain flour b) 6 people: 30g butter 2 apples 3) b) For 6 people: 120g plain flour b) 6 people: 30g butter 6 apples c) For 18 people: 30g plain flour b) 6 people: 30g butter 2 apples 3) b) For 6 people: 30g butter 2 apples 3) b) For 6 people: 30g butter 2 apples 3) b) For 6 people: 30g butter 6 apples c) For 18 people: 30g butter 2 apples 3) b) For 6 people: 30g butter 4 apples butter 6 apples c) For 18 people: 30g butter 2 apples 3) b) For 6 people: 30g butter 6 apples 3) b) For 6 people 3) b) For 6 people 3) b) For 6 people: 30g butter 6 apples 3) b) For 6 people 3) b) For 6 peopl 270g ground almonds 405g sugar 270g butter 18 apples 1 onion ½ pint of chicken stock a) For 500ml: 150g parsnips 300g leeks 50g bramley apples 3 onions 1 12 pints of chicken stock a) For 500ml: 150g parsnips 100g leeks 50g bramley apples 3 onions 1 12 pints of chicken stock a) For 500ml: 150g parsnips 100g leeks 50g bramley apples 3 onions 1 12 pints of chicken stock a) For 500ml: 150g parsnips 100g leeks 50g bramley apples 3 onions 1 12 pints of chicken stock a) For 500ml: 150g parsnips 100g leeks 50g bramley apples 3 onions 1 12 pints of chicken stock a) For 500ml: 150g parsnips 100g leeks 50g bramley apples 3 onions 1 12 pints of chicken stock a) For 500ml: 150g parsnips 100g leeks 50g bramley apples 3 onions 1 12 pints of chicken stock a) For 500ml: 150g parsnips 100g leeks 50g bramley apples 3 onions 1 12 pints of chicken stock a) For 500ml: 150g parsnips 100g leeks 50g bramley apples 3 onions 1 12 pints of chicken stock a) For 500ml: 150g parsnips 100g leeks 50g bramley apples 3 onions 1 12 pints of chicken stock a) For 500ml: 150g parsnips 100g leeks 50g bramley apples 3 onions 1 12 pints of chicken stock a) For 500ml: 150g parsnips 100g leeks 50g bramley apples 3 onions 1 12 pints of chicken stock a) For 500ml: 150g parsnips 100g leeks 50g bramley apples 3 onions 1 12 pints of chicken stock a) For 500ml: 150g parsnips 100g leeks 50g bramley apples 3 onions 1 12 pints of chicken stock a) For 500ml: 150g parsnips 100g leeks 50g bramley apples 3 onions 1 12 pints of chicken stock a) For 500ml: 150g parsnips 100g leeks 50g bramley apples 3 onions 1 12 pints of chicken stock a) For 500ml: 150g parsnips 100g leeks 50g bramley apples 3 onions 1 12 pints of chicken stock a) For 500ml: 150g parsnips 100g leeks 50g bramley apples 3 onions 1 12 pints of chicken stock a) For 500ml: 150g parsnips 100g leeks 50g bramley apples 3 onions 1 12 pints of chicken stock a) For 500ml: 150g parsnips 100g leeks 50g bramley apples 3 onions 1 12 pints of chicken stock a) For 500mleeks 50g bramley apples 3 onions 1 12 pints 6 pin 1000ml: a) 500 ml of soup 300g parsnips 200g leeks b) 1000 ml of soup 100g bramley apples 2 onions c) 2500 ml of soup. 1 pint of chicken stock Page 57 © Mathswatch 1) Clip 63 Find the value of the following: (write down all the figures on your calculator display) a) (0.3 + 2.8)2 9.61 2) b) 2.72 + 3.92 22.5 c) 4.5 - 53 12.96989011 d) $6 \times (37 \div 4) 18.24828759 2$ Find the value of the following: (write your answers correct to 1 decimal place) a) 5.6 + 11.2 3 186.8 186.816 3) Hard Calculator Questions b) $87.4 \div (39 + 3) 9.5 9.453760835$ c) 15 - 12 d) $9.6 - 387 \cdot 2 3412 4.3 2 3.2 3.159130745 2$ 33.8 33.83823544 Work out 16.75 + 153 . 2 a) Write down all the figures on your calculator display. 6.433576386 b) Write your answer to part (a) correct to 1 decimal place. 4) 6.4 Work out 2 (2.4×1.9) × 2.03 42.211008 Write down all the figures on your calculator display. 5) Use your calculator to work out the value of 7.34 × 4.71 5.63 + 1189 . a) Write down all the figures on your calculator display. 1.973253425 b) Write your answer to part (a) to an appropriate degree of accuracy. 1.97 or 2.0 Page 58 © Mathswatch 1) Real-Life Money Questions Clip 64 Lance goes on holiday to France. The exchange rate is £1 = 1.40 Euros. He changes £350 into Euros. a) How many Euros should he get? \$\cong 490 350 \times 1.40 = 490 In France, Lance buys a digital camera for 126 Euros. b) Work out the cost of the camera in pounds. 2) £90 126 ÷ 1.40 = 90 Whilst on holiday in Spain, Gemma bought a pair of sunglasses for 77 Euros. In which country were the glasses the cheapest, and by how much? Show all your working. Spain, by £4.99 77 ÷ 1.40 = 55 3) 59.99 - 55.00 = 4.99 Luke buys a pair of trainers in Switzerland. He can pay either 86 Swiss Frances or 56 Euros. The exchange rates are: £1 = 2.10 Swiss Frances or 56 Euros. The exchange rates are: £1 = 2.10 Swiss Frances or 56 Euros. The exchange rates are: £1 = 2.10 Swiss Frances or 56 Euros. would he save? Give your answer in pounds (f). Euros, saving £0.95 86 ÷ 2.10 = 40.95 4) 56 ÷ 1.40 = 40 The total cost of 5 kg of potatoes and 2 kg of carrots is £4.88. 3 kg of potatoes cost £1.98. Work out the cost of 1 kg of carrots is £4.88. 3 kg of potatoes cost £1.98. Work out the cost of 5 kg of potatoes and 2 kg of carrots is £4.88. 3 kg of potatoes cost £1.98. Work out the cost of 5 kg of potatoes cost £1.98. The cost of 5 kg of potatoes cost £1.98. Work out the cost of 1 kg of carrots is £4.88. 3 kg of potatoes cost £1.98. Work out the cost of 1 kg of carrots is £4.88. 3 kg of potatoes cost £1.98. Work out the cost of 5 kg of potatoes cost £1.98. The cost of 5 kg of potatoes cost £1.98. Work out the cost of 5 kg of potatoes cos total cost of 3 kg of bananas and 1.5 kg of pears is ± 5.61 . Work out the cost of 1 kg of pears. ± 0.84 5.80 ÷ 4 = 1.45 3 × 1.45 = 4.35 5.61 - 4.35 = 1.26 1.26 ÷ 1.5 = 0.84 Page 59 Nth Term © Mathswatch Clip 65, 112 1. Write down the first 5 terms and the 10th term of the following sequences: eg. 2n + 1 3, 5, 7, 9, 11.....21 a) 2n + 2 4, 6, 8, 10, 12, ... 6, -11... -5n + 9 3 3 3 7 7 7 6n - 9 6 6 6 -5 -5 3. Here are some pattern 3 a) Draw pattern 3 a) Draw pattern 4 in the space, below.. +1 b) How many sticks are used in (i) pattern 3 a) Draw pattern 4 in the space, below.. +1 b) How many sticks are used in (i) pattern 10 51 sticks (ii) pattern 3 a) Draw pattern 4 in the space, below.. +1 b) How many sticks are used in (i) pattern 3 a) Draw pattern 4 in the space below.. +1 b) How many sticks are used in (i) pattern 20 101 sticks (ii) pattern 50 251 sticks Pat 4 Pat 5 Pat 6 6 11 16 21 26 31 5 5 5 5 nth term is 5n + 1 c) Find an expression, in terms of n, for the number of sticks in pattern number n. 5n + 1 d) Which pattern number can be made using 301 sticks? Pattern 60 Page 60 © Mathswatch 1) 2) 3) 4) 5) 6) 7) 8) 9) 10) Substitution Clip 66 Work out the value of 5x when a) $x = 2\ 10\ b)\ x = 6\ 5\times 6\ 5\times 2\ 30\ c)\ x = 10\ 50\ 5\times 10\ Work$ out the value of 3x when a) $x = 2\ 10\ b)\ x = 6\ 5\times 6\ 5\times 2\ 30\ c)\ x = 10\ 50\ 5\times 10\ Work$ out the value of 3x when a) $x = 2\
10\ b)\ x = 6\ 5\times 6\ 5\times 2\ 30\ c)\ x = 10\ 50\ 5\times 10\ Work$ out the value of 3x when a) $x = 2\ 10\ b)\ x = 6\ 5\times 6\ 5\times 2\ 30\ c)\ x = 10\ 50\ 5\times 10\ Work$ out the value of 3x when a) $x = 2\ 10\ b)\ x = 6\ 5\times 6\ 5\times 2\ 30\ c)\ x = 10\ 50\ 5\times 10\ Work$ out the value of 3x when a) $x = 2\ 10\ b)\ x = 6\ 5\times 6\ 5\times 2\ 30\ c)\ x = 10\ 50\ 5\times 10\ Work$ out the value of 3x when a) $x = 2\ 10\ b)\ x = 6\ 5\times 6\ 5\times 2\ 30\ c)\ x = 10\ 50\ 5\times 10\ Work$ out the value of 3x when a) $x = 2\ 10\ b)\ x = 6\ 5\times 6\ 5\times 2\ 30\ c)\ x = 10\ 50\ 5\times 10\ Work$ out the value of 3x when a) $x = 2\ 10\ b)\ x = 6\ 5\times 6\ 5\times 2\ 30\ c)\ x = 10\ 50\ 5\times 10\ Work$ out the value of 3x when a) $x = 2\ 10\ b)\ x = 6\ 5\times 6\ 5\times 10\ Work$ out the value of $5x\ Work$ out the value o -2 - 6 b) x = 10 30 3 × 10 3 × (-2) c) x = -12 - 36 3 × (-12) Work out the value of 2x when a) x = 3 9 3 × 3 b) x = -4 16 (-4) × (-4) c) x = -10 100 (-10) × (-10) Work out the value of 2x + 5 when a) x = 5 50 b) x = -4 16 (-4) × (-4) c) x = -12 3 × (-1) + 5 Work out the value of 2x + 5 when a) x = 2 11 b) x = 6 23 3 × 6 + 5 3 × 2 + 5 c) x = -12 3 × (-1) + 5 Work out the value of 2x + 5 when a) x = 2 11 b) x = 6 23 3 × 6 + 5 3 × 2 + 5 c) x = -12 3 × (-1) + 5 Work out the value of 2x + 5 when a) x = -4 16 (-4) × (-4) c) x = -12 3 × (-1) + 5 Work out the value of 2x + 5 when a) x = -4 16 (-4) × (-4) c) x = -12 3 × (-1) + 5 Work out the value of 2x + 5 when a) x = -4 16 (-4) × (-4) c) x = -12 3 × (-1) + 5 Work out the value of 2x + 5 when a) x = -4 16 (-4) × (-4) c) x = -4 16 (-4) × (-4) c = -4 (out the value of 4 + 2x when a) x = 7 18 b) $x = -124 + 2 \times (-1)4 + 2 \times 7$ c) $x = -3 - 24 + 2 \times (-3)$ Work out the value of 3x + 2y when a) x = 1 and y = 2.7 b) x = 4 and $y = 3.3 \times 4 + 2 \times 3.3 \times 1 + 2 \times 2.18$ Work out the value of 6x - 3y when a) x = 2 and y = 1.9 b) $x = 1.3 \times (-2) 6 \times 2.3 \times 1$ c) x = -3 and y = 4.30 6 × (-3) - 3 × 4 Work out the value of 3x + 2y when a) x = 2.7 b) x = 4.30 6 × (-3) - 3 × 4 Work out the value of 3x + 2y when a) x = 2.30 6 × (-3) - 3 × 4 Work out the value of 3x + 2y when a) x = 2.30 6 × (-3) - 3 × 4 Work out the value of 3x + 2y when a) x = 2.30 6 × (-3) - 3 × 4 Work out the value of 3x + 2y when a) x = 2.30 6 × (-3) - 3 × 4 Work out the value of 3x + 2y when a) x = 2.30 6 × (-3) - 3 × 4 Work out the value of 3x + 2y when a) x = 2.30 6 × (-3) - 3 × 4 Work out the value of 3x + 2y when a) x = 2.30 6 × (-3) - 3 × 4 Work out the value of 3x + 2y when a) x = 2.30 6 × (-3) - 3 × 4 Work out the value of 3x + 2y when a) x = 2.30 6 × (-3) - 3 × 4 Work out the value of 3x + 2y when a) x = 2.30 6 × (-3) - 3 × 4 Work out the value of 3x + 2y when a) x = 2.30 6 × (-3) - 3 × 4 Work out the value of 3x + 2y when a) x = 2.30 6 × (-3) - 3 × 4 Work out the value of 3x + 2y when a) x = 2.30 6 × (-3) - 3 × 4 Work out the value of 3x + 2y when a) x = 2.30 6 × (-3) - 3 × 4 Work out the value of 3x + 2y when a) x = 2.30 6 × (-3) - 3 × 4 Work out the value of 3x + 2y when a) x = 2.30 6 × (-3) - 3 × 4 Work out the value of 3x + 2y when a) x = 2.30 6 × (-3) - 3 × 4 = 2.30 6 × (-3) - 3 × (-3) = 2.30 6 × (-3) - 3 × (-3) = 2.30 6 × (-3) - 3 × (-3) = 2.30 6 × (-3) - 3 × (-3) = 2.30 6 × (-3) = 2.30 6 × (-3) - 3 × (-3) = 2.30 6 × (-3) = 2.30 6 × (-3) = 2.30 6 × (-3) = 2.30 6 × (-3) = 2.30 6 × (-3) = 2.30 6 × (-3) = 2.30 6 × (-3) = 2.30 6 × (-3) = 2.30 6 × (-3) = 2.30 6 × (-3) = 2.30 6 × (-3) = 2.30 7 × (-3) = 2.30 6 × (-3) = 2.30 7 × (-3) = 2.30 7 × (-3) = 2.30 7 × (-3) = 2.30 7 × (-3) = value of $3x^2 + 4y$ when a) x = 1 and y = 5 23 b) x = -2 and $y = 2 20 2 3 \times (-2)^2 + 4 \times 2 3 \times 1 + 4 \times 5$ c) x = 3 and $y = -2 19 3 \times 32 + 4 \times (-2)$ Using the formula P = H × R, where P is the total pay, H is the number of hours worked, and R is the hourly rate of pay. Work out the total pay, H is the number of hours at £7 per hours worked, and R is the hourly rate of pay. Work out the total pay, H is the number of hours worked 10 hours at £7 per hours worked. f_{70} b) John worked 15 hours and is paid f9 per hour f135 c) Mike worked for 90 minutes at f16 an hour. f24 11) c) x = 5 and y = -4 7 3 × 5 + 2 × (-4) P = 10 × 7 P = 15 × 9 P = 1.5 × 16 The equation of a straight line is given as y = 3x + 2 a) Work out the value of y when y=3×0+2 (i) x = 0 y = 2 y=3×1+2 (ii) x = 1 y = 5 y=3×2+2 (iii) x = 2 y = 8 b) What is the value of x when y = 17? x = 5 17 = 3x + 2 17 - 2 = 3 × x 15 = x 3 Page 61 \odot Mathswatch 1) Alternate Angles Clip 67 Line PQ is parallel to line RS If angle PQR is equal to 36° a) What is the size of angle ABC 33° 68° b) Find the size of angle DCA c) Calculate the size of angle ACB 79° C D DCE is straight line 180° - 68° - 33° = 79° E 33 68 A 3) B a) Find the size of angle BF 54° b) Find the size of angle ACB 79° C D DCE is straight line 180° - 68° - 33° = 79° E 33 68 A 3) B a) Find the size of angle ACB 79° C D DCE is straight line 180° - 68° - 33° = 79° E 33 68 A 3) B a) Find the size of angle ACB 79° C D DCE is straight line 180° - 68° - 33° = 79° E 33 68 A 3) B a) Find the size of angle ACB 79° C D DCE is straight line 180° - 68° - 33° = 79° E 33 68 A 3) B a) Find the size of angle ACB 79° C D DCE is straight line 180° - 68° - 33° = 79° E 33 68 A 3) B a) Find the size of angle ACB 79° C D DCE is straight line 180° - 68° - 33° = 79° E 33 68 A 3) B a) Find the size of angle ACB 79° C D DCE is straight line 180° - 68° - 33° = 79° E 33 68 A 3) B a) Find the size of angle ACB 79° C D DCE is straight line 180° - 68° - 33° = 79° E 33 68 A 3) B a) Find the size of angle ACB 79° C D DCE is straight line 180° - 68° - 33° = 79° E 33 68 A 3) B a) Find the size of angle ACB 79° C D DCE is straight line 180° - 68° - 33° = 79° E 33 68 A 3) B a) Find the size of angle ACB 79° C D DCE is straight line 180° - 68° - 33° = 79° E 33 68 A 3) B a) Find the size of angle ACB 79° C D DCE is straight line 180° - 68° - 33° = 79° E 33 68 A 3) B a) Find the size of angle ACB 79° C D DCE is straight line 180° - 68° - 33° = 79° E 33 68 A 3) B a) Find the size of angle ACB 79° C D DCE is straight line 180° - 68° - 33° = 79° E 33 68 A 3) B a) Find the size of angle ACB 79° C D DCE is straight line 180° - 68° - 33° = 79° E 33 68 A 3) B a) Find the size of angle ACB 79° C D DCE is straight line 180° - 68° - 33° = 79° E 33 68 A 3) B a) Find the size of angle ACB 79° C D DCE is straight line 180° - 68° - 33° E 30° C D DCE 80° 60° 3) c = 66° 70° 120° j i j = 30° i = 45° Work out the size of the angles marked with letters. 300° a = 40° a 80° 60° 150° 30° 140° 40° 120° d = 60° d b f = 40° e = 110° e 70° b = 75° 65° 115° 60° c = 50° c 70° 60° f 70° g = 120° g 60° 60° f 70° g = 120° g 60° 60^\circ 60° f 70° g = 120° g 60° f 70° g = 120° g 60° f ABC is a triangle. 60° a) Find the size of angle A. 180 - 60 - 60 Angle A is 60° b) Triangle ABC is equilateral because all three angles are 60°. 2) 60° A B BCD is a triangle. D ABC is a straight line. Diagram NOT accurately drawn y° Angle CBD = 70°. BD = CD. a) (i) Work out the value of x. x = 110° 180 - 70 (ii) Give a reason for your answer. A Angles on a straight line add up to 180°. x° 70° B C b) (i) Work out the value of y. 180 - 70 - 70 y = 40° (ii) Give reasons for your answer. Base angles of an isosceles triangle are equal in a triangle. 3) Diagram NOT accurately drawn The diagram shows a 5-sided shape. All the sides of the shape are equal in length. a) (i) Find the value of x. x = 60° y° x° (ii) Give a reason for your answer. The triangle in the diagram is equilateral. b) (i) Work out the value of y. y = 150° (ii) Explain your answer. Angle y is made up of the angle in the square and the angle in the equilateral triangle. This is 90° + 60° = 150°. Page 64 © Mathswatch Clip 70 Angles of Regular Polygons 1) 120° 60° a) Work out the size of an exterior angle of a regular hexagon. 60° 360 ÷ 6 b) Work out the size of an interior angle and of an interior angle for this polygon. Exterior angle = 36° Interior angle = 144° 360 ÷ 10 180 - 36 The size of each exterior angle of a regular polygon is 90°. Work out the number of sides of the regular polygon is 40°. Work out the number of sides of the regular polygon is 90°. Work out the number of sides of the regular polygon is 120°. Work out the number of sides of the regular polygon is 90°. Work out the number of sides of the regular polygon is 40°. Work out the number of sides of the regular polygon is 40°. Work out the number of sides of the regular polygon is 90°. Work out the number of sides of the regular polygon is 40°. Work out the number of sides of the regular polygon is 40°. Work out the number of sides of the regular polygon is 40°. 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polygon is 40°. Work out the number of sides of the regular polygon is 40°. Work out the number of sides of the regular polygon is 40°. Work out the number of sides of the regular polygon is 40°. Work out the number of sides of the regular polygon is 40°. Work out the number of sides of the regular polygon is 40°. Work out the number of sides of the regular polygon is 40°. Work out the number of sides of the regular polygon is 40°. Work out the number of sides of the numbe the number of sides of the regular polygon. 6 sides Interior angle = $60, 360 \div ? = 60, 360 \div ? = 40$ Page 65 (Mathswatch 1) Area of Circles Clip 71 Sides Interior angle = $150, exterior angle = 30, 360 \div ? = 40$ Page 65 (Mathswatch 1) Area of Circles Clip 71 Sides Interior angle = 120, exterior angle = 120Find the areas of the following shapes. Take to be $3.14 \times 32 = 28.26 \text{ cm} 2$ Diagrams NOT accurately drawn $3.14 \times 5 = 78.5 \text{ m} 2$ $3.14 \times 42 = 50.24 \text{ cm} 2$ $3.14 \times 42 = 50.24 \text{ cm$ a circular garden comprising a rectangular pond enclosed by grass. The circular garden has a diameter of 10 m. The rectangular pond measures 8 m by 6 m. 6m Work out the area of the garden area: 3.14 × 52 = 78.5 Rectangular pond area: $8 \times 6 = 48\ 78.5 - 48 = 30.5\ 4$) The radius of the top of a circular table is 60 cm. The table also has a circular base with diameter 30 cm. a) Work out the area of the table. 11 304 cm2 b) Work out the area of table rectangle. The diameter of the semi-circle is 13 cm. Rectangle area: The length of the rectangle is 17 cm. 17 × 13 = 221 cm2 Calculate the area of the shape. Give your answer correct to 3 significant figures. 287 cm2 221 + 66.3325 = 287.3325 13 cm Semi-circle area: 3.14 × 6.52 = 132.665 132.665 ÷ 2 = 66.3325 cm2 17 cm Page 66 © Mathswatch 1) Circumference of Circles Clip 72 Find the circumference of the following shapes. Take a) to be 3.14. C = 18.84 cm 3 cm C = $2 \times 3.14 \times 3$ 2) Diagrams NOT accurately drawn b) C = 25.12 cm C = 31.4 m c) 5m 8 cm C = $2 \times 3.14 \times 5$ Work out the perimeter of the following shapes, taking a) Perimeter is green length plus 12 mm. 12 mm C = $2 \times 3.14 \times 5$ Work out the perimeter of the following shapes, taking a) Perimeter is green length plus 12 mm. 12 mm C = $2 \times 3.14 \times 5$ Work out the perimeter of the following shapes, taking a) Perimeter is green length plus 12 mm. 12 mm C = $2 \times 3.14 \times 5$ Work out the perimeter of the following shapes, taking a) Perimeter is green length plus 12 mm. 12 mm C = $2 \times 3.14 \times 5$ Work out the perimeter of the following shapes, taking a) Perimeter is green length plus 12 mm. 12 mm C = $2 \times 3.14 \times 5$ Work out the perimeter of the following shapes, taking a) Perimeter is green length plus 12 mm. 12 mm C = $2 \times 3.14 \times 5$ Work out the perimeter of the following shapes, taking a) Perimeter is green length plus 12 mm. 12 mm C = $2 \times 3.14 \times 5$ Work out the perimeter of the following shapes, taking a) Perimeter is green length plus 12 mm. 12 mm C = $2 \times 3.14 \times 5$ Work out the perimeter of the following shapes, taking a) Perimeter is green length plus 12 mm. 12 mm C = $2 \times 3.14 \times 5$ Work out the perimeter of the following shapes, taking a) Perimeter is green length plus 12 mm. 12 mm C = $2 \times 3.14 \times 5$ Work out the perimeter of the following shapes, taking a) Perimeter is green length plus 12 mm C = $2 \times 3.14 \times 5$ Work out the perimeter of the following shapes, taking a) Perimeter is green length plus 12 mm C = $2 \times 3.14 \times 5$ Work out the perimeter of the following shapes, taking a) Perimeter is green length plus 12 mm C = $2 \times 3.14 \times 5$ Work out the perimeter is green length plus 12 mm C = $2 \times 3.14 \times 5$ Work out the perimeter is green length plus 12 mm C = $2 \times 3.14 \times 5$ Work out the perimeter is green length plus 12 mm C = 2×3 \times 4 to be 3.14. P = 35.7 cm b) P = 30.84 mm 10 cm Perimeter is green length plus 10 cm + 10 cm C = 2 \times 3.14 \times 60 3) The radius of the top of a circular base with diameter 30 cm. a) Work out the circumference of the table. Let be 3.14 C = 376.8 cm b) Work out the circumference of the base of the table. Let be 3.14 C = 94.2 cm 4) C = $2 \times 3.14 \times 15$ The diameter of a wheel on Kyle's bicycle is 0.75 m. C = $2 \times 3.14 \times 0.375$ a) Calculate the number of complete turns the wheel makes. 847 complete turns 5) The diagram shows a shape, made from a semi-circle and a rectangle. The diameter of the semi-circle is 12 cm. The length of the rectangle is 15 cm. Perimeter of shape = 18.8 + 15 + 12 + 15 Give your answer correct to 3 significant figures. P = 60.8 cm 15 cm 26 cm 25 cm 213 cm 25 cm 213 cm 213 cm 26 mm 26 mm 25 cm 213 cm cm6 mm 3 mm 9m 6 mm 18 mm 2 2 mm 9 mm 2 Find the shaded area of each shape. a) Area = 56 cm 2 (60 - 6) 3 cm 2 cm b) Area = 56 cm 2 12 cm (60 - 4 - 8) Area = 48 mm 2 (132 - 66) d) 2 mm 6 mm 2 mm 12 m 4 mm 10 mm 11 m Page 68 @ Mathswatch Rotations Clip 74 y 5 1) a) Rotate $-4 - 3 - 2 - 1 \times Ox 1 2 3 4 5 - 1 - 2 - 3 - 4 - 5$ Page 69 © Mathswatch Reflections Clip 75 y y = -x 5 4 1) a) Reflect triangle T in the single T in the x axis. Label your new triangle V. $-5 1 \times -4 - 3 - 2 - 1 O 1 2 3 4 5 - 1 - 2 U - 3 V - 4 - 5 y y = x 5 4 2)$ a) Describe fully the single transformation which maps triangle T to triangle U. Reflection in the x axis. b) Describe fully the single transformation which maps triangle T to triangle V. Reflection in the y = x line. 3 T 2 1 x -5 -4 -3 -2 -1 O 1 2 3 4 5 -1 -2 U -3 V -4 -5 Page 70 © Mathswatch Enlargements Clip 76 y 5 4 1) a) Enlarge triangle T by scale factor 2 using point (-5, 2) as the centre of enlargement. Label your new triangle U. 3 2 T b) Enlarge triangle V by scale factor a half using the point (-2, -3) as the centre of enlargement. Label your new triangle W. U 1 -5 -4 -3 -2 -1 x O 1 2 3 4 5 -1 -2 V W -3 -4 -5 2) Describe fully the single transformation which maps triangle S to triangle T Enlargement, scale factor 3, centre of enlargement (0, -2, -3) as the centre of enlargement. 3). y 9 8 7 6 5 4 3 S 2 T 1 x O 1 2 3 4 5 6 7 8 9 Page 71 © Mathswatch 1) Translations Clip 77 a) Translate triangle T by vector -4 2 and label it V y 6 5 4 U 3 2 T 1 -6 -5 -4 -3 -2 -1 x O 1 2 3 4V 5 6 -1 -2 -3 2) Translation with vector a) Describe fully the single transformation which maps triangle A to triangle B. b) Describe fully the single transformation which maps triangle A to triangle C. y Translation with vector 6 -6 -3 3 -7 5 A 4 3 2 B -6 -5 -4 1 -3 -2 -1 O x 1 2 3 4 5 6 -1 -2 C -3 -4 -5 -6 Page 72 (a) How the midpoint of A and B where A has coordinates (4, -1). Midpoint of a Line Clip 78 Find the midpoint of A and B where A has coordinates (4, -1). Midpoint of A and B where A has coordinates (-2, 5) and B has coordinates (4, -1). Midpoint of A and B where A has coordinates (-2, 5) and B has coordinat at (1, 2) y 6 A× 5 4 3 2 1 -3 -2 -1 O -1 1 2 3 4× 5 x B -2 x y $(2 + 8) \div 2 = 5 (0 + 6) \div 2 = 3 2$) Find the midpoint of A and B where A has coordinates (2, 4). Midpoint at (-1, 1) x y $(-4 + 2) \div 2 = -1 (-2 + 4) \div 2 = 1$ 4) Find the midpoint of A and B where A has coordinates (7, 4). Midpoint at (2, -5) and B has coordinates (7, 4). Hidpoint at (2, -5) and B has coordinates (7, 4). Hidpoint at (2, -5) and B has coordinates (7, 4). coordinates (-7, -4) and B has coordinates of A are (2, -1). Midpoint at (-4.5, -2.5) x y (-7 + -2) \div 2 = -4.5 (-4 + -1) \div 2 = -2.5 7) The midpoint of A and B is at (1, 3). The coordinates of B. (4, 2) 8) The midpoint of A and B is at (1, 3). The coordinates of B. (4, 2) 8) The midpoint of A and B is at (3.5, 2.5). The coordinates of B. (4, 2) 8) The midpoint of A and B is at (3.5, 2.5). The coordinates of B. (4, 2) 8) The midpoint of A and B is at (1, 3). The coordinates of B. (4, 2) 8) The midpoint of A and B is at (1, 3). $= 1 (4 + ?) \div 2 = 3 x y (2 + ?) \div 2 = 3.5 (5 + ?) \div 2 = 2.5$ Page 73 © Mathswatch 1) Measuring and Drawing Angles Clip 79 Measure the following angles: a) angle ABC = 60° b) angle PQR = 127° C c) angle XYZ = 275° X 127° Q 60° B P A Z Y 275° Page 74 © Mathswatch 1) Measuring and Drawing Angles Clip 79 Measure the following angles: a) angle ABC = 60° b) angle PQR = 127° C c) angle XYZ = 275° X 127° Q 60° B P A Z Y 275° Page 74 © Mathswatch 1) Drawing Triangles Clip 80 The diagram shows the sketch of triangle ABC. C 7.4 cm 38° A 8.5 cm B a) Make an accurate drawing of triangle ABC. b) Measure the size of angle A on your diagram. Angle A = 59° 2) Use ruler and
compasses to construct an equilateral triangle ABC. b) Measure the size of angle ABC. b) Mea PQR. Q Angle P = 43° 10.5 cm 7.3 cm P 43° 9 cm R Page 75 © Mathswatch Clip 81 Plans and Elevations The diagram shows a prism drawn on an isometric grid. Front a) On the grid below, draw the front elevations The diagram shows a prism drawn on an isometric grid. Front a) On the grid below, draw the front elevation of the prism. Page 76 © Mathswatch 1) Nets Clip 82 Sketch nets of these solids. a) b) 2) Cuboid Cube Right-angled triangular prism 3) The two nets, below, are folded to make cubes. Two other vertex will meet at the dot B. Mark it with B. a) b) A A A B B Page 77 © Mathswatch Symmetries Clip 83 1) Draw all the lines of symmetry on the triangle and the rectangle. 2) What is the order of rotational symmetry of the two shapes below, drawnetry order 5 3) S Rotational symmetry order 5 3) S Rotational symmetry of the shape has rotational symmetry order 5 4) On each of the shape has rotational symmetry of the two shapes below, drawnetry order 5 4) On each of the shape has rotational symmetry of the two shapes below, drawnetry of the two shapes below. one plane of symmetry. There are other answers for these two questionnaires and Data Collection Clip 84 Claire wants to find how much time pupils spend on their homework? Not much A lot a) Write down two things that are wrong with this question No mention of time. Does it mean 'per night', 'per week', etc. 'A lot' and 'Not much' are not specific enough. They mean different things to different people. b) Design a suitable guestion she could use. You should include response boxes. How much time do you spend on homework per night? Less than 15 mins Between 15 and 30 mins 2) More than 30 mins 2) More than 30 mins 2) More than 30 mins 7 or you spend on homework per night? Less than 15 mins Between 15 and 30 mins 2) More than 30 mins 7 or you spend on homework per night? Less than 15 mins Between 15 and 30 mins 2) More than 30 mins 7 or you spend on homework per night? Less than 15 mins Between 15 and 30 mins 7 or you spend on homework per night? Less than 15 mins Between 15 and 30 mins 2) More than 30 mins 7 or you spend on homework per night? Less than 15 mins Between 15 and 30 mins 2) More than 30 mins 7 or you spend on homework per night? Less than 15 mins Between 15 and 30 mins 7 or you spend on homework per night? Less than 15 mins Between 15 and 30 mins 7 or you spend on homework per night? Less than 15 mins Between 15 and 30 mins 7 or you spend on homework per night? Less than 15 mins Between 15 and 30 mins 7 or you spend on homework per night? Less than 15 mins Between 15 and 30 mins 7 or you spend on homework per night? Less than 15 mins Between 15 and 30 mins 7 or you spend on homework per night? Less than 15 mins Between 15 and 30 mins 7 or you spend on homework per night? Less than 15 mins Between 15 and 30 mins 7 or you spend on homework per night? Less than 15 mins Between 15 and 30 mins 7 or you spend on homework per night? Less than 15 mins Between 15 and 30 mins 7 or you spend on homework per night? Less than 15 mins Between 15 and 30 mins 7 or you spend on homework per night? Less than 15 mins Between 15 and 30 mins 7 or you spend on homework per night? Less than 15 mins Between 15 and 30 mins 7 or you spend on homework per night? Less than 15 mins 8 mins 7 or you spend on homework per night? Less than 15 mins 8 mins 7 or you spend on homework per night? Less than 15 mins 8 mins 7 or you spend on homework per night? Less than 15 mins 8 mins 7 or you spend on homework per night? Less than 15 mins 8 mins 7 or you spend on homewor programme Tally Frequency Soap opera Reality TV Films Situation comedy Documentary 3) Emma asked 20 people what was their favourite pet. Here are their answers. cat mouse dog cat cat cat hamster dog cat beneficial to the source of the sourc have used to collect and show this information. Favourite pet Cat Hamster Mouse Dog Snake Tally Frequency 8 5 1 4 2 Page 79 © Mathswatch Two-Way Tables Clip 85 1. Billy has been carrying out a survey. He asked 100 people the type of water they like to drink (still, sparkling or both). Here are part of his results: Still Sparkling Both Total Male 26 21 6 53 Female 17 20 10 47 Total 43 41 16 100 a) Complete the two-way table. b) How many males were in the survey? 53 c) How many females drink only sparkling water? 41 2. 90 students. French German Spanish Total Female 6 11 23 40 Male 14 7 29 50 Total 20 18 52 90 50 of the 90 students are male. 29 of the 50 male study Spanish. a) Complete the two-way table. b) How many females study French? 6 c) How many people study Spanish? 52 Page 80 © Mathswatch Pie Charts Clip 86 1) Patrick asked some of his colleagues which was their favourite holiday destination. The table shows the results. Frequency Angle Alicante 8 × 9 72° Paris 7 × 9 63° Ibiza 15 × 9 135° St Lucia 1 × 9 9° Biarritz 9 × 9 81° 360° City 40 Draw a pie chart to illustrate the information. Alicante Biarritz 5 × 9 135° St Lucia 1 × 9 9° Biarritz 9 × 9 81° 360° City 40 Draw a pie chart to illustrate the information. Alicante Biarritz 5 × 9 135° St Lucia 1 × 9 9° Biarritz 9 × 9 81° 360° City 40 Draw a pie chart to illustrate the information. Alicante Biarritz 5 × 9 135° St Lucia 1 × 9 9° Biarritz 9 × 9 81° 360° City 40 Draw a pie chart to illustrate the information. Alicante Biarritz 5 × 9 135° St Lucia 1 × 9 9° Biarritz 9 × 9 81° 360° City 40 Draw a pie chart to illustrate the information. Alicante Biarritz 5 × 9 135° St Lucia 1 × 9 9° Biarritz 9 × 9 81° 360° City 40 Draw a pie chart to illustrate the information. Alicante Biarritz 5 × 9 135° St Lucia 1 × 9 9° Biarritz 9 × 9 81° 360° City 40 Draw a pie chart to illustrate the information. Alicante Biarritz 5 × 9 135° St Lucia 1 × 9 9° Biarritz 9 × 9 81° 360° City 40 Draw a pie chart to illustrate the information. Alicante Biarritz 5 × 9 135° St Lucia 1 × 9 9° Biarritz 9 × 9 81° 360° City 40 Draw a pie chart to illustrate the information. Alicante Biarritz 5 × 9 135° St Lucia 1 × 9 9° Biarritz 9 × 9 81° 360° City 40 Draw a pie chart to illustrate the information. Alicante Biarritz 5 × 9 135° St Lucia 1 × 9 9° Biarritz 9 × 9 81° 360° City 40 Draw a pie chart to illustrate the information. Alicante Biarritz 5 × 9 135° St Lucia 1 × 9 9° Biarritz 9 × 9 81° 360° City 40 Draw a pie chart to illustrate the information. Alicante Biarritz 5 × 9 135° St Lucia 1 × 9 9° Biarritz 9 × 9 81° 360° City 40 Draw a pie chart to illustrate the information. Alicante Biarritz 5 × 9 135° St Lucia 1 × 9 9° Biarritz 5 × 9 135° St Lucia 1 × 9 9° Biarritz 5 × 9 135° St Lucia 1 × 9 9° Biarritz 5 × 9 135° St Lucia 1 × 9 9° Biarritz 5 × 9 135° St Lucia 1 × 9 9° Biarritz 5 × 9 135° St Lucia 1 × 9 9° Biarritz 5 × 9 135° St Lucia 1 × 9 9° Biarritz 5 team came from. The table shows the results. Southern England 9 × 6 Angle Draw a pie chart to illustrate the information. 54° London 23 × 6 138° Midlands 360 ÷ ? 360 ÷ 60 = 6 Southern England London 3) Sophie represents her monthly expenses using a pie chart. Numbers from her table dout Diagram by mistake. accurately Use the pie chart to complete the table. drawn Books Clothes £35 70° Magazines £20 40° Books £35 70° Total £180 360° Page 81 © Mathswatch 1) Scatter Graphs Clip 87 The scatter graph shows some information about the marks of six students. It shows each students. It shows each students. × Maths 22 8 17 26 Science 30 × × 20 a) On the scatter graph, plot the information from the table. b) Draw a line of best fit c) Describe the correlation between the marks in Maths and the marks in Science. d) Use the line of best fit to estimate the mark 0 0 10 20 in Maths of this student. Maths My answer is 14. Yours will depend on your line of best fit. 40 The table below shows the average daily number of hours sleep of 10 children. Age (years) 4 2 5 1 9 6 8 7 10 1.5 Number of hours sleep 14 13 12.5 15 10 12.5 10.8 12 11 14 The first five results have been plotted on the scatter diagram. 16 a) Plot the next five points. b) Draw a line of best fit. 14 Number of hours sleep 2) 30 c) Decribe the relationship between the age of the 12 children. and their number of hours sleep per day. A negative correlation. d) Use your scatter graph to 10 estimate the number of hours sleep for a 3 year old child. My answer is 13.6 Yours will depend on your 8 0 line of best fit. × × × × 2 4 6 Age (years) 8 × 10 Page 82 © Mathswatch Frequency Diagrams Clip 88 A class of pupils is asked to solve a puzzle. The frequency table below shows the times taken by the pupils to solve the puzzle. Time (t) in min Frequency $0.5 \times 2 a$ (b) $7y + 2 \le 30 y 10 d$ (b) 5 + 2x > 7 x > 1 b (c) 7y < 28 y < 28 7 x > 2 + 3 x > 2 a (c) 7y < 28 y < 28 7 x > 2 + 3 x > 2 a (c) 7y < 28 y < 28 7 x > 2 x > 7 - 5 2x > 2 x >
2 x > 2 x $2 < 5p \ 10 < 5p \ 10 < 23 \ y > -2 \times 3 \ g$) $2x > -3 + 5 \ 3 \ 2x > 2 \ 3x > 2 \ x > 2 \ x > 2 \ x > 3 + 5 \ 4x > 8 \ x > 8 \ 4 \ 3p + 2p < 6 + 9 \ 5p < 15 \ 5 + 10 < 2y + 3y \ 15 < 5y \ 15 \ 7 - 2 \ 2z > 5 \ 2z + 2 \ge 7 \ z > 5 \ z > 2.5 \ z$ integers. Write down two possible pairs of values that satisfy this inequality. 1 y =, and 1 y =, other pairs of values are possible. Page 101 © Mathswatch 1) Clip 110 Trial and Improvement The equation x=3 x=4 has a solution between 3 and 4 Use a trial and improvement method to find x = 3.1 x = 3.2 this solution. Give your answer correct to 1 decimal place. x = 3.35 You must show all your working. $x^3 - x = 292$) The equation x = 3.4 x = 3.35 You must show all your working. $x_3 - 4x = 25$ 3) The equation x=4 x=5 has a solution between 4 and 5 Use a trial and improvement method to find x = 4.2 x = 4.3 this solution. Give your answer correct to 1 decimal place. x = 4.25 You must show all your working. $x_3 - 2x = 68$ 4) The equation x=4 x=5 has a solution between 4 and 5 Use a trial and improvement method to find x = 4.2 x = 4.3 this solution. method to find x = 4.2 this solution. x = 4.3 Give your answer correct to 1 decimal place. x = 4.4 You must show all your working. $x = 4.35 x^3 + 4x = 101 x^3 - x = 29.33 - 3 = 24$ too low 3.2 - 3.2 = 29.568 too high 3.3.1 - 3.1 = 26.691 too low 3.2 - 3.2 = 29.568 too high 3.3 - 3.2 = 29.568 Low Low High x3 - 4x = 25 33 - 4 × 3 = 15 too low 43 - 4 × 4 = 48 too high 3.43 - 4 × 3.4 = 25.704 too high 3.43 - 4 × 3.3 = 22.737 too low 3.35 - 4 × 3.35 = 24.195375 too low 3.35 - 4 × 3.35 = 24.195375 too low 4.2 - 2 × 4.2 = 65.688 3 4.3 - 2 4.3 = 70.907 too high 3 $4.25 - 2 \times 4.25 = 68.265625$ too high Therefore, x = 4.2 to 1 decimal place. $4.2 \times 4.25 + 4.3 = 90.712875$ too low Therefore, x = 4.4 to 1 decimal place. 4.3 4.35 4.4 Low Low High Page 102 (a) 84 × 83 8 7 b) 812 ÷ 87 85 Write as a power of 8 a) 812 ÷ 87 85 Write as a power of 8 a) 812 ÷ 87 85 Write as a power of 8 a) 812 ÷ 87 85 Write as a power of 8 a) 812 ÷ 87 85 Write as a power of 8 a) 812 ÷ 87 85 Write as a power of 8 a) 812 ÷ 87 85 Write as a power of 8 a) 812 ÷ 87 85 Write as a power of 8 a) 812 ÷ 87 85 Write as a power of 8 a) 812 ÷ 87 85 Write as a power of 8 a) 812 ÷ 87 85 Write as a power of 8 a) 812 ÷ 87 85 Write as a power of 8 a) 812 ÷ 87 85 Write as a power of 8 a) 812 ÷ 87 85 Write as a power of 8 a) 812 ÷ 87 85 Write as a power of 8 a) 812 ÷ 87 85 Write as a power of 8 a $(2xy3)4 = 2xy3 \times 2xy3 = 16x4y12 8x 3y15 a$) (2xy2)3 8x6y6 5) c) (4xy4)2 16x2y8 d) $(3xy2)4 81x4y8 2x \times 2y = 210 and x 5 \div 5y = 56 Work out the value of y. x = 9 and y = 37) a = 2x$, b = 2y Express in terms of y. x = 9 and y = 46) 5x \times 5y = 512 and x 5 \div 5y = 56 Work out the value of y. x = 9 and y = 46) 5x \times 5y = 512 and x 5 \div 5y = 56 Work out the value of y. x = 9 and y = 37) a = 2x, b = 2y Express in terms of y. x = 9 and y = 46) 5x \times 5y = 512 and x 5 \div 5y = 56 Work out the value of y. x = 9 and y = 46) 5x \times 5y = 512 and x 5 \div 5y = 56 Work out the value of y. x = 9 and y = 37) a = 2x, b = 2y Express in terms of y. x = 9 and y = 46) 5x \times 5y = 512 and x 5 \div 5y = 56 Work out the value of y. x = 9 and y = 37) a = 2x, b = 2y Express in terms of y. x = 9 and y = 46) 5x \times 5y = 512 and x 5 \div 5y = 56 Work out the value of y. x = 9 and y = 37) a = 2x, b = 2y Express in terms of y. x = 9 and y = 46) 5x \times 5y = 512 and x 5 \div 5y = 56 Work out the value of y. x = 9 and y = 37) a = 2x, b = 2y Express in terms of y. x = 9 and y = 46) 5x \times 5y = 512 and x 5 \div 5y = 56 Work out the value of y. x = 9 and y = 46) 5x \times 5y = 512 and x 5 \div 5y = 56 Work out the value of y. x = 9 and y = 46) 5x \times 5y = 512 and x 5 \div 5y = 56 Work out the value of y. x = 9 and y = 46) 5x \times 5y = 512 and x 5 \div 5y = 56 Work out the value of y. x = 9 and y = 46) 5x \times 5y = 512 and x 5 \div 5y = 56 Work out the value of y. x = 9 and y = 46) 5x \times 5y = 512 and x 5 \div 5y = 56 Work out the value of y. x = 9 and y = 46) 5x \times 5y = 56 Work out the value of y. x = 9 and y = 46) 5x \times 5y = 56 Work out the value of y. x = 9 and y = 46) 5x \times 5y = 56 Work out the value of y. x = 9 and y = 46) 5x \times 5y = 56 Work out the value of y. x = 9 and y = 46) 5x \times 5y = 56 Work out the value of y. x = 9 and y = 46) 5x \times 5y = 56 Work out the value of y. x = 9 and y = 46) 5x \times 5y = 56 Work out the value of y. x = 9 and y = 46) 5x \times 5y = 56 Work out the value of y. x = 9 and y = 46 a and b a) 2x + y ab b) 22x a2 c) 23y b3 d) 2x + 2y ab2 Page 103 Nth Term © Mathswatch Clip 65, 112 1. Write down the first 5 terms and the
10th term of the following sequences: eg. 2n + 1 3, 5, 7, 9, 11.....21 a) 2n + 2 4, 6, 8, 10, 12, ... 22 d) 7n 7, 14, 21, 28, 35, ... 70 b) 3n + 1 4, 7, 10, 13, 16, ... 31 e) 3n - 1 2, 5, 8, 11, 14, ... 29 c) n + 3 4, 5, 6, 7, 9, 11.....21 a) 2n + 2 4, 6, 8, 10, 12, ... 22 d) 7n 7, 14, 21, 28, 35, ... 70 b) 3n + 1 4, 7, 10, 13, 16, ... 31 e) 3n - 1 2, 5, 8, 11, 14, ... 29 c) n + 3 4, 5, 6, 7, 9, 11.....21 a) 2n + 2 4, 6, 8, 10, 12, ... 22 d) 7n 7, 14, 21, 28, 35, ... 70 b) 3n + 1 4, 7, 10, 13, 16, ... 31 e) 3n - 1 2, 5, 8, 11, 14, ... 29 c) n + 3 4, 5, 6, 7, 9, 11.....21 a) 2n + 2 4, 6, 8, 10, 12, ... 22 d) 7n 7, 14, 21, 28, 35, ... 70 b) 3n + 1 4, 7, 10, 13, 16, ... 31 e) 3n - 1 2, 5, 8, 11, 14, ... 29 c) n + 3 4, 5, 6, 7, 9, 11.....21 a) 2n + 2 4, 6, 8, 10, 12, ... 22 d) 7n 7, 14, 21, 28, 35, ... 70 b) 3n + 1 4, 7, 10, 13, 16, ... 31 e) 3n - 1 2, 5, 8, 11, 14, ... 29 c) n + 3 4, 5, 6, 7, 9, 11.....21 a) 2n + 2 4, 6, 8, 10, 12, ... 22 d) 7n 7, 14, 21, 28, 35, ... 70 b) 3n + 1 4, 7, 10, 13, 16, ... 31 e) 3n - 1 2, 5, 8, 11, 14, ... 29 c) n + 3 4, 5, 6, 7, 9, 11.....21 a) 2n + 2 4, 6, 8, 10, 12, ... 22 d) 7n 7, 14, 21, 28, 35, ... 70 b) 3n + 1 4, 7, 10, 13, 16, ... 31 e) 3n - 1 2, 5, 8, 11, 14, ... 29 c) n + 3 4, 5, 6, 7, 9, 11.....21 a) 2n + 2 4, 6, 8, 10, 12, ... 31 e) 3n - 1 2, 5, 8, 11, 14, ... 29 c) n + 3 4, 5, 6, 7, 9, 11.....21 a) 2n + 2 4, 6, 8, 10, 12, ... 31 e) 3n - 1 2, 5, 8, 11, 14, ... 31 e) 3n - 1 2, 5, 8, 11, 14, ... 31 e) 3n - 1 2, 5, 8, 11, 14, ... 31 e) 3n - 1 2, 5, 8, 11, 14, ... 31 e) 3n - 1 2, 5, 8, 11, 14, ... 31 e) 3n - 1 2, 5, 8, 11, 14, ... 31 e) 3n - 1 2, 5, 8, 11, 14, ... 31 e) 3n - 1 2, 5, 8, 11, 14, ... 31 e) 3n - 1 2, 5, 8, 11, 14, ... 31 e) 3n - 1 2, 5, 8, 11, 14, ... 31 e) 3n - 1 2, 5, 8, 11, 14, ... 31 e) 3n - 1 2, 5, 8, 11, 14, ... 31 e) 3n - 1 2, 5, 8, 11, 14, ... 31 e) 3n - 1 2, 5, 8, 11, 14, ... 31 e) 3n - 1 2, 5, 8, 11, 14, ... 31 e) 3n .. 13 f) 7n - 3 4, 11, 18, 25, 32, .. 67 2. Find the nth term of the following sequences: 0 a) 5, 10, 15, 20... 5n 5 5 + 26 d) 22, 18, 14, 10... -4n + 26 5 - 4 - 4 + 2 b) 5, 8, 11, 14... 3n + 2 - 9 e) -3, 3, 9, 15... -6 c) 1, 8, 15, 22... 7n - 6 + 9 f) 4, -1, -6, -11... -5n + 9 3 3 3 7 7 7 6n - 9 6 6 6 - 5 - 5 - 5 3. Here are some patterns made from sticks. Pattern 1 Pattern 2 Pattern 3 a) Draw pattern 4 in the space, below.. +1 b) How many sticks are used in (i) pattern 10 51 sticks (ii) pattern 20 101 sticks (iii) pattern 20 101 sticks (iii) pattern 50 251 sticks Pat 4 Pat 5 Pat 6 6 11 16 21 26 31 5 5 5 5 nth term is 5n + 1 c) Find an expression, in terms of n, for the number of sticks in pattern number n. 5n + 1 d) Which pattern 50 251 sticks Pat 4 Pat 5 Pat 6 6 11 16 21 26 31 5 5 5 5 nth term is 5n + 1 c) Find an expression, in terms of n, for the number of sticks in pattern number n. 5n + 1 d) Which pattern number can be made using 301 sticks? Pattern 60 Page 104 © Mathswatch Drawing Straight Line Graphs Clip 113 y x -1 0 1 2 3 4 y -5 -3 -1 1 3 5 y = 2x - 3 4 y = 2 - 3 2 c) Use your graph to work out the value of y when x = 2.5 y = 2 1 d) Use your graph to work out the value of x when $y = 4.5 x = 3.75 O 1 - 1 \times -1 \times x 2 3 4 2$) a) Complete the table of values for $y = 2 - x \times -5 3$) a) Complete the table of values for $y = \frac{1}{2}x - 1$ b) Draw the graph of y = \frac{1}{2}x - 1 b) $1 y 2 y = \frac{1}{2}x - 11 - 10 x 12 3 4 - 1 - 2 c$) Use your graph to find the value of y when x = 3.5 x = 0.75 Page 105 © Mathswatch 1) Finding the Equations of lines A, B and C on the axes below y A 8 B C 7 Line A: y = 2x + 1 6 Line B: y = $\frac{1}{2}x + 45$ Line C: y = x + 84 or Line C: y = x 8 Find the equations of lines A, B and C on the axes below y B A C 6 5 Line A: y = 2x - 24 Line B: $y = -\frac{1}{2}x + 43$ Line C: y = -x 21 - 6 - 5 - 4 - 3 - 2 - 1 O x 1 2 3 4 5 6 -1 -2 -3 -4 -5 -6 Page 106 © Mathswatch 1) Solving Simultaneous Equations of lines A, B and C on the axes below, the graphs of y = x + 2 and y = 6 - x have been drawn. Use the graphs to solve the simultaneous equations y = x + 2 and y = 6 - x x = 2 and y = 4 y y = x + 2 87 y = 6 - x x = 2 and y = 7 - x x = 2 and y = 5 y 87 y = 2x + 1 y = 7 - x 654321 x O 2) 1 2 3 4 5 6 7 8 On the axes below draw the graphs to solve the simultaneous equations y = 2x + 1 and y = 7 - x x = 2 and y = 5 y 87 y = 2x + 1 y = 7 - x C = 2 and y = 5 y 87 y = 2x + 1 y = 7 - x C = 2 and y = 5 y 87 y = 2x + 1 y = 7 - x C = 2 and y = 5 y 87 y = 2x + 1 y = 7 - x C = 2 and y = 5 y 87 y = 2x + 1 y = 7 - x C = 2y = 4x = -0.85 or x = 2.33 a) Complete the table of values of x from -2 to 3 y 10 × × y = 2.5 (i) Write down the graph of $y = x^2 - 2x x - 2 - 10 1 2 3 y 8 3 0 - 10 3 b$) On the graph of $y = x^2 - 2x x - 2 - 15 0 \times x \times 1 \times 2 x 3 - 5 c$) (i) On the same axes draw the straight line y = 2.5 (ii) Write down the values of x for which $x^2 - 2x = 2.5 x = -0.89$ or x = 2.9 Page 108 © Mathswatch Real Life Graphs Clip 117 1) Sarah travelled 20 km from home to her friend's house for some time before returning home. Here is the travel graph for part of Sarah's journey. 25 20 Distance 15 from home (km) 10 5 0 1000 1010 1020 1030 1040 1050 1100 1110 1120 1130 1140 1150 1200 Time of day a) At what time did Sarah leave home? 10 10 b) How far was Sarah from home at 10 30? 13.5 km Sarah left her friend's house at 11 10 to return home. c) Work out the time in minutes Sarah spent at her friend's house at 11 10 to return home. c) Work out the time in minutes Sarah spent at her friend's house at 11 10 to return home. c) Work out the time in minutes Sarah spent at her friend's house at 11 10 to return home. c) Work out the time in minutes Sarah spent at her friend's house at 11 50 d) Complete the travel graph. e) Work out Sarah spent at her friend's house at 11 10 to return home. c) Work out the time in minutes Sarah spent at her friend's house at 11 10 to return home. c) Work out the time in minutes Sarah spent at her friend's house at 10 30? 13.5 km Sarah spent at her friend's house at 11 10 to return home. c) Work out the time in minutes Sarah spent at her friend's house at 11 10 to return home. c) Work out the time in minutes Sarah spent at her friend's house at 11 10 to return home. c) Work out the time in minutes Sarah spent at her friend's house at 11 10 to return home. c) Work out the time in minutes Sarah spent at her friend's house at 11 10 to return home. c) Work out the time in minutes Sarah spent at her friend's house at 11 10 to return home. c) Work out the time in minutes Sarah spent at her friend's house at 11 10 to return home. c) Work out the time in minutes Sarah spent at her friend's house at 11 10 to return home. c) Work out the time in minutes Sarah spent at her friend's house at 11 10 to return home. c) Work out the time in minutes Sarah spent at 11 50 d) Complete the travel spent at 10 to return home. c) Work out the time in minutes Sarah spent at 10 to return home. c) Work out the time in minutes Sarah spent at 10 to return home. c) Work out the time in minutes Sarah spent at 10 to return home. c) Work out the time in minutes Sarah spent at 10 to return home. c) Work out the time in minutes Sarah spent at 10 to return home. c) Work out the time in minutes Sarah spent at 11 average speed on her journey from her friend's house. Give your answer in kilometres per hour. 30km/h f) Work out Sarah's average speed on her journey home from her friend's house. Give your answer in kilometres per hour. 30km/h f) Work out Sarah's average speed on her journey from her friend's house. answer to 1 decimal place. 4) Longest side A Below is a picture of a doorway. 2.2m Find the size of the diagonal of the doorway. Cive your answer to 1 decimal place. 4) The size of the diagonal of the doorway. Cive your answer to 1 decimal place. 4) The size of the diagonal of the doorway. Cive your answer to 1 decimal place. 4) The size of the diagonal of the
doorway. Cive your answer to 1 decimal place. 4) The size of the diagonal of the doorway. Cive your answer to 1 decimal place is a picture of a doorway. Cive your answer to 1 decimal place is a picture of a doorway. Cive your answer to 1 decimal place is a picture of a doorway. Cive your answer to 1 decimal place is a picture of a doorway. Cive your answer to 1 decimal place is a picture of a doorway. Cive your answer to 1 decimal place is a picture of a doorway. Cive your answer to 1 decimal place is a picture of a doorway. Cive your answer to 1 decimal place is a picture of a doorway. Cive your answer to 1 decimal place is a picture of a doorway. Cive your answer to 1 decimal place is a picture of a doorway. Cive your answer to 1 decimal place is a picture of a doorway. Cive your answer to 1 decimal place is a picture of a doorway. Cive your answer to 1 decimal place is a picture of a doorway. Cive your answer to 1 decimal place is a picture of a doorway. Cive your answer to 1 decimal place is a picture of a doorway. Cive your answer to 1 decimal place is a picture of a doorway. Cive your answer to 1 decimal place is a picture of a doorway. Cive your answer to 1 decimal place is a picture of a doorway. Cive your answer to 1 do place. 4.8cm Q P B to C to D 60m + 50m = 110m 60m 7.6cm D Shorter side 7.62 = 57.764.82 = 23.0434.72 R Find the length of side SU 18.2cm Give your answer to 1 decimal place. 23cm T S 14cm 50m C B to D by 32m From B to C to D or straight across the field from B to D. A B 6) Fiona keeps her pencils in a cylindrical beaker as shown below. The beaker has a diameter of 8cm and a height of 17cm. Will a pencil of length 19cm fit in the beaker without poking out of the top? No. The All workings must be shown. diagonal is only 18.8cm. Longest side U Shorter side 23 2 = 529 142 = 196 333 333 = 18.2 172 = 289 82 = 64 353 17cm 353 = 18.79 8cm Page 110 © Mathswatch 1) Pythagoras - Line on a Graph Clip 119 Points P and Q have coordinates (1, 4) and (5, 2). Calculate the shortest distance between P and O. Give your answer correct to 1 decimal place. $4.5 \times 642 = 1622 = 420543P20 = 4.5224O1 \times O2)$ and (3, -2). Calculate the shortest distance between A and B. Give your answer correct to 1 decimal place. $4.5 \times 642 = 1622 = 420543P20 = 4.5224O1 \times O2)$ 8.6 2 1 5 -5 -4 -3 -2 -1 O x 1 2 3 4 5 -1 7 -2 B -3 -4 -5 Page 111 © Mathswatch 1) Coordinates in 3 Dimensions Clip 120 A cuboid lies on the coordinates (5, 3, 4) 5 T O R 4 x S z The point Q has coordinates (5, 3, 4) 2) a) Write down the coordinates of the point T (5, 0, 0) c) Write down Surface area = 14.22 m2 3.91 m2 1.3 6 m2 plus the sides you can't see 1.84 m2 0.8 m 1.7 m 2.3 m 3) A water tank measures 2 m by 5 m by 6 m. It has no top. The outside of the tank, including the base, has to be painted. 2m Calculate the surface area which will be painted. Surface area which will be painted. Surface area = 40 m2 4m 4) 3m A water tank measures 2 m by 5 m by 6 m. It has no top. The outside of the tank, including the base, has to be painted. A litre of paint will cover an area of 4.3 m². Paint is sold in 5 litre tins and each tin costs £13.50. Surface area to be painted: $5 \times 2 = 10 \text{ m}^2$ How much will it cost to paint the tank? £54 $5 \times 2 = 10 \text{ m}^2$ How much will it cost to paint the tank? $\pm 54 \times 2 = 10 \text{ m}^2$ How much will it cost to paint the tank? $6 \times 5 = 30 \text{ m2} 2\text{m}$ Litres of paint needed: $74 \div 4.3 = 17.2$ litres 3 tins is only 15 litres so 4 tins must be bought. $6\text{m} 4 \times £13.50 = £54 5\text{m}$ Page 113 © Mathswatch 1) Volume of a Prism Clip 122 The diagram shows a cuboid. Work out the volume of the cuboid. $V = 22500 \text{ cm} 3\ 12345678901234\ 12345678$ 12345678901234 123456 123456789012 123 with a radius of 3.8 cm and a thickness of 2.5 cm. 2.5 cm. 2.5 cm. 2.5 cm. 2.5 cm. 2.5 cm. 2.5 cm a width of 2 cm 80 \div 5 \div 2 Work out the height of the cuboid. H = 8 cm a width of 2 cm 80 \div 5 \div 2 Work out the height of the cuboid. H = 8 cm a width of 2 cm 80 \div 5 \div 2 Work out the height of the cuboid. H = 8 cm a width of 2 cm 80 \div 5 \div 2 Work out the height of the cuboid. H = 8 cm a width of 2 cm 80 \div 5 \div 2 Work out the height of the cuboid. H = 8 cm a width of 2 cm 80 \div 5 \div 2 Work out the height of the cuboid. H = 8 cm a width of 2 cm
80 \div 5 \div 2 Work out the height of the cuboid. H = 8 cm a width of 2 cm 80 \div 5 \div 2 Work out the height of the cuboid. H = 8 cm a width of 2 cm 80 \div 5 \div 2 Work out the height of the cuboid. H = 8 cm a width of 2 cm 80 \div 5 \div 2 Work out the height of the cuboid. H = 8 cm a width of 2 cm 80 \div 5 \div 2 Work out the height of the cuboid. H = 8 cm a width of 2 cm 80 \div 5 \div 2 Work out the height of the cuboid. H = 8 cm a width of 2 cm 80 \div 5 \div 2 Work out the height of the cuboid. H = 8 cm a width of 2 cm 80 \div 5 \div 2 Work out the height of the cuboid. H = 8 cm a width of 2 cm 80 \div 5 \div 2 Work out the height of the cuboid. H = 8 cm a width of 2 cm 80 \div 5 \div 2 Work out the height of the cuboid. H = 8 cm a width of 2 cm 80 \div 5 \div 2 Work out the height of the cuboid. 1600000 cm3 5) V = 10000 cm3 Work out the maximum number of boxes which can fit in the carton. 160 boxes will fit. 50 cm Box 10 cm 20 cm 20 cm Carton 80 cm A P 21 cm So 20 cm Carton 80 cm 1600000 \div 10000 \div 100000 \div 10000 \div 100000 \div 10000 \div 10000 \div 100 = 8 - 69 cm 96 cm S612 V V 3 cm T R U U 7cm 3) BE is parallel to CD. ABC and AED are straight lines. AB = 4 cm, BC = 6 cm, AE = 5 shows some expressions. The letters a, b, c and d represent lengths. and 3 are numbers that have no dimensions. Underneath each one write L if it is a narea V if it is a length A if it is an area V if it is a volume N if it is a narea V if it is a volume N if it is a volume N if it is a volume N if it is a length A if it is a narea V if it is a volume N if it is a a, b, c and d represent lengths. and 2 are numbers that have no dimensions. Underneath each one write L if it is a length A if it is an area V if it is a length A if it is an area V if it is a length A if it is an area V if it is a length A if it is an area V if it is a length A if it is an area V if it is a length A if it is an area V if it is a length A if it is a length A if it is an area V if it is a length A if it is a lengt down the least possible mass of the necklace. 122.5 g b) Write down the greatest possible mass of the necklace. 123.5 g 2. Each of these measurements was made correct to one decimal place. Write the maximum and minimum possible measurements was made correct to one decimal place. max: 12.55 L min: 12.45 L d) 25.0 km/h max: 25.05 km/h e) 10.3 s max: 10.35 s min: 10.25 s f) 36.1 m max: 36.15 m min: 36.05 m g) 136.7 m/s max: 136.75 m/s min: 136.65 m/s h) 0.1 g max: 0.15 g min: 0.05 g 3. Each side of a regular octagon has a length of 20.6 cm, correct to the nearest millimetre. a) Write down the least possible length of each side. 20.55 cm b) Write down the greatest possible length 12 cm, measured to the nearest millimetre. Explain why it might not be possible for her to fit the pen in the pencil case. 12 cm to the nearest cm has a maximum possible length of 12.25 cm. 12.3 cm to the nearest mm has a minimum possible length of 12.25 cm. 5. A square has sides of length 7 cm, correct to the nearest centimetre. a) Calculate the lower bound for the square. 26 cm b) Calculate the upper bound for the square. as is 7.5 cm min is 6.5 cm 7.5×7.5 max is 7.5 cm 7.5×7.5 max is $7.5 \times$ Measures Jane runs 200 metres in 21.4 seconds. S = 9.3 m/s D T S = 200 21.4 A car travels at a steady speed and takes five hours to travel 310 miles. S = D T Work out the average speed of the car in miles per hour. S = 62 mph S = 310 5 A plane flies 1440 miles at a speed of 240 mph. T = D S T = 6 hours T = 1440 240 A marathon runner runs at 7.6 mph for three and a half hours. D = 26.6 miles 5) 6) A car takes 10 minutes to travel 2.4 miles. S = Find its speed in mph. S = 96 mph D T S = 24 0.25 A cyclist takes 10 minutes to travel 2.4 miles. S = Find its speed in mph. S = 96 mph D T S = 24 0.25 A cyclist takes 10 minutes to travel 2.4 miles. S = Find its speed in mph. S = 96 mph D T S = 24 0.25 A cyclist takes 10 minutes to travel 2.4 miles. S = Find its speed in mph. S = 96 mph D T S = 24 0.25 A cyclist takes 10 minutes to travel 2.4 miles. S = Find its speed in mph. S = 96 mph D T S = 24 0.25 A cyclist takes 10 minutes to travel 2.4 miles. S = Find its speed in mph. S = 96 mph D T S = 24 0.25 A cyclist takes 10 minutes to travel 2.4 miles. S = Find its speed in mph. S = 96 mph D T S = 24 0.25 A cyclist takes 10 minutes to travel 2.4 miles. S = Find its speed in mph. S = 96 mph D T S = 24 0.25 A cyclist takes 10 minutes to travel 2.4 miles. S = Find its speed in mph. S = 96 mph D T S = 24 0.25 A cyclist takes 10 minutes to travel 2.4 miles. S = Find its speed in mph. S = 96 mph D T S = 24 0.25 A cyclist takes 10 minutes to travel 2.4 miles. S = Find its speed in mph. S = 96 mph D T S = 24 0.25 A cyclist takes 10 minutes to travel 2.4 miles. S = Find its speed in mph. S = 96 mph D T S = 24 0.25 A cyclist takes 10 minutes to travel 2.4 miles. S = Find its speed in mph. S = 96 mph D T S = 24 0.25 A cyclist takes 10 minutes to travel 2.4 miles. S = Find its speed in mph. S = 96 mph D T S = 24 0.25 A cyclist takes 10 minutes to travel 2.4 miles. S = Find its speed in mph. S = 96 mph S = 96 mph D T S = 24 0.25 mph S =miles. Calculate the average speed in mph. S = 14.4 mph 7) An ice hockey puck has a volume of 113 cm3. It is made out of rubber with a density of 1.5 grams per cm3. 8) 9) 10) $D = 7.6 \times 3.5$ D S = T S = 2.4. 0.16 15 mins is 0.25 of an hour $M = D \times V$ Work out the mass of the ice hockey puck. M = 169.5 g $M = 1.5 \times 113$ An apple has a mass of 160 g and a volume of 100 cm3. D = 1.6 g/cm3 M V D = 1.6 g/cm3 g/cm3. What is the volume of the bar of chocolate? V = 200 cm3 V = M D D = 1800 9 Page 118 © Mathswatch 1) Bisect line AB b) Bisect line AB b) Bisect line AC d) Place your compasses, bisect line AB a 2) Using ruler and compasses a) Bisect line AB b) Bisect line AB vour pencil is touching vertex A. Draw a circle using this radius. C B A * If your three lines don't cross at a point then you have a mistake somewhere or just haven't been accurate enough. Page 119 © Mathswatch 1) Clip 128 Drawing a Perpendicular to a Line Use ruler and compasses to construct the perpendicular to the line segment AB that passes through the point P. You must show all construction lines. B P A 2) Use ruler and compasses to construct the perpendicular to the line segment CD that passes through the point P. You must show all construction lines. C P D Page 120 © Mathswatch 1) Bisecting an Angle Clip 129 Using ruler and compasses, bisect angle ABC. A B 2) C The diagram below shows the plan of a park. The border of the park is shown by the quadrilateral RSUV S T U V R There are two paths in the park so that he is always the same distance from both paths. Using ruler and compasses show exactly where the man can walk. Page 121 © Mathswatch Loci -centimetre from the line AB. 2) Two radio transmitters, A and B, are situated as below. B A 12345678901
12345678901 123456789001 12345678901 12345678901 123456789 12345678901 12345678901 12345678901 Transmitter A broadcasts signals which can be heard up to 3 km from A. Transmitter B broadcasts signals which can be heard up to 6 km from B. Shade in the area in which radio signals can be heard up to 6 km from B. Shade in the area in which radio signals can be heard up to 7 km from A. Transmitter B broadcasts signals which can be heard up to 6 km from B. Shade in the area in which radio signals can be heard up to 6 km from B. Shade in the area in which radio signals which can be heard up to 6 km from B. Shade in the area in which radio signals which can be heard up to 7 km from B. Shade in the area in which radio signals which can be heard up to 7 km from A. Transmitter B broadcasts signals which can be heard up to 7 km from B. Shade in the area in which radio signals which can be heard up to 8 km from A. Transmitter B broadcasts signals which can be heard up to 8 km from B. Shade in the area in which radio signals which can be heard up to 8 km from A. Transmitter B broadcasts signals which can be heard up to 8 km from B. Shade in the area in which radio signals which can be heard up to 8 km from A. Transmitter B broadcasts signals which can be heard up to 8 km from B. Shade in the area in which radio signals which can be heard up to 8 km from A. Transmitter B broadcasts signals which can be heard up to 8 km from A. Transmitter B broadcasts signals which can be heard up to 8 km from A. Transmitter B broadcasts signals which can be heard up to 8 km from A. Transmitter B broadcasts signals which can be heard up to 8 km from A. Transmitter B broadcasts signals which can be heard up to 8 km from A. Transmitter B broadcasts signals which can be heard up to 8 km from A. Transmitter B broadcasts signals which can be heard up to 8 km from A. Transmitter B broadcasts signals which can be heard up to 8 km from A. Transmitter B broadcasts signals which can be heard up to 8 km from A. Transmitter B broadcasts signals which can be heard up to 8 km from A. Transmitter B broadcasts signal 1) 12345678900123456789000000000000000000000000000 12345678901234567890123456789012345678901234567890121 × C Point C is equidistant from point A and B. Sarah rolls a ball from point A and point B. a) On the diagram above draw accurately the path that the ball will take. b) On the diagram shade the region that contains all the points that are no more than 3cm from point B. 2) The map shows part of a lake. In a competition for radio-controlled ducks, participants have to steer their ducks othat: its path is always the same distance from A as from B a) On the map, draw the path the ducks should take. Scale: 1 cm represents 10 m × B C × × A E
123456789012341234567890000000000000001234567890123456789012345678901234567890121 × D There is a practice region for competitors. This is the part of the lake which is less than 30 m from point E. b) Shade the practice region on the map. Page 123 © Mathswatch 1) Bearings Clip 131 School B is due east of school A. C is another school. The bearing of C from A is 065°. The bearing of C from B another school B is due east of school B is due east of school A. C is another school. The bearing of C from A is 065°. is 313°. Complete the scale drawing below. Mark with a cross the position of C. N C 65° 47° A B 313° 2) In the diagram, point A marks the position of Middlewarch is to be marked on the diagram, point A marks the position of Middlewarch is to be marked on the diagram. A B N 40° A 3) 320° Work out the bearing of a) B from P 222° b) P from A 244° N A 64° 180° + 64° 64 138 P158° 64° + 158° B Diagram NOT accurately drawn. Page 124 © Mathswatch Clip 132 Experimental Probabilities 1) Ahmad does a statistical experiment. He throws a dice 600 times. He scores one, 200 times. Is the dice fair? Explain your answer Two possible answers: No, you would expect to score 1 about 100 times. Yes, although you would expect 1 about 100 times, you could still get it 200 times. 2) Chris has a biased coin. The probability that the biased coin will land on a tail is 0.3 Chris is going to flip the coin 150 times. Work out an estimate for the number of times the coin will land on a tail. $0.3 \times 150 = 453$) On a biased dice, the probability of getting a six is 45 times 2 . 3 The dice is rolled 300 times. Work out an estimate for the number of times the dice will land on a six. 200 times 2 × 300 = 200 3 4) 5) On a biased dice, the probability of getting a six is 45 times 2 . 3 The dice is rolled 300 times. Work out an estimate for the number of times the dice will land on a six. number of times the dice will land on a three. 0.5 × 350 = 175 175 times Jenny throws a biased dice 100 times. The table shows her results. Score Frequency 1 15 2 17 3 10 4 24 5 18 6 16 a) She throws the dice once more. Find an estimate for the probability that she will get a four. 24 or 0.24 100 b) If the dice is rolled 250 times, how many times would you expect to get a five? 18 × 250 = 45 100 45 times Page 125 © Mathswatch 1) Averages From a Table Clip 133 The number of pens in each pupil's pencil case in a classroom has been counted. The results are displayed in a table. Number of pens in each pupil's pencil case in a classroom has been counted. The results are displayed in a table. out the total number of pens in a pencil case. 2 pens 5 2 pens 6 Work out the mean number of pens in a pencil case. 2) Thomas is analysing the local football team. He records the number of goals scored in each football match in the past twelve months. Thomas said that the mode is 7 Thomas is wrong. Thomas is wrong. Thomas ave the highest a) Explain why. frequency 0 7 0 × 7 0 1 5 1 × 5 5 2 3 2 × 3 6 3 6 3×6 18 4 2 4×2 8 5 1 5×1 5 6 1 6×1 6 Total 25 Tina recorded how long, in minutes, she watched TV for each day during a month. Time (t in minutes) Frequency a) Find the class interval in which the median lies. 30 < t < 45 b) Work out an estimate for the median lies. 30 < t < 45 b) Work out an estimate for the median lies. 30 < t < 45 b) Work out an estimate for the median lies. 30 < t < 45 b) Work out an estimate for the median lies. 30 < t < 45 b) Work out an estimate for the median lies. 30 < t < 45 b) Work out an estimate for the median lies. 30 < t < 45 b) Work out an estimate for the median lies. 30 < t < 45 b) Work out an estimate for the median lies. 30 < t < 45 b) Work out an estimate for the median lies. 30 < t < 45 b) Work out an estimate for the median lies. 30 < t < 45 b) Work out an estimate for the median lies. 30 < t < 45 b) Work out an estimate for the median lies. 30 < t < 45 b) Work out an estimate for the median lies. 30 < t < 45 b) Work out an estimate for the median lies. 30 < t < 45 b) Work out an estimate for the median lies. 30 < t < 45 b) Work out an estimate for the median lies. 30 < t < 45 b) Work out an estimate for the median lies. 30 < t < 45 b) Work out an estimate for the median lies. 30 < t < 45 b) Work out an estimate for the median lies. 30 < t < 45 b) Work out an estimate for the median lies. 30 < t < 45 b) Work out an estimate for the median lies. 30 < t < 45 b) Work out an estimate for the median lies. 30 < t < 45 b) Work out an estimate for the median lies. 30 < t < 45 b) Work out an estimate for the median lies. 30 < t < 45 b) Work out an estimate for the median lies. 30 < t < 45 b) Work out an estimate for the median lies. 30 < t < 45 b) Work out an estimate for the median lies. 30 < t < 45 b) Work out an estimate for the median lies. 30 < t < 45 b) Work out an estimate for the median lies. 30 < t < 45 b) Work out an estimate for the median lies. 30 < t < 45 b) Work out an estimate for the median lies. 30 < t < 45 b) Work out an estimate for the median lies. 30 < t < nearest minute. 37 minutes 1140 \div 31 48 MP MP × F 10 < t < 20 5 15 75 20 < t < 30 9 25 225 30 < t < 45 8 37.5 300 45 < t < 60 6 52.5 315 60 < t < 90 3 75 225 Total 31 1140 Page 126 © Mathswatch 1) Questionnaire sclip 134 A survey into how people communicate with each other is carried out. A questionnaire is designed and two of the questions used are shown below. The questions are not suitable. For each question, write down a reason why. a) Do you prefer to communicate with your friend by phone (voice call) or by text message? Yes No This is not a question you can answer 'yes' or 'no' to. Reason . .. b) How many text messages do you send? 1 2 3 4 Response boxes need to include '0' and 'more than 4'. Reason .. . Question needs a time frame eg per day, per week. .. 2) A restaurant owner has made some changes. He wants to find out what customers think of these changes in the restaurant?"
Excellent Very good Good a) Write down what is wrong with this question. There is no negative or neutral response box. This is another question on the questionnaire. "How often do you come to the restaurant?" Very often Not often b) i) Write down one thing that is wrong with this question. Question needs a time frame eg per week, per month. Response boxes need to be more specific eg once a week, twice a week. ii)

 $4.3 \times 104\ 1.1 \times 108\ b$) (7.5 × 105) × (1.9 × 10-2) 4) 5) 1.4 × 104\ 5\ c) 9.435 × 103 3.28 × 102 5.98 × 108 6.14 × 10-2 9.7 × 109\ d) Work out the following, giving your answer in standard form correct to 3 significant figures. a) 5.76 × 107 + 3.89 × 109 7.18 × 10-2 5.50 × 1010\ c) 3 × 108 × 2 × 107 3 × 108 + 2 × 107 b) 7.2 × 10-2 - 5.4 × 10-2 - 5 $19.25 \times 10^{-7} - 5.06 \times 105$ d) $3 \times 3.2 \times 1012 \times 1.5 \times 1012$ $3.2 \times 1012 - 1.5 \times 1012$ $4 \times 10^{-7} - 5.06 \times 1012$ $4 \times 10^{-7} - 5.06 \times 105$ d) $3 \times 3.2 \times 1012 \times 1.5 \times 1012$ $4 \times 10^{-7} - 5.06 \times 1012$ $4 \times 10^{-7} - 5.06 \times 105$ d) $3 \times 3.2 \times 1012 \times 1.5 \times 1012$ $4 \times 10^{-7} - 5.06 \times 10^{-7$ microseconds. b) How many of these calculations can the computer do in 1 second? Give your answer in standard form, correct to 3 significant figures. 6) 1.88×105 1.4×105 b) Calculate the weight, in grams, of one tomato seed. Give your answer in standard form, correct to 3 significant figures. $2.9 \times 10-61 \div (3.4 \times 105)$ Page 128 © Mathswatch 1) Clip 136 Percentage Increase and Decrease A car dealer is comparing his sales over the past two years. In 2006, he sold 175 cars. In 2007, he sold 175 cars. In 2007, he sold 196 cars. Work out the percentage increase in the number of pupils attending MathsWatch College was 1352. In September 2006, the number of pupils attending MathsWatch College was 1014. Work out the percentage decrease in the number of pupils attending MathsWatch College was 1352. In September 2006, the number of pupils attending MathsWatch College was 1352. In September 2006, the number of pupils attending MathsWatch College was 1014. Work out the percentage decrease in the number of pupils attending MathsWatch College was 1014. percentage reduction? 10% 3.25 × 100 = 10 32.50 - 29.25 = 3.25 32.50 4) Olivia opened an account with £750 at the MathsWatch Bank. After one year, the bank paid her interest. She then had £795 in her account. Work out, as a percentage, MathsWatch Bank. After one year, the bank paid her interest. She then had £795 in her account. Work out, as a percentage of the mathsWatch Bank. After one year, the bank paid her interest. She then had £795 in her account. Work out, as a percentage of the mathsWatch Bank. After one year, the bank paid her interest. sells it two years later for £300 000. What is his percentage profit? Give your answer to 2 significant figures. 11% 300 000 - 270 000 = 30 000 & 100 = 11 270 000 Shelley bought for £15, sold for £20 33% profit b) DVD recorder bought for £42, sold for £60.90 45% profit c) Gold necklace bought for £120, sold for £78.30 13% loss d) A DVD collection bought for £120, sold for £12 Calculate the amount in his account after 2 years. $\pounds 6564.70\ 6000 \times 1.0462 = 6564.70\ 2)$ Sarah puts $\pounds 8600\ \times\ 1.0384 = 9983.62\ Mary\ deposits\ \pounds 10000\ in\ an\ account\ which\ pays\ 5.6\%\ compound\ interest\ per\ year$ How much will Mary have in her account after 5 years? £13131.66 10000 \times 1.0565 = 13131.66 3) 4) Susan places £7900 in an account which pays 2.4% compound interest does she earn in 3 years? £582.56 7900 \times 1.0243 = 8482.56 £8482.56 - £7900 = £582.56 5) Harry puts money into an account which pays 6% compound interest per year. If he puts £23000 in the account for 5 years how much interest will he earn altogether? $\pm 7779.19 \pm 30779.19 \pm 30$ rate of depreciation of a particular brand of computer is 65% per year. If the cost of the computer when new is £650 how much is it worth after 2 years? £79.63 650 × 0.764 more as a condhand car. The annual rate of depreciation of the car is 24% How much is it worth after 2 years? £79.63 8) Sharon pays £3500 for a second hand car. The annual rate of depreciation of the car is 24% How much is it worth after 2 years? = 1167.68 9) 10) £1167.68 Dave places £17000 in an account which pays 4% compound interest per year. How many years will it take before he has £19122.68 A new motorbike costs £8900. The annual rate of depreciation is 18% per year. After how many years will it be worth £2705.66? 8900 \times 0.826 = 2705.66 6 years Page 130 © Mathswatch 1) Clip 138 In a sale, normal price of a shirt is £26 Calculate the normal price of a shirt is £26 Calculate the normal price of a shirt is £26 Calculate the normal price of the shirt. (26 ÷ 80) × 100 = 32.5 2) £32.50 A car dealer offers a discount of 15% off the normal price of a car for cash. Emma pays £6120 cash for a car. Calculate the normal price of the car $(6120 \div 85) \times 100 = 7200 3)$ Reverse Percentages £7200 In a sale, normal prices are reduced by 13%. The sale price of a DVD recorder. $(108.75 \div 87) \times 100 = 125 4) 5)$ A salesman gets a basic wage of £160 per week plus a commision of 30% of the sales he makes that week. In one week his total wage was £640 Work out the value of the sales he made that week. 640 - 160 = 480 (480 ÷ 30) × 100 = 1600 Jason opened an account at MathsWatch Bank. MathsWatch Bank. MathsWatch Bank. MathsWatch Bank. MathsWatch Bank. MathsWatch Bank with which Jason opened an account at MathsWatch Bank. opened his account (1976 ÷ 104) × 100 = 1900 6) £1900 Jonathan's weekly pay last year was £768". Tess is wrong. a) Explain why Tess has calculated 20% of £960, and subtracted it. b) Work out Jonathan's weekly pay last year. (960 ÷ $120) \times 100 = 8007$ f 122.40 Work out the price of a rail season tickets to London increased by 4%. a) The price of a rail season ticket from Oxford to London was $122.40 + 4 \times 100 = 3060$ b) After the increase, the price of a rail season ticket from Newport to London was 1232.80 Work out the price before this increase. £2820 (2932.80 ÷ 104) × 100 = 2820 Page 131 (a) Hat swatch Four Rules of Fractions Clip 139 Work out 11) 2 3 × 3 4 1 2 21) 2 3 × 5 7 4 12 12) 115 - 126112 22) 53 - 2423 + 58314013) 24 ÷ 4) 3 1 + 461112 14) 5) 3 5 - 141206) 4 2 × 598457) 144 - 11238) 9 3 - 1079) 10) 13 151) 2 1 + 352) 13 + 2423 + 58314013) 24 ÷ 4) 3 1 + 461112 14) 5) 3 5 - 141206) 4 2 × 598457) 144 - 11238) 9 3 - 1079) 10) 13 151) 2 1 + 352) 13 + 2423 + 58314013) 24 ÷ 4) 3 1 + 461112 14) 5) 3 5 - 141206) 4 2 × 598457) 144 - 11238) 9 3 - 1079) 10) 13 151) 2 1 + 352) 13 + 2423 + 58314013) 24 ÷ 4) 3 1 + 461112 14) 5) 3 5 - 141206) 4 2 × 598457) 144 - 11238) 9 3 - 1079) 10) 13 151) 2 1 + 352) 13 + 2423 + 58314013) 24 ÷ 4) 3 1 + 461112 14) 5) 3 5 - 141206) 4 2 × 598457) 144 - 11238) 9 3 - 1079) 10) 13 151) 2 1 + 352) 13 + 2423 + 58314013) 24 ÷ 4) 3 1 + 461112 14) 5) 3 5 - 141206) 4 2 × 598457) 144 - 11238) 9 3 - 1079) 10) 13 151) 2 1 + 352) 13 + 2423 + 58314013) 24 ÷ 4) 3 1 + 461112 14) 5) 3 5 - 141206) 4 2 × 598457) 144 - 11238) 9 3 - 1079) 10) 13 151) 2 1 + 352) 13 + 2423 + 58314013) 24 + 461112 14) 5) 3 5 - 141206) 4 2 × 598457) 144 - 11238) 9 3 - 1079) 10) 13 151) 2 1 + 352) 13 + 2423 + 58314013) 24 + 461112 14) 5) 3 5 - 141206) 4 2 × 598457) 144 - 11238) 9 3 - 1079) 10) 13 151) 2 1 + 352) 13 + 2423 + 58314013) 24 + 461112 14) 10 + 1006 3) 2 5 3 6 35 11 2 3 2 12 1 2 4 2 3 3 35 1 6 1 3 5 3 3 4 23) 2 2 + 13 2 3 × 14 2 1 3 1 3 24) 15 + 2 7 15) 1 3 + 3 5 14 15 25) 3 4 + 112 15 16) 1 1 - (+) 2 6 1 3 26) 12 2 ÷ 5 8 20 17) 1 3 1 - (+) 5 8 17 40 27) 1 - (33 70 18) 2 3 × 32 8 28) 64 ÷ 4 12 ÷ 9 18 2 3 19) 4 1 + 7 3 19 21 29) 23 × 7 5 × 10 8 7 16 20) 33 + 2 4 30) 2 13 3 3 1 1 4 1 1 1 3 1 6 1 6 12 3 29 1 1 1 4 3 3 1 + 10 5 10 1 5 12 15 1 2 5 14 15 2 1 1 - (+) 3 5 2 15 Page 132 (a mathematic equations: a) $x^2 + 5x + 6 = 0 (x + 2)(x + 3) = 0 x = -2 \text{ or } -3 \text{ b} x^2 + 9x + 20 = 0 (x + 4)(x + 5) = 0 x = -4 \text{ or } -5 \text{ c} x^2 + x - 6 = 0 (x + 3)(x - 2) = 0 x = -3 \text{ or } 2 \text{ d} x^2 + 3 x^2 + 3$ $x^2 + 5x - 24 = 0 (x + 8)(x - 3) = 0 x = -8 \text{ or } 3 e) x^2 - 6x + 8 = 0 (x - 2)(x - 4) = 0 x = 2 \text{ or } 4 f) x^2 - 3x - 28 = 0 (x - 7)(x + 4) = 0 x = 7 \text{ or } -4 g) 2x^2 + 7x + 3 = 0 (x + 3)(3x + 1) = 0 x = -3 \text{ or } -1 2 1 3 \text{ or } 3 2 i) 3x^2 + 13x - 10 = 0 (x + 5)(3x - 2) = 0 x = -5 \text{ or } j) 3x^2 - 34x + 63 = 0 (3x - 7)(x - 9) = 0 x = 2 3 7 \text{ or } 9 3 x^2 + 13x - 10 = 0 (x + 5)(3x - 2) = 0 x = -5
\text{ or } j) 3x^2 - 34x + 63 = 0 (3x - 7)(x - 9) = 0 x = 2 3 7 \text{ or } 9 3 x^2 + 13x - 10 = 0 (x + 5)(3x - 2) = 0 x = -5 \text{ or } j) 3x^2 - 34x + 63 = 0 (3x - 7)(x - 9) = 0 x = 2 3 7 \text{ or } 9 3 x^2 + 13x - 10 = 0 (x + 5)(3x - 2) = 0 x = -5 \text{ or } j) 3x^2 - 34x + 63 = 0 (3x - 7)(x - 9) = 0 x = 2 3 7 \text{ or } 9 3 x^2 + 13x - 10 = 0 (x + 5)(3x - 2) = 0 x = -5 \text{ or } j) 3x^2 - 34x + 63 = 0 (3x - 7)(x - 9) = 0 x = -2 3 7 \text{ or } 9 3 x^2 + 13x - 10 = 0 (x + 5)(3x - 2) = 0 x = -5 \text{ or } j) 3x^2 - 34x + 63 = 0 (3x - 7)(x - 9) = 0 x = -2 3 7 \text{ or } 9 3 x^2 + 13x - 10 = 0 (x + 5)(3x - 2) = 0 x = -5 \text{ or } j) 3x^2 - 34x + 63 = 0 (3x - 7)(x - 9) = 0 x = -2 3 7 \text{ or } 9 3 x^2 + 13x - 10 = 0 (x + 5)(3x - 2) = 0 x = -5 \text{ or } j) 3x^2 - 34x + 63 = 0 (3x - 7)(x - 9) = 0 x = -2 3 7 \text{ or } 9 3 x^2 + 13x - 10 = 0 (x + 5)(3x - 2) = 0 x = -5 \text{ or } j) 3x^2 - 34x + 63 = 0 (3x - 7)(x - 9) = 0 x = -2 3 7 \text{ or } 9 3 x^2 + 13x - 10 = 0 (x + 5)(3x - 2) = 0 x = -5 \text{ or } j) 3x^2 - 34x + 63 = 0 (3x - 7)(x - 9) = 0 x = -2 3 7 \text{ or } 9 3 x^2 + 13x - 10 = 0 (x + 5)(3x - 2) = 0 x = -5 \text{ or } j) 3x^2 - 34x + 63 = 0 (3x - 7)(x - 9) = 0 x = -2 3 7 \text{ or } 9 3 x^2 + 13x - 10 = 0 (x + 5)(3x - 2) = 0 x = -5 \text{ or } j) 3x^2 - 34x + 63 = 0 (3x - 7)(x - 9) = 0 x = -2 3 7 \text{ or } 9 3 x^2 + 13x - 10 = 0 (x + 5)(3x - 2) = 0 x = -5 \text{ or } j) 3x^2 - 34x + 63 = 0 (x - 7)(x - 9) = 0 x = -2 3 7 \text{ or } 9 x^2 + 13x - 10 = 0 (x - 5)(x - 5)($ Lucy said that -1 is the only solution of x that satisfies the equation $x^2 + 2x + 1 = 0$ Was Lucy correct? Yes Show working to justify your answer $x^2 + 2x + 1 = 0$ (x + 1)(x + 1) = 0 so x = -1 3) Ben said that -5 is the only solution of x that satisfies the equation $x^2 + 2x + 1 = 0$ Was Ben correct? Yes Show working to justify your answer 2x + 10x + 25= 0 (x + 5)(x + 5) = 0 so x = -5 Page 133 (x - 1)(x + 1) 2 2 b) a 2 - 16 (x - 4)(x + 4) c y 2 = (x - y)(x + y 1) 2 3 Factorise a x 2 - 16 (x - 4)(x + 4) c y 2 - 9 (y - 3)(y + 3) e) x 2 - 16 (x - 4)(x + 4) c y 2 - 9 (y - 3)(y + 4) e) x 2 - 16 (x - 4)(x + 4) c y 2 - 9 (y - 3)(y + 4) e) x 2 - 16 (x - 4)(x + 4) (x - 4)(x + 4) e) x 2 - 16 (x - 4)(x - 4)(x25y2(2x - 5y)(2x + 5y)b) 9a 2 - b2 (3a - b)(3a + b) d) Factorise 1 2 y 9 1 1 (x y)(x + y) 3 3 f) x 2 - Simplify y - 4 5 × a) y + 2 y + 5 5(y - 2) y + 5 (y - 2)(y + 2) × y + 2 3 4x2 - 1 b) 2 x + 1 × x - 2 3(2x - 1)(2x + 1) × 2x + 1 x + 2 12 x + 8 x c) 2 9x - 4 4x 3x - 2 4x(3x + 2) (3x - 2)(3x 10ab - 8b 2 d) 4) 12 x - y2 4 11 (x - y)(x + y) 22 5 y + 5 Solve a) 4x2 - 16 = 0 (2x - 4)(2x + 4) = 0 x = 2, x = -2 (5x - 1)(5x + 1) = 0 b) 25x2 = 111 x = -17 d) 9x2 - 9 = 7 x =Solve 4x + 3y = 65x - 3y = 21x = 3 and y = -24x + 3y = 193x - 5y = 7x = 4 and y = 1 Solve Solve 3x + 5y = 132x + 3y = 84) (5) (6) (7) (8) (9) Solve x + 4y = 54x - 2y = 11x = 3 and y = -23a - 2b = 144a + 3b = 13a = 25 and y = -23a - 2b = 144a + 3b = 13a = 254 and b = -1 Solve Solve Solve Solve Solve Solve Solve Solve 5x + 4y = 5 2x + 7y = 29 10) x = 1 and y = 2 Solve 6x - 4y = 39 2x + y = 6 x = -3 and y = 5 x = 4.5 and y = equation y = 1 - 2x, y = 3x - 2 and goes through (1, 8). What is its equation? y = 3x + 4 3) A straight line passes through points (0, 7) and (2, -1). What is its equation? y = 3x + 4 3) A straight line is parallel to y = 3x - 2 and goes through (1, 8). What is its equation? y = 3x + 55) A straight line is parallel to y = 2x + 5 and goes through (5, 6). What is its equation? y = 2x - 4 B (1, 6) 6) A is the point (-1, 2). B is the point (-1, 2) C (0, -1) Page 136 [©] Mathswatch 1) Regions Clip 144 On the grid below, draw straight lines and use shading to show the region R that satisfies the inequalities x > 1 y>x +yx+1 y = x+1 x=1 8 7 6 y=5 5 4 3 2 1 O x 1 2 3 4 5 6 7 8 Page 137 [©] Mathswatch Cubic and Reciprocal Functions Clip 145 y 8 1) a) Complete this table of values for y = x3 + x - 4x 6 4x - 2 - 1012 y - 14 - 6 - 4 - 262 - 2 - 1 x O 1 x - 2 b) On the grid, draw the graph of $y = x^3 + x - 42 - 4x x c$) Use the graph to find the value of x when y = 2x = 1.75 - 6 - 8 - 10 - 12x - 14x 122) a) Complete this table of values for $y = x^3 + 2x c$) Use the graph to find the value of x when y = -6x = -1.5x x - 2 - 1012 x - 43) 1 Sketch the graph of y = 1 + x in your book. -8 x -12 Page 138 © Mathswatch Recognise the Shapes of Functions Clip 146 Match each of the functions below, with the correct sketch of its graph. $y = 3x^3 y = -2x y = 3x - 1 y = 2x y = 5x - x^3 y = -2x y = 5x - x^3 y = -2x y = 3x - 1 y = 2x y = -2x y = -$ Trigonometry Q 1) PQR is a right-angled triangle. PR = 11 cm. QR = 4.5 cm Mork out the value of x. 22.2° Give your answer correct to 1 decimal place. x° P R 11 cm A 2) AC = 14 cm. Angle ABC = 90° Angle ACB = 34° C B 3) Work out the value of x. 27.8° Give your answer correct to 1 decimal place. 4) Q PQR is a right-angled triangle. PQ = 18 cm. QR = 8.4 cm Angle PRQ = 90° 18 cm 8.4 cm x° P R A AB = 23 cm. Angle ACB = 21° Calculate the length of AC. 64.2 cm Give your answer correct to 3 significant figures. 23 cm 21° C B 5) A lighthouse, L, is 3.4 cm x° P R A AB = 23 cm. Angle ACB = 21° Calculate the length of AC. 64.2 cm Give your answer correct to 3 significant figures. 23 cm 21° C B 5) A lighthouse, L, is 3.4 cm x° P R A AB = 23 cm. Angle ACB = 21° Calculate the length of AC. 64.2 cm Give your answer correct to 3 significant figures. 23 cm 21° C B 5) A lighthouse, L, is 3.4 cm x° P R A AB = 23 cm. Angle ACB = 21° Calculate the length of AC. 64.2 cm Give your answer correct to 3 significant figures. 23 cm 21° C B 5) A lighthouse, L, is 3.4 cm x° P R A AB = 23 cm. Angle ACB = 21° Calculate the length of AC. 64.2 cm Give your answer correct to 3 significant figures. 23 cm 21° C B 5) A lighthouse, L, is 3.4 cm x° P R A AB = 23 cm. Angle ACB = 21° Calculate the length of AC. 64.2 cm Give your answer correct to 3 significant figures. 23 cm 21° C B 5) A lighthouse, L, is 3.4 cm x° P R A AB = 23 cm. Angle ACB = 21° Calculate the length of AC. 64.2 cm Give your answer correct to 3 significant figures. 23 cm 21° C B 5) A lighthouse, L, is 3.4 cm x° P R A AB = 23 cm. Angle ACB = 21° Calculate the length of AC. 64.2 cm Give your answer correct to 3 significant figures. 23 cm 21° C B 5) A lighthouse, L, is 3.4 cm x° P R A AB = 23 cm. Angle ACB = 21° Calculate the length of AC. 64.2 cm Give your answer correct to 3 significant figures. 23 cm 21° C B 5) A lighthouse, L, is 3.4 cm x° P R A AB = 23 cm. Angle ACB = 21° Calculate the length of A km due West of a port, P. A ship, S, is 1.8 km due North of the lighthouse, L. Calculate the size of the angle marked x. 27.9° Give your answer correct to 3 significant figures. N S 1.8 km L N x 3.4 km P Page 140 © Mathswatch Bearings by Trigonometry Clip 148 1) Crowdace N Diagram NOT accurately drawn. 7.6 km Appleby 9.8 km Brompton Appleby, Brompton and Crowdace are three towns. Appleby is 9.8 km due west of Brompton is 7.6 km due south of Crowdace. a) Calculate the bearing of Appleby from
Crowdace. Give your answer correct to 1 decimal place. 232.2° 2) Froncham Diagram NOT accurately drawn. N Denton 12.3 km Egleby and Froncham are three towns. Egleby is 12.3 km due East of Denton. Froncham is due north of Denton and on a bearing of 320° from Egleby. Calculate the distance between Froncham is due north of Denton and on a bearing of 320° from Egleby. Mathswatch Similar Shapes Clip 149 A 1) BE is parallel to CD. AB = 12 cm, BC = 3 cm, CD = 7 cm, AE = 8 cm. a) Calculate the length of ED. 2 cm b) Calculate the length of ED. $8 = 2 \text{ cm E 7 cm D C D 7 cm} \div 1.25 2$) Diagram NOT accurately drawn. A V = 36000 cm3 Volume scale factor 383328 cm3 3 Two prisms, A and B, are mathematically similar. The volume of prism B is 383328 cm3 3 Two prisms, A and B, are mathematically similar. The volume of prism A is 36000 cm3 Volume scale factor 383328 cm3 3 Two prisms, A and B, are mathematically similar. 10.648 = 2.2 Area scale factor $2.22 = 4.8440656 \div 4.84 = 8400$ cm² Calculate the total surface area of shape P is 540 cm². The total surface area of shape P is 540 cm². The total surface area of shape P is 2700 cm². cm3. Calculate the volume of shape Q. 6400 cm Area scale factor . 960 ÷ 540 = 1.7 3 . . . 1.33 = 2.370 . . 2700 × 2.370 = 6400 cm3 Page 142 © Mathswatch Clip 150 Circle Theorems B 1) In the diagram, A, B and C are points on the circumference of a circle, centre O. PA and PB are tangents to the circle. Angle ACB = 72°. a) (i) Work out the size of angle AOB. 144° 90° O 144° 72° C (ii) Give reasons for your answer. P 90° A R P, Q, R and S are points on the circle. PQ is a diameter of the circle. PQ is a diameter of the circle. Angle RPQ = 32°. a) (i) Work out the size of angle PQR. 58° Diagram NOT accurately drawn S P Diagram NOT accurately drawn 90° b a 32° Q Angle in semi-circle is 90° Angles in triangle add to 180° b) (i) Work out the size of angle PSR. 122° (ii) Give a reason for your answer. Opposite angles of a cyclic quadrilateral add to 180° 3) The diagram shows a circle, centre O. AC is a diameter. Angle BAC = 31°. D is a point on AC such that angle BDA is a right angle. a) Work out the size of angle BCA. 59° C D O Angle in semi-circle is 90° Angles in triangle add to 180° b) Calculate the size of angle DBC. 31° c) Calculate the size of angle BOA. 118° 4) A, B, C and D are four points on the circumference of a circle. ABE and DCE are straight lines. Angle BAC = 21°. Angle EBC = 58°. A Diagram NOT accurately drawn 21° B a) Find the size of angle ADE. 37° Angle CAD = 69°. c) Is BD a diameter of the circle? Yes You must explain your answer. D C E Angle DAB = 69° + 21° = 90° BD subtends 90° on the circumference. Therefore BD is a diameter. Page 143 © Mathswatch Cumulative Frequency Clip 151 The heights of 80 plants were measured and can be seen in the table, below. Height (cm) a) Complete the cumulative frequency table for the plants. Frequency 0 < h < 10 2 10 < h < 20 5 20 < h < 30 19 30 < h < 40 38 40 < h < 50 13 50 < h < 60 3 CF 80 x Height (cm) Cumulative Frequency 0 < h < 2070 < h < 30260 < h < 30260 < h < 30260 < h < 50770 < h < 6080 x b) Draw a cumulative frequency graph to find an estimate for (i) the median height of a plant. 34 cm (ii) the interquartile range of the heights of the plants. 39 -41, 43, 44, 49, 55, 57, 58, 58 a) On the grid below, draw a boxplot to show the information about the teachers? 60 70 19.5 years 2) A warehouse has 60 employees working in it. The age of the youngest employee is 16 years. The age of the teachers? 60 70 19.5 years 2) A warehouse has 60 employees working in it. The age of the teachers? 60 70 19.5 years 2) A warehouse has 60 employees working in it. median age is 37 years. The lower quartile age is 29 years. The upper quartile age is 43 years. On the grid below, draw a boxplot to show information about the ages of the employees. 10 20 30 40 50 60 Page 145 © Mathswatch Moving Averages Clip 153 1) The table shows the number of board games sold in a supermarket each month from January , 178 _, 180 __ , . 187.3 $(146+163+237) \div 3(163+237+134) \div 3(237+134+169) \div 3(134+169+259) \div 32)$ The table shows the number of computers sold in a shop in the first five to June. Jan Feb Mar Apr May Jun 146 163 237 134 169 259 Work out the 3-month moving averages for this information. 182 months of 2007. Jan Feb Mar Apr May June 74 83 112 78 91 x a) Work out the first two 3-month moving averages for this information. 89.6 , 91 $(74 + 83 + 112) \div 3(83 + 112 + 78) \div 3$ b) Work out the first 4-month moving average for this information. 86.75 average of the number of computers sold in 2007 is 96. The number of computers sold in the shop in June was x. c) Work out the value of x. $x = 103 4 \times 96 = 384 112 + 78 + 91 = 281 384 - 281 = 103 Page 146$ © Mathswatch Tree Diagrams Clip 154 1) Lucy throws a biased dice twice. Complete the probability tree diagram to show the outcomes Label clearly the branches of the tree diagram. 1st Throw 2 6 4 6 2 6 2nd Throw six Six not six 4 6 Not Six 2 6 six 4 6 not six 2) A bag contains 10 coloured balls. 7 of the balls are blue and 3 of the balls are green. Nathan is going to take a ball, replace it, and then take a second ball. a) Complete the tree diagram. 1st Ball 7 10 3 10 7 10 . 2nd Ball Blue BB 7 10 7 × 10 Green BG 7 10 3 × 10 Blue GB 3 10 7 × 10 Green GG 3 10 3 × 10 Blue 3 10 7 10 Green 3 10 b) Work out the probability that Nathan will take one of each coloured balls. 42 100 d) Work out the probability that Nathan will take two balls of the same colour. 58 100 21 100 21 100 + 49 100 + 9 100 Page 147 \otimes Mathswatch 1) Recurring decimal 0.36 to a fraction in its simplest form. 4 11 8 b) Prove that the recurring decimal 0.72 = 11 • • 2). 4 a) Change to a decimal 0.49 0.44 4 9 4 00 • • b) Prove that the recurring decimal 0.72 = 11 • • 2). 0.57 = 3) a) Change ... 3 to a decimal. $0.27 \, 11 \cdot a$) Change 15 33 . 1 0.166 to a decimal. 0.16446610005 b) Prove that the recurring decimal $0.135 = 37 \cdot 5$) 6) 100x = 36.3636... 99x = 36 364 x = 99 11 x = 0.5757... 100x = 57.5757... 99x = 57 57 19 x = 99 33 b) Prove that the recurring decimal 0.45 = 4) 19 33 . . . $0.72 = 2 \times 0.36 ... 4 0.72 = 2 \times 0.36 ... 4$ $= 2 \times ..8 11 0.72 = 11 x = 0.3636... \bullet x = 0.4545... 100x = 45.4545... 99x = 45.45 15 x = 99.33 x = 0.135135... 1000x = 135.135135... 99x = 135.135135... 09x = 135.135135... 00x = 135.$ 27.777... 18 99x = 27.5 27.5 55 5 x = = 99 198 18 • a) Convert the recurring decimal 5.2 to a fraction in its simplest form. x = 5.222... 3 . = b) Prove that the recurring decimal 0136 22 x = 0.1363636... • • 100x = 13.63636... • 100x = 13.63636... • 100x = 13.63636... • 100x = 13.63636... • 10 Negative Indices Clip 156 ax × ay = ax+y ax = ax-y ay a0 = 1 a-x = x y 1 ax p 25 c) x5 ÷ x2 x3 b) k3 × k2 k5 d) (p2)-35 = 25 2 67 66 d) x y = 1 x (a) y m10 e) (85)0 1 f) (23)2 64 80 = 1 6 2 = 64 6 61 = 6 Work out each of these, leaving your answers as exact fractions when needed. a) 4 0 1 e) 4 - 2 b) 7 0 1 f) 8 - 1 c) 250 1 g) 5 - 3 1 16 1 8 1 125 1 i) 49 2 2 j 3 2 5 1 k 27 3 1 h 10-5 100000 4 5 5 can be written in the form <math>5n . 1 Find the value of $n . 1.5 51 \times 5 2 5$ $2 \times 8 = 2m$ Find the value of n . 2.5 3 l $164 1 21 \times (23)2$ Find the value of x when 125 = 5x 1 1.5 (53)2 Find the value of y when 128 = 2 8 - f $(3xy2)3 27x3y6 7 = 2 164 1 21 \times (23)2$ Find the value of n . 2.5 3 l $164 2 1 \times (23)2$ Find the value of x when 125 = 5x 1 1.5 (53)2 Find the value of y when 128 = 2 8 - f $(3xy2)3 27x3y6 7 = 2 164 1 21 \times (23)2$ Find the value of x when 125 = 5x 1 1.5 (53)2 Find the value of y when 128 = 2 8 - f $(3xy2)3 27x3y6 7 = 2 164 1 21 \times (23)2$ Find the value of x when 125 = 5x 1 1.5 (53)2 Find the value of y when 128 = 2 8 - f $(3xy2)3 27x3y6 7 = 2 164 1 21 \times (23)2$ Find the value of x when 125 = 5x 1 1.5 (53)2 Find the value of y when 128 = 2 8 - f $(3xy2)3 27x3y6 7 = 2 164 1 21 \times (23)2$ Find the value of x when 125 = 5x 1 1.5 (53)2 Find the value of y when 128 = 2 8 - f $(3xy2)3 27x3y6 7 = 2 164 1 21 \times (23)2$ Find the value of x when 125 = 5x 1 1.5 (53)2 49 d) 139 0 1 7) p -6 2 25 a e) (m-5)-2 Without using a calculator, find the exact value of the following. c) $75 \div 73 49$ a) $40 \times 42 16$ b) $54 \times 5-2 6$) y x a = (a) Simplify a) (p5)5 1 × 16 = 16 3) (ax)y = axy y 3.5 1 (27) 2 a = 2x , b = 2y a) Express in terms of a and b i) 2x + 2y ab value of y. $16 = 2x \times 2y = 2x + yx + y = 4$ $16 = 2(2x \times 2y \times 2y)$ $8 = 2x \times 2y \times 2y \times 2y = 3x = 5$, y = -1 Page 149 Surds © Mathswatch Clips 157, 158 is not a surd because it is equal to exactly 5. 25 is a surd because it is equal to exactly 5. 25 is a surd because it is equal to exactly 5. 25 is a surd because it is equal to exactly 5. 25 is a surd because it is equal to exactly 5. 25 is a surd because it is equal to exactly 5. 25 is a surd because it is equal to exactly 5. 25 is a surd because it is equal to exactly 5. 25 is a
surd because it is equal to exactly 5. 25 is a su that we transfer the surd expression to the numerator. 1) Simplify the following: a) 2) 3 3 × 3 c) 20 2 5 d) 24 2 6 e) 72 6 2 f) 200 10 2 2 25 2 5 2 × 18 6 b) 8 × 32 16 c) 99 × 22 33 2 d) 45 × 20 30 e) 18 × 128 48 f) 28 × 175 70 Expand and simplify where possible: a) a) (1 + b) (3 + 5)(2 - 5) c) (3 + 2)(3 + 4) 11 + 6 3 d) (5 - 3)(5 + 1) 2 - 2 5 e) (2 + f) (3 + 2)(3 + 4) (1 + b) (3 + 5)(2 - 5) c) (3 + 2)(3 + 4) (1 + 6 3 d) (5 - 3)(5 + 1) 2 - 2 5 e) (2 + f) (3 + 2)(3 + 4) (3 + 2)(3 + 2 5) 6) 1-57 (2 - 7) -36-3 (2 - 7) -36-3 (2 - 7) -36-3 (2 - 7) -36-3 (2 - 7) (2 - 7) -36-3 (2 - 8) (4 - 5) (4 - 5) (4 - 5) (4 - 5) (1 + 1) (2 + 2) (3 - 2) (3 + 2) (1 + 1) (2 + 2) (3 + 2) following, giving your answer in its simplest form: 2 16 1 16 2 the form m 2 where m is an integer. 15 - 6 6 3 2 2 $\frac{1}{2}$ 3 × 27 = 3n Find the value of n 2)(1 - 2) -1 Rationalise the denominator, simplifying where possible: 3(3 - 3) 3 3 - 3 b) d) Expand and simplify where possible: 3(3 - 3) 3 3 - 3 b) d) Expand and simplifying where possible: 3(3 - 3) 3 3 - 3 b) d) Expand and simplify the following: a) 3 7 × 7 b) g) 4) (3 + 1) 2 3 (5 + 3) 2 2043+6375+155(5-5)(2+25)204 Page 150 © Mathswatch 1) Direct and Inverse Proportional to y. When x = 21, then y = 3. a) Express x in terms of y. x = ky 21 = k × 3 k = 7 x = 7 y b) Find the value of x when y is equal to: (i) 1 7 (ii) 2 14 (iii) 10 70 2) a) Find a formula for a in terms of b. a = b) Find the value of a when b is equal to: (i) 1 48 (ii) 8 6 (iii) 10 c) Find the value of b when a is equal to: (i) 4 12 (ii) 3.2 3) k b k 12 = 4 k = 48 a = a is inversely proportional to b. When a = 12, then b = 4.48 b 4.8 b = 15 The variables u and v are in inverse proportional to b. When a = 12, then b = 4 k = 48 a = a is inversely proportional to b. When a = 12, then b = 4.48 b 4.8 b = 15 The variables u and v are in inverse proportional to b. When a = 12, then b = 4 k = 48 a = a is inversely proportional to b. When a = 12, then b = 4.48 b 4.8 b = 15 The variables u and v are in inverse proportional to b. When a = 12, then b = 4.48 b 4.8 b = 15 The variables u and v are in inverse proportional to b. When a = 12, then b = 4.48 b 4.8 b = 15 The variables u and v are in inverse proportional to b. When a = 12, then b = 4.48 b 4.8 b = 15 The variables u and v are in inverse proportional to b. When a = 12, then b = 4.48 b 4.8 b = 15 The variables u and v are in inverse proportional to b. When a = 12, then b = 4.48 b 4.8 b = 15 The variables u and v are in inverse proportional to b. When a = 12, then b = 4.48 b 4.8 b = 15 The variables u and v are in inverse proportional to b. When a = 12, then b = 4.48 b 4.8 b = 15 The variables u and v are in inverse proportional to b. When a = 12, then b = 4.48 b 4.8 b = 15 The variables u and v are in inverse proportional to b. When a = 12, then b = 4.48 b 4.8 b = 15 The variables u and v are in inverse proportional to b. When a = 12, then b = 4.48 b 4.8 b = 15 The variables u and v are in inverse proportional to b. When a = 12, then b = 4.48 b 4.8 b = 15 The variables u and v are in inverse proportional to b. When a = 12, then b = 4.48 b 4.8 b = 15 The variables u and v are in inverse proportional to b. When a = 12, then b = 4.48 b 4.8 b = 15 The variables u and v are in inverse proportional to b. When a = 12, then b = 4.48 b 4.8 b = 15 The variables u and v are in inverse proportional to b. When a = 12, then b = 4.48 b 4.8 b = 15 The variables u and v are in inverse proportional to b. When \times 25 3 a) Express p in terms q. p = 3q2 p = 3 × 72 b) Work out the value of p when q = 7. p = 147 p = 3 × 49 c) Work out the positive value of q. p = 75 when x = 3, then y = 36. a) Express y in terms of x. = = = k u = v k 3 = 8 k = 24 24 u = v 4) p is directly proportional to the square of q. p = 75 when x = 3, then y = 36. a) Express y in terms of x. = = = k u = v k 3 = 8 k = 24 24 u = v 4) p is directly proportional to the square of q. p = 75 when x = 3, then y = 36. a) Express y in terms of x. = = = k u = v k 3 = 8 k = 24 24 u = v 4) p is directly proportional to the square of q. p = 75 when x = 3, then y = 36. a) Express y in terms of x. = = = k u = v k 3 = 8 k = 24 24 u = v 4) p is directly proportional to the square of q. p = 75 when x = 3, then y = 36. a) Express y in terms of x. = = = k u = v k 3 = 8 k = 24 24 u = v 4) p is directly proportional to the square of q. p = 75 when x = 3, then y = 36. a) Express y in terms of x. = = = k u = v k 3 = 8 k = 24 24 u = v 4) p is directly proportional to the square of q. p = 75 when x = 3, then y = 36. a) Express y in terms of x. = = = k u = v k 3 = 8 k = 24 24 u = v 4) p is directly proportional to the square of q. p = 75 when x = 3, then y = 36. a) Express y in terms of x. = = = k u = v k 3 = 8 k = 24 24 u = v 4 q = 5 p 75 75 k 48 a y = 4x2 z is inversely proportional to x. When x = 4, z = 2. b) Show that z = c yn, where c and n are numbers and c > 0. You must find the values of c and n. z = 16y-0.5 c = 16 n = -0.5 Page 151 \odot Mathswatch Upper and Lower Bounds Clip 160 1) A = 11.3 correct to 1 decimal place B
= 300 correct to 1 significant figure C = 9 correct to the nearest integer 11.3 11.35 11.25 300 a) Calculate the upper bound for A + B. 361.35 b) Calculate the least possible value of AC. 95.625 11.25 × 8.5 = 95.625 A+B d) Calculate the greatest possible value of 1.4 (1 dp) B+C 350 250 9 9.5 8.5 11.35 + 350 = 1.4 (1 dp) 250 + 8.52) An estimate of the acceleration due to gravity can be found using the formula: g = 2LT 2 sinx Using T = 1.2 correct to 1 decimal places x = 40 correct to 2 decimal places x = 40 corr answer correct to 3 decimal places. $8.859 \ 2 \times 4.495 = 8.859 \ 1.252 \times \sin 40.5 \ b$) Calculate the upper bound for the value of g. Give your answer correct to 3 decimal places. $8.859 \ 2 \times 4.495 = 8.859 \ 1.252 \times \sin 40.5 \ b$) Calculate the upper bound for the value of g. Give your answer correct to 3 decimal places. $8.859 \ 2 \times 4.495 = 8.859 \ 1.252 \times \sin 40.5 \ b$) Calculate the upper bound for the value of g. Give your answer correct to 3 decimal places. $8.859 \ 2 \times 4.495 = 8.859 \ 1.252 \times \sin 40.5 \ b$) Calculate the upper bound for the value of g. Give your answer correct to 3 decimal places. $8.859 \ 1.252 \times \sin 40.5 \ b$) Calculate the upper bound for the value of g. Give your answer correct to 3 decimal places. ...mm Angle CAB = x° (c) Calculate the lower bound for the value of tan x°. 75 O BC tan x = = = 1.02 (2 dp) A AB 73.5 1.02 (2 dp) Page 152 (2 dp) equation $x^2 + 8x + 6 = 0$ Give your answers correct to 3 significant figures. x = -0.838 or x = -7.163) Solve the equation $x^2 - 3x - 2 = 0$ Give your answers correct to 3 significant figures. x = -0.562 or x = 3.564) Solve the equation $2x^2 + 6x$ -1 = 0 Give your answers correct to 3 significant figures. x = -3.16 or x = 0.158 6) Solve the equation $3x^2 - 2x - 20 = 0$ Give your answers correct to 3 significant figures. x = -2.27 or x = 2.947) Solve the equation $3x^2 - 2x - 20 = 0$ Give your answers correct to 3 significant figures. x = -3.16 or x = -2.27 or x = 2.947) Solve the equation $3x^2 - 2x - 20 = 0$ Give your answers correct to 3 significant figures. x = -3.16 or x = -2.27 or x = 2.947) Solve the equation $3x^2 - 2x - 20 = 0$ Give your answers correct to 3 significant figures. x = -3.16 or x = -2.27 or x = 2.947) Solve the equation $3x^2 - 2x - 20 = 0$ Give your answers correct to 3 significant figures. x = -3.16 or x = -2.27 or x = 2.947) Solve the equation $3x^2 - 2x - 20 = 0$ Give your answers correct to 3 significant figures. x = -3.16 or x= -1.70 or x = 7.11 9) $x^2 + 10x = 300$ $x^2 + 10x = 300$ x $0 2 x^2 - 3x + 2x - 6 = 1 x^2 - x - 6 = 1 x^2 - x - 6 = 1 x^2 - x - 7 = 0$ b) Solve the equation $x^2 - x - 7 = 0$ Give your answers correct to 3 significant figures. x = -2.19 or x = 3.19 Page 153 © Mathswatch 1) 2) 3) 4) 5) Clip 162 Completing the Square $y = (x + 4)^2 - 16 - 3 y = (x + 4)^2 - 19$ for all values of x. $(x + 4)^2 - 19 y = (x - 5)^2 - 25 + 30$ Show that if $y = x^2 - 10x + 30$ $y = (x - 5)^2 + 5$ then $y \ge 5$ for all values of x. $(x - 5)^2 > 0$ y > 5 The expression $x^2 + 4x + 10$ can be written in the form $(x + p)^2 + q$ for all values of x. $(x - 3)^2 - 9 + 17$ $(x - 3)^2 + 8$ find the value of p and q. p = 2 and q = 6 Given that $x^2 - 6x + 17 = (x - p)^2 + q$ for all values of x. $(x - 3)^2 - 9 + 17$ $(x - 3)^2 + 8$ find the value of p and q. p = 2 and q = 6 Given that $x^2 - 6x + 17 = (x - p)^2 + q$ for all values of x. $(x - 3)^2 - 9 + 17$ $(x - 3)^2 + 8$ find the value of p and q. p = 2 and q = 6 Given that $x^2 - 6x + 17 = (x - p)^2 + q$ for all values of x. $(x - 3)^2 - 9 + 17$ $(x - 3)^2 + 8$ find the value of p and q. p = 2 and q = 6 Given that $x^2 - 6x + 17 = (x - p)^2 + q$ for all values of x. $(x - 3)^2 - 9 + 17$ $(x - 3)^2 + 8$ find the value of p and q. p = 2 and q = 6 Given that $x^2 - 6x + 17 = (x - p)^2 + q$ for all values of x. $(x - 3)^2 - 9 + 17$ $(x - 3)^2 + 8$ find the value of p and q. p = 2 and q = 6 Given that $x^2 - 6x + 17 = (x - p)^2 + q$ for all values of x. $(x - 3)^2 - 9 + 17$ $(x - 3)^2 + 8$ find the value of p and q. p = 2 and q = 6 Given that $x^2 - 6x + 17 = (x - p)^2 + q$ for all values of x. $(x - 3)^2 - 9 + 17$ $(x - 3)^2 - 9$ the value of g. p = 3 and g = 8 Show that if y = x2 + 8x - 3 For all values of x, x2 + 6x = (x + p)2 + g a) Find the values of p and g = -9 (x + 3)2 - 9 b) Find the value of g. p = 4 and g = -21 (x - 4)2 - 21 2 b) On the axes, sketch the graph of y = x - 8x - 5. O 4 x -21 c) Find the coordinate of the minimum point on the graph of $y = x^2 - 8x - 5$. (4, -21) 7) The expression 10x - x2 can be rearranged as a) Find the values of p and q. -x2 + 10x p = 25 and q = 5 -(x^2 - 10x) b) The expression 10x - x2 has a maximum value of 10x - x. -(x - 5)2 (i) Find the maximum value of 10x - x. -(x - 5)2 (ii) State the value of x for which this maximum value of 10x - x. -(x - 5)2 (ii) State the value of 10x - x. -(x - 5)2 (ii) State the value of x for which this maximum value of 10x - x. -(x - 5)2 (ii) State the value of x for which this maximum value of 10x - x. -(x - 5)2 (ii) State the value of 10x - x. -(x - 5)2 (iii) State the value of x = 5 Page 154 (iv) State the value of 10x - x. -(x - 5)2 (iv) State the value of x = 5 Page 154 (iv) State the value of 10x - x. -(x - 5)2 (iv) State the value of x = 5 Page 154 (iv) State the value of x = 5 Page 154 (iv) State the value of 10x - x. -(x - 5)2 (iv) State the value of x - 8x 2x x + 5x - 3x c) 2x + x - 12x - 2x d) 5) 4x - 12x + 9 b Simplify 6x - 7x - 324x - 12x + 9x + 7x + 102x + 5x x + 2x (2x - 3) 2 a) Factorise 3x + 12x - 3 Write as single fractions in their simplest form a) 33 + x 2x 9 2x c) x + 2x - 1 + 527x - 110 b) 53 - 3x 4x 11 12x d) <math>35 - x + 22x + 1x - 7(x + 2)(2x + 1) a) Factorise 22x + 7x + 102x + 9x + 7x + 102x + 102x2.5 or 671 + = 4x + 2x - 1x = -0.5 or 1.5 e) f) 317 + = 2x + 2x - 2x - 4x = 2.75 x 2 + = 12x - 1x + 2x = 0 or 3 Page 155 @ Mathswatch 1) Rearranging Difficult Formula. v = 2a + 3b + cc = v - 2a - 3b + 2x = 0 or 3 Page 155 @ Mathswatch 1) Rearranging Difficult Formula. v = 2a + 3b + cc = v - 2a - 3b + 2x = 0 or 3 Page 155 @ Mathswatch 1) Rearranging Difficult Formula. v = 2a + 3b + cc = v - 2a - 3b + 2x = 0 or 3 Page 155 @ Mathswatch 1) Rearranging Difficult Formula. v = 2a + 3b + cc = v - 2a - 3b + 2x = 0 or 3 Page 155 @ Mathswatch 1) Rearranging Difficult Formula. v = 2a + 3b + cc = v - 2a - 3b + 2x = 0 or 3 Page 155 @ Mathswatch 1) Rearranging Difficult Formula. v = 2a + 3b + cc = v - 2a - 3b + 2x = 0 or 3 Page 155 @ Mathswatch 1) Rearranging Difficult Formula. v = 2a + 3b + cc = v - 2a - 3b + 2x = 0 or 3 Page 155 @ Mathswatch 1) Rearranging Difficult Formula. v = 2a + 3b + cc = v - 2a - 3b + 2x = 0 or 3 Page 155 @ Mathswatch 1) Rearranging Difficult Formula. v = 2a + 3b + cc = v - 2a - 3b + 2x = 0 or 3 Page 155 @ Mathswatch 1) Rearranging Difficult Formula. v = 2a + 3b + cc = v - 2a - 3b + 2x = 0 or 3 Page 155 @ Mathswatch 1) Rearranging Difficult Formula. v = 2a + 3b + cc = v - 2a - 3b + 2x = 0 or 3 Page 155 @ Mathswatch 1) Rearranging Difficult Formula. v = 2a + 3b + cc = v - 2a - 3b + 2x = 0 or 3 Page 155 @ Mathswatch 1. subject of the formula. $R - 2tR = 3s + \pi s + 2ts = 3 + k = +5$ R - 2t = s(3 + 1m - 1b) Make m the subject of the formula. $7) u = 3A - 5kkv^2 - RvR - 13x + 2y = 510 + yMake u$ the subject of the formula. $7) u = 3A - 5kkv^2 - RvR - 13x + 2y = 510 + yMake u$ the subject of the formula. $7) u = 3A - 5kkv^2 - RvR - 13x + 2y = 510 + yMake u$ the subject of the formula. $7) u = 3A - 5kkv^2 - RvR - 13x + 2y = 510 + yMake u$ the subject of the formula. $7) u = 3A - 5kkv^2 - RvR - 13x + 2y = 510 + yMake u$ the subject of the formula. $7) u = 3A - 5kkv^2 - RvR - 13x + 2y = 510 + yMake u$ the subject of the formula. $7) u = 3A - 5kkv^2 - RvR - 13x + 2y = 510 + yMake u$ subject of the formula. x = 6) k(m - 1) = 1 km a Make 1 the subject of the formula. l = 1 + k 5 s 30x + 20 = 3x + 5k 3A - 5k = kx R(u + v) = u + v2 Ru + Rv = u + v2 Ru + Rv = u + v2 Ru + 20 = 5y - 3xy - 2y 30x + 20 = 5y - 3xy - 2y 30x + 20 = 3y - 3xy 30x + 20 = y(3 - 3x) a - 3 = 4b 5 Rearrange thisand y = 3x = -2 and y = -22) Solve these simultaneous equations. $y = x^2 - 4y = 3x = 4$ and y = 12x = -1 and y = -33) y = x + 2x = 5 and y = -105 (3) $y = x^2 - 4x^2 - 3x - 4 = 0$ (x - 4)(x + 1) = 0 x = 4 or x = -1 Solve these simultaneous equations. $y = x^2 - 35x - y = 5x = 6$ and y = 12x = -105 (5) $3x = x^2 - 4x^2 - 3x - 4 = 0$ (x - 4)(x + 1) = 0 x = 4 or x = -1 Solve these simultaneous equations. $y = x^2 - 35x - y = 5x = 6$ and y = 12x = -3 and y = -105 (5) $3x = x^2 - 4x^2 - 3x - 4 = 0$
 (x - 4)(x + 1) = 0 x = 4 or x = -1 Solve these simultaneous equations. $y = x^2 - 35x - y = 5x = 6$ and y = 12x = -3 and y = -105 (5) $3x = x^2 - 4x^2 - 3x - 4 = 0$ (x - 4)(x + 1) = 0 x = 4 or x = -1 Solve these simultaneous equations. $y = x^2 - 35x - y = 5x = 6$ and y = -105 (5) $3x = x^2 - 4x^2 - 3x - 4 = 0$ (x - 4)(x + 1) = 0 x = 4 or x = -1 Solve these simultaneous equations. $y = x^2 - 35x - y = 5x = 6$ and y = -105 (5) $3x = x^2 - 4x^2 - 3x - 4 = 0$ (x - 4)(x + 1) = 0 x = 4 or x = -1 Solve these simultaneous equations. $y = x^2 - 35x - y = 5x = 6$ and y = -105 (5) $3x = x^2 - 4x^2 - 3x - 4 = 0$ (x - 4)(x + 1) = 0 x = 4 or x = -1 Solve these simultaneous equations. $y = x^2 - 35x - y = 5x = 6$ and y = -105 (5) $3x = x^2 - 4x^2 - 3x - 4 = 0$ (x - 4)(x + 1) = 0 x = 4 or x = -1 Solve these simultaneous equations. $y = x^2 - 35x - y = 5x = 6$ and y = -105 (5) $3x = x^2 - 4x^2 - 3x - 4 = 0$ (5) $3x = x^2 - 4x^2 - 3x - 4 = 0$ (5) $3x = x^2 - 4x^2 - 3x - 4 = 0$ (5) $3x = x^2 - 4x^2 - 3x - 4 = 0$ (5) $3x = x^2 - 4x^2 - 3x - 4 = 0$ (5) $3x = x^2 - 4x^2 - 3x - 4 = 0$ (5) $3x = x^2 - 4x^2 - 3x - 4 = 0$ (5) $3x = x^2 - 4x^2 - 3x - 4 = 0$ (5) $3x = x^2 - 4x^2 - 3x - 4 = 0$ (5) $3x = x^2 - 4x^2 - 3x - 4 = 0$ (5) $3x = x^2 - 4x^2 - 3x - 4 = 0$ (5) $3x = x^2 - 4x^2 - 3x - 4 = 0$ (5) $3x = x^2 - 4x^2 - 3x - 4 = 0$ (5) $3x = x^2 - 4x^2 - 3x - 4 = 0$ (5) $3x = x^2 - 4x^2 - 3x - 4 = 0$ (5) $3x = x^2 - 4x^2 - 3x - 4 = 0$ (5) $3x = x^2 - 4x^2 - 3x - 4 = 0$ (5) $3x = x^2 - 4x^2 - 3$ equations. $y = x^2 - x - 134$ $x = x^2 - 6x^2 - x - 6 = 0(x - 3)(x + 2) = 0x = 3$ or $x = -2x + 2 = x^2 - x - 13x^2 - 2x - 15 = 0(x - 5)(x + 3) = 0x = 5$ or $x = -3y = x - 6x^2 + x^2 - 12x + 10 = 0x = 5$ or $x = -3y = x - 6x^2 + x^2 - 12x + 10 = 0x = 5$ or $x = -3y = x - 6x^2 + x^2 - 12x + 10 = 0x = 5$ or $x = -3y = x - 6x^2 + x^2 - 12x + 10 = 0x = 5$ or $x = -3y = x - 6x^2 + x^2 - 12x + 10 = 0x = 5$ or $x = -3y = x - 6x^2 + x^2 - 12x + 10 = 0x = 5$ or $x = -3y = x - 6x^2 + x^2 - 12x + 10 = 0x = 5$ or $x = -3y = x - 6x^2 + x^2 - 12x + 10 = 0x = 5$ or $x = -3y = x - 6x^2 + x^2 - 12x + 10 = 0x = 5$ or $x = -3y = x - 6x^2 + x^2 - 12x + 10 = 0x = 5$ or $x = -3y = x - 6x^2 + x^2 - 12x + 10 = 0x = 5$ or $x = -3y = x - 6x^2 + x^2 - 12x + 10 = 0x = 5$ or $x = -3y = x - 6x^2 + x^2 - 12x + 10 = 0x = 5$ or $x = -3y = x - 6x^2 + x^2 - 12x + 10 = 0x = 5$ or $x = -3y = x - 6x^2 + x^2 - 12x + 10 = 0x = 5$ or $x = -3y = x - 6x^2 + x^2 - 12x + 10 = 0x = 5$ or $x = -3y = x - 6x^2 + x^2 - 12x + 10 = 0x = 5$ or $x = -3y = x - 6x^2 + 12x + 10 = 0x = 5$ or $x = -3y = x - 6x^2 + 12x + 10 = 0x = 5$ or $x = -3y = x - 6x^2 + 12x + 10 = 0x = 5$ or $x = -3y = x - 6x^2 + 12x + 10 = 0x = 5$ or $x = -3y = x - 6x^2 + 12x + 10 = 0x = 5$ or $x = -3y = x - 6x^2 + 12x + 10 = 0x = 5$ or $x = -3y = x - 6x^2 + 12x + 10 = 0x = 5$ or $x = -3y = x - 5x^2 + 12x + 10 = 0x = 5$ or $x = -3y = x - 5x^2 + 12x + 10 = 0x = 5$ or $x = -3y = x - 5x^2 + 12x + 10 = 0x = 5$ or $x = -3y = x - 5x^2 + 12x + 10 = 0x = 5$ or $x = -3y = x - 5x^2 + 12x + 10 = 0x = 5$ (x - 1) = 0 x = 1 and y = -5 x = 5 or x = 1 Sarah said that the line y = 7 cuts the curve $x^2 + y^2 = 25$ at two points. $x^2 + 49 = 25 x^2 = -24$ a) By eliminating y show that Sarah is not correct. Solve these simultaneous equations. There is no solution to $x^2 = -24$ hence y = 7 does not cut the curve $x^2 + y^2 = 25$ at two points. $x^2 + 49 = 25 x^2 = -24$ a) By eliminating y show that Sarah is not correct. equations $x^2 + (3x - 9)^2 = 25 x^2 + y^2 = 25 x^2 + y^2 = 25 x^2 + 9x^2 - 54x + 81 = 25 y = 3x - 910x^2 - 54x + 56 = 0 x = 1.4$ and $y = -4.8 5x^2 - 27x + 28 = 0$ (5x - 7)(x - 4) = 0 x = 4 and y = 3 x = 1.4 or x = 4 Page 157 © Mathswatch 1) Gradients of Lines Clip 166 y Diagram NOT accurately drawn $y = \frac{1}{2}x + 2 \times B(10, 7) \times A(0, 2) \times 0$ In qu a) and b) c and m can be any numbers you choose. A is the point (0, 2) B is the point (10, 7) The equation of another straight line that is parallel to $y = 1 x + 2 y = \frac{1}{2}x + c 2 b$ Write down the equation of another straight line that passes through the point (0, 2). y = mx + c m = -2, x = 10, $y = \frac{1}{2}x + c 2 b$ Write down the equation of another straight line that is parallel to $y = 1 x + 2 y = \frac{1}{2}x + c 2 b$. = 77 = -20 + cc = 27 c) Find the equation of the line perpendicular to AB passing through B. y = -2x + 27 2) A straight line has equation of P. x = -0.5 A straight line L is parallel to y = 2x - 5 and passes through the point (3, 2). b) Find the equation of the line perpendicular to AB passing through B. y = -2x + 27 2) A straight line has equation of P. x = -0.5 A straight line L is parallel to y = 2x - 5 The point P lies on the straight line has equation of P. x = -0.5 A straight line has equation of P. line L. y = 2x - 4c) Find the equation of the line that is perpendicular to line L and passes through point (3, 2). $y = -\frac{1}{2}x + 3\frac{1}{2}3$ In the diagram y A is the point (0, -2) B is the point (0, and is perpendicular to AB. y = x + 2 C 1 - 5 - 4 - 3 - 2 - 1 O 1 2 x - 1 - 2 A - 3 Page 158 © Mathswatch Clip 167 Transformations of Functions 1) This is a sketch of the curve with equation (i) y = f(x - 3) (4, -1) = 0 Write down the coordinates of the curve with equation (i) y = f(x - 3) (4, -1) = 0-1 (ii) y = f(x) - 5(1, -6) (iii) $y = -f(x)(1, 1)(\frac{1}{2}, -1)$ (iv) y = f(2x) b) The curve $y = x^2 - 2x + 1 - 1$ $y = x^2 - 2x$ = 2f(x) 3) Sketch the graph of y = (x - 2)2 + 3 State the coordinates of the vertex and the points at (2, 3) 4) Sketch the graph of y = $x^2 + 4x - 1$ State the coordinates of the vertex and the points at (2, -5) crosses x axis at (5 - 2, 0) and (-5 - 2, 0) Page 159 © Mathswatch Graphs of Trigonometric Functions - 1 of 2 Clip 168 1) On the axes below below, draw a sketch-graph to show $y = \cos x y 1 x 90 180 270 360 - 1$ Given that $\sin 30^\circ = 0.5$, write down the value of: (i) $\cos 120^\circ - 0.5$ (ii) $\sin 330^\circ - 0.5$ (ii) $\cos 120^\circ - 0.5$ -0.5 Page 160 © Mathswatch 1) Graphs of Trigonometric Functions - 2 of 2 Clip 168 On the axes below, draw a sketch-graph to show s the graph of y = cos ax + b, for values of x between 0 and 300°. the graph values and b.y = cos x for 0 < x < 360°. 2) Work Here out is the of of theacurve y 4 3 2 1 a) Use the graph to solve $\cos x
= 0.75$ for $0 < x < 360^{\circ}$ b) Use the graph to solve $\cos x = -0.75$ for $0 < x < 360^{\circ}$ b) Use the graph to solve $\cos x = -0.75$ for $0 < x < 360^{\circ}$ b) Use the graph to solve $\cos x = -0.75$ for $0 < x < 360^{\circ}$ b) Use the graph to solve $\cos x = -0.75$ for $0 < x < 360^{\circ}$ b) Use the graph to solve $\cos x = -0.75$ for $0 < x < 360^{\circ}$ b) Use the graph to solve $\cos x = -0.75$ for $0 < x < 360^{\circ}$ b) Use the graph to solve $\cos x = -0.75$ for $0 < x < 360^{\circ}$ b) Use the graph to solve $\cos x = -0.75$ for $0 < x < 360^{\circ}$ b) Use the graph to solve $\cos x = -0.75$ for $0 < x < 360^{\circ}$ b) Use the graph to solve $\cos x = -0.75$ for $0 < x < 360^{\circ}$ b) Use the graph to solve $\cos x = -0.75$ for $0 < x < 360^{\circ}$ b) Use the graph to solve $\cos x = -0.75$ for $0 < x < 360^{\circ}$ b) Use the graph to solve $\cos x = -0.75$ for $0 < x < 360^{\circ}$ b) Use the graph to solve $\cos x = -0.75$ for $0 < x < 360^{\circ}$ b) Use the graph to solve $\cos x = -0.75$ for $0 < x < 360^{\circ}$ b) Use the graph to solve $\cos x = -0.75$ for $0 < x < 360^{\circ}$ b) Use the graph to solve $\cos x = -0.75$ for $0 < x < 360^{\circ}$ b) Use the graph to solve $\cos x = -0.75$ for $0 < x < 360^{\circ}$ b) Use the graph to solve $\cos x = -0.75$ for $0 < x < 360^{\circ}$ b) Use the graph to solve $\cos x = -0.75$ for $0 < x < 360^{\circ}$ b) Use the graph to solve $\cos x = -0.75$ for $0 < x < 360^{\circ}$ b) Use the graph to solve $\cos x = -0.75$ for $0 < x < 360^{\circ}$ b) Use the graph to solve $\cos x = -0.75$ for $0 < x < 360^{\circ}$ b) Use the graph to solve $\cos x = -0.75$ for $0 < x < 360^{\circ}$ b) Use the graph to solve $\cos x = -0.75$ for $0 < x < 360^{\circ}$ b) Use the graph to solve $\cos x = -0.75$ for $0 < x < 360^{\circ}$ b) Use the graph to solve $\cos x = -0.75$ for $0 < x < 360^{\circ}$ b) Use the graph to solve $\cos x = -0.75$ for $0 < x < 360^{\circ}$ b) Use the graph to solve $\cos x = -0.75$ for $0 < x < 360^{\circ}$ b) Use the graph to solve $\cos x = -0.75$ for $0 < x < 360^{\circ}$ b) Use the graph to solve $\cos x = -0.75$ for $0 < x < 360^{\circ}$ b) Use the graph to solve $\cos x =$ $= 2 \sin x + 1 B 2 1 90^\circ A x y = \sin x + 1 B 2 1 90^\circ A x y = \sin x + 1$ for values of X. Write down the coordinates of B. (180°, 0) (90°, 2) On the same diagram, sketch the graph of $y = 2 \sin x + 1$ for values of x between 0 and 360°. The diagram below shows the graph of y = cos ax + b, for values of x between 0 and 300°. Work out the values of a and b. a=2 b=3 y 4 y = cos x + 3 1 y = cos x x 90 180 270 Page 162 Mathswatch 1) Graphs of Exponential Functions Clip 170 Using (1, 3) y Using (4, 375) y = pqx 3 = pq 3 p = q y = pqx 375 = pq4 3 Replacing p with q 375 = pq4 3 Replacing p with q 375 = pq4 3 × q4 375 = q 375 = 3q3 (4, 375) (1, 3) q3 = 125 q = 5 x 3 p = q p = 3 5 The sketch-graph shows a curve with equation y = pqx. The curve passes through the points (1, 3) and (4, 375). Calculate the value of q. p = 0.6 and q = 5 The graph shows the number of bacteria living in a petri dish. The number N of bacteria at time t is given by the relation: $N = a \times bt$ The curve passes through the point (0, 400). $N = a \times bt$ 0 a) Use this information to show that a = 400. $N = 400 \times bt$ 2 b) Use this information to find the value of b. $900 = 400 \times bt$ 2 b) Use this information to show that a = 400. $N = a \times bt$ 0 a) Use this information to show that a = 400. $N = a \times bt$ 0 a) Use this information to find the value of b. $900 = 400 \times bt$ 2 b) Use this information to find the value of b. $900 = 400 \times bt$ 2 b) Use this information to find the value of b. $900 = 400 \times bt$ 2 b) Use this information to find the value of b. $900 = 400 \times bt$ 2 b) Use this information to find the value of b. $900 = 400 \times bt$ 2 b) Use this information to find the value of b. $900 = 400 \times bt$ 2 b) Use this information to find the value of b. $900 = 400 \times bt$ 2 b) Use this information to find the value of b. $900 = 400 \times bt$ 2 b) Use this information to find the value of b. $900 = 400 \times bt$ 2 b) Use this information to find the value of b. $900 = 400 \times bt$ 2 b) Use this information to find the value of b. $900 = 400 \times bt$ 2 b) Use this information to find the value of b. $900 = 400 \times bt$ 2 b) Use this information to find the value of b. $900 = 400 \times bt$ 2 b) Use this information to find the value of b. $900 = 400 \times bt$ 2 b) Use this information to find the value of b. $900 = 400 \times bt$ 2 b) Use this information to find the value of b. $900 \pm 400 \times bt$ 2 b) Use this information to find the value of b. $900 \pm 400 \times bt$ 2 b) Use this information to find the value of b. $900 \pm 400 \times bt$ 2 b) Use this information to find the value of b. $900 \pm 400 \times bt$ 2 b) Use this information to find the value of b. $900 \pm 400 \times bt$ 2 b) Use this information to find the value of b. $900 \pm 400 \times bt$ 2 b) Use this information to find the value of b. $900 \pm 400 \times bt$ 2 b) Use this information to find the value of b. $900 \pm 400 \times bt$ 2 b) Use this information to find the value of b. $900 \pm 400 \times bt$ 2 b) Use this information to find the value of b. $900 \pm 400 \times bt$ 2 b) Use this information to fi number of bacteria in the dish at time t = 3. N = 1350 N = 400 × (1.5t Time (hours) 3 N = 400 × (2.7 8) N = 50 × 27 N = 1350 Page 163 © Mathswatch 1) Enlargement by Negative Scale Factor Clip 171 Enlarge triangle T by scale factor -2 using coordinates (2, 2) as the centre of enlargement. y 6 5 4 T 3 × 2 1 -6 -5 -4 -3 -2 -1 x O 1 2 3 4 5 6 -1 -2 -3 -4 -5 -6 2) Describe fully the single transformation which maps triangle U. y Enlargement at (-2, -2) 6 5 4 U 3 2 1 -6 -5 -4 -3 -2 -1 O x 1 2 3 4 5 6 -1 -2 -3 -4 T -5 -6 Page 164 © Mathswatch 1) Equations of Circles and Loci Clip 172 Show that any straight line which passes through the point (1, 1) must intersect the curve with equation $x^2 + y^2 = 9$ at two points. $y^2 + y^2 = 9$ is a circle with centre (0, 0). Point (1, 1) lies inside the curve at two points. $y^2 + y^2 = 9$ is a circle with centre (0, 0). Point (1, 1) lies inside the curve at two points. $y^2 + y^2 = 9$ is a circle with centre (0, 0). 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The locus of P has the following property: The distance of the point (0, 3) is the same as the distance of the point P from the x-axis. 2 Show that y = x + 9.6 y $y = x^2 + 9.6$ y $y = x^2 + 9$ out the size of the angle marked x. 36.2° Give your answer correct to one decimal place. C Sin A = Sin 30 13 11 a b 11 cm Sin A = $13 \times Sin 30 13 11$ a b 11 cm Sin A = $13 \times Sin 30 11 13$ cm x $30^{\circ} A B c xxx 2$) c A ABC is a triangle. AC = $8 \text{ cm BC} = 9 \text{ cm Angle ACB} = 43^{\circ} \text{ Calculate the length of AB}$. the sides of a triangle are 4.1 cm, 5.4 cm and 7.8 cm. Calculate the size of the largest angle of the triangle. 109.6° A Give your answer correct to 1 decimal place. A is the largest angle because it is opposite the largest angle of the triangle. 109.6° A Give your answer correct to 1 decimal place. A is the largest angle because it is opposite the largest angle of the triangle. 109.6° A Give your answer correct to 1 decimal place. A is the largest angle because it is opposite the largest angle of the triangle. 109.6° A Give your answer correct to 1 decimal place. A since the largest angle because it is opposite the largest angle because it is $9 \times 8 \times \cos 43 c_2 = 39.6851 2 B B$ Find the missing lengths, x cm and y cm, in this triangle. x = 13.9 cm y = 11.3 cm Give your answers to 3 significant figures. b = 12.6 Sin 50 Sin 59 y c y = 12.6 × Sin 50 Sin 59 y c y = 12.6 × Sin 50 Sin 59 12.6 × Sin 71 Sin 59 50° C 71° a 12.6 cm B Page 166 © Mathswatch 1) Clip 174 Pythagoras in 3 Dimensions The diagram shows a box in the shape of a cuboid. AB = 6cm, BC = 4cm, CG = 3cm A
string runs diagonally across the box from D to F and is 18cm long. G E F 18cm D C Calculate the length AE. 11.8 cm Give your answer correct to 3 significant figures. AE = 182 - 112 - 82 3) 11cm A 8cm The diagram shows a wedge from A to C. AC = 202 + 172 + 82 Calculate the length AC 27.4 cm Give your answer correct to 3 significant figures. 4) 3cm F Calculate the length of the string AG. Give your answer correct 7.81 cm to 3 significant figures. AG = 62 + 42 + 32 G B C D 8cm E F 17cm 20cm A Two points, P and Q, lie on coordinate axes. By Q (7, 5, 2) Find the distance PQ to 1 decimal place. 5.5 D2 = $x^2 + y^2 + z^2$ Q (7, 5, 2) P (2, 3, 1) P (2, 3, 1) D2 = (7 - 2)^2 + (5 - 3)^2 + (2 - 1)^2 x D2 = 52 + 22 + 12 D = 30 z Page 167 © Mathswatch 1) Trigonometry in 3 Dimensions Clip 175 The diagram shows a wedge. The base of the wedge is a horizontal. S R C D 21 A 60 cm 80 cm B Step 1: Find AC using Pythagoras in triangle ABC. Answer: AC = 100 cm Step 2: Find CR using Tan 21 in triangle BCR. Answer: CR = 30.71 cm Step 3: Find angle RAC using Tan in triangle RAC = 17.1° Calculate the angle that AR makes with the horizontal plane ABCD. 17.1° Give your answer correct to 1 decimal place. 2) The diagram shows a box in the shape of a cuboid. A string runs diagonally across the box from C to E. H E G F 25 cm D C 40 cm A 30 cm B a) Work out the length of the string CE and the horizontal place. CE = 302 + 402 + 252 b) Work out the length of the string CE and the horizontal place. we have CE = 55.9 cm and AE = 25 cm. It has a right angle at A. Use Sin to find the required angle. Page 168 @ Mathswatch Clip 176 Area of Triangles Using ½abSinC 1) B A Diagram NOT accurately drawn. A = ½abSinC 8 cm 10 cm ABC is a triangle. AC = 8 cm. BC = 10 cm Angle ACB = 42° 42° C Calculate the area of triangle ABC. 26.8 cm2 Give Angle BAC = 54° Angle ABC = 39° 54° A Diagram NOT accurately drawn. 31 cm 39° B Calculate the area of triangle ABC. 356 cm2 Give your answer correct to 3 significant figures. Page 169 © Mathswatch 1) Cones and Spheres Clip 177 V = A cone has a base radius of 4 cm and a vertical height of 8 cm. a) Calculate the volume of the cone. 134 cm3 Give your answer correct to 3 significant figures. 2) r2h CSA = b) Use Pythagoras' Theorem to find the slant height of the cone. 8.9 cm Give your answer correct to 3 significant figures. 2) r2h CSA = b) Use Pythagoras' Theorem to find the slant height of the cone. 8.9 cm Give your answer correct to 3 significant figures. 2) r2h CSA = b) Use Pythagoras' Theorem to find the slant height of the cone. 8.9 cm Give your answer correct to 3 significant figures. 2) r2h CSA = b) Use Pythagoras' Theorem to find the slant height of the cone. 8.9 cm Give your answer correct to 3 significant figures. 2) r2h CSA = b) Use Pythagoras' Theorem to find the slant height of the cone. 8.9 cm Give your answer correct to 3 significant figures. 2) r2h CSA = b) Use Pythagoras' Theorem to find the slant height of the cone. 8.9 cm Give your answer correct to 3 significant figures. 2) r2h CSA = b) Use Pythagoras' Theorem to find the slant height of the cone. 8.9 cm Give your answer correct to 3 significant figures. 2) r2h CSA = b) Use Pythagoras' Theorem to find the slant height of the cone. 8.9 cm Give your answer correct to 3 significant figures. 2) r2h CSA = b) Use Pythagoras' Theorem to find the slant height of the cone. 8.9 cm Give your answer correct to 3 significant figures. 2) r2h CSA = b) Use Pythagoras' Theorem to find the slant height of the cone. 8.9 cm Give your answer correct to 3 significant figures. 2) r2h CSA = b) Use Pythagoras' Theorem to find the slant height of the cone. 8.9 cm Give your answer correct to 3 significant figures. 2) r2h CSA = b) Use Pythagoras' Theorem to find the slant height of the cone. 8.9 cm Give your answer correct to 3 significant figures. 2) r2h CSA = b) Use Pythagoras' Theorem to find the cone. 8.9 cm Give your answer correct to 3 significant figures. 2) r2h CSA = b) Use Pythagoras' Theorem to find the cone. 8.9 cm Give your answer correct to 3 significant figures. 2) r2h CSA = b) Use Pythagoras' Theorem to find the cone. 8.9 cm Give your answer correct to 3 significant figures. 2) r2h CSA = b) r 2 12 cm a) Calculate the volume of the sphere. 7240 cm Give your answer correct to 3 significant figures. 3 b) Find the curved surface area of the sphere. 1810 cm2 Give your answer correct to 3 significant figures. 3) A cone has a base radius of 8 cm and a slant height of 10 cm. Calculate the volume of the cone. 128 Leave your answer in terms of Area of triangle AOB $\frac{1}{2} \times 6 \times 6 \times \sin 100 = 17.73$ 6 cm 100° O Area of shaded segment 31.42 - 17.73 = 13.7 to 3 sig figs. 6 cm B 2) The diagram shows a cone of height 8 cm is removed to form a frustum. V = = 1 3 1 3 r2h V = $\times 3.142 \times 102 \times 40$. = 4189.3 8 cm r = 1 3 1 3 r2h $\times 3.142 \times 22 \times 8$ = $33.51 \text{ V} = 4189.33 - 33.51 = 4155.82 \text{ r} 40 \text{ cm} 10 \text{$ triangles Clip 179 ABCD is a quadrilateral. A B D AB is parallel to CD. DA is parallel to CB. C Prove that triangle ABD is congruent to triangle ABD is a shared side. Therefore ABD is congruent to CDB (SSS) 2) P Q T S R X U PQRS is a square. PTS and SUR are equilateral triangles. a) Prove that triangle USP is congruent to TSR (SAS) X is the point such that RUXT is a parallelogram. b) Prove that UP = UX UP = RT (corresponding sides of congruent triangles) RT = UX (opp. sides of congruent to TSR (SAS) X is the point such that RUXT is a parallelogram. b) Prove that UP = RT (corresponding sides of congruent to TSR (SAS) X is the point such that RUXT is a parallelogram. b) Prove that UP = UX UP = RT (corresponding sides of congruent triangles) RT = UX (opp. sides of congruent to TSR (SAS) X is the point such that RUXT is a parallelogram. b) Prove that UP = RT (corresponding sides of congruent to TSR (SAS) X is the point such that RUXT is a parallelogram. b) Prove that UP = RT (corresponding sides of congruent to TSR (SAS) X is the point such that RUXT is a parallelogram. b) Prove that UP = RT (corresponding sides of congruent to TSR (SAS) X is the point such that RUXT is a parallelogram. b) Prove that UP = RT (corresponding sides of congruent to TSR (SAS) X is the point such that RUXT is a parallelogram. b) Prove that UP = RT (corresponding sides of congruent to TSR (SAS) X is the point such that RUXT is a parallelogram. b) Prove that UP = RT (corresponding sides of congruent to TSR (SAS) X is the point such that RUXT is a parallelogram. b) Prove that UP = RT (corresponding sides of congruent to TSR (SAS) X is the point such that RUXT is a parallelogram. b) Prove that RUXT is a parallel parallelogram are equal) Therefore UP = UX Page 172 © Mathswatch 1) Vectors - page 1 of 2 Clip 180 The diagram shows a trapezium PQRS. PQ = a and QR = b. Q PS is three times the length of QR. b Diagram NOT accurately drawn R a P Find, in terms of a and b, expressions for a) QP = -a 2) b) PR = a + b c) PS = 3b S QS = QP + PS = -a + 3b d) QS = 3b - a In triangle ABC, P and Q are the midpoints of AB and AC. Diagram NOT accurately drawn A AP = p and AQ = q. p P q Q a) Find, in terms of p and q, expressions for (i) PQ q-p (ii) AB 2p (iii) AC 2q (iv) BC 2q - 2p B b) Use your results from (a) to prove that PQ is parallel to BC. PQ = q - p BC = 2q - 2p = 2(q - p) C Therefore PQ is parallel to BC. BC B 3) Diagram NOT accurately drawn b D O C A a OAB is a triangle. D is the midpoint of OB. C is the midpoint of AB. OA = a and OB = b (i) Find OC in terms of a and b. OC = $\frac{1}{2}(a + b)$ (ii) Show that DC is parallel to OA. OC = OA + AC AC = $\frac{1}{2}(a + b)$ OC = $\frac{1}{2}(a + b)$ (ii) Show that DC is parallel to OA. OC = OA + AC AC = $\frac{1}{2}(a + b)$ OC = $\frac{1}{2}(a$ Therefore DC is parallel to OA Page 173 © Mathswatch Vectors - page 2 of 2 Clip 180 1) p P Q Diagram NOT accurately drawn q U 2q R T X S PQRSTU is a regular hexagon. PQ = p QR = q PS = 2q a) Find the vector PR in terms of p and q. SX = = = = PQ = PR = RX b) Prove that PQ is parallel to SX 2) B M PR = p + q SP + PX SP + 2PR - 2q + 2(p + 2) PR - 2(p + 2) PR + q) -2q + 2p + 2q 2p p Therefore PQ is parallel to SX C Y X A N ABCD is a trapezium with BC parallel to AD. AB = 3 b BC = 3 a Diagram NOT accurately drawn AD = 9 a M is the midpoint of AD. a) Find the vector MN in terms of a and b. MN = 3a - 3b X is the midpoint of CD. b) Prove that XY is parallel to AD. D Working for part b) $XY = = = XN + ND + DY \frac{1}{2}MN + ND + DY \frac{1}{2}B - 3a XY = 6a - 1\frac{1}{2}b + 1\frac{1}{2}b - 3a XY = 6a - 1\frac{1}{2}b + 1\frac{1}{2}b - 3a XY = 6a - 1\frac{1}{2}b + 1\frac{1}{2}b - 3a XY = 6a - 1\frac{1}{2}b + 1\frac$ centimetres, of some 18 year old students. Use the table to draw a histogram. Height (h cm) Frequency 135 < h < 145 12 145 < h < 145 12 145 15 165 175 185 Height (h cm) 195 2. The histogram shows the amount of time, in hours, that students spend on their homework per week. 27 Frequency Frequency density = Class width From the numbers in the table: Frequency density = 27 = 27 1 0 1 2 3 4 5 Use the histogram to complete the table. Time (t hours) Frequency 0

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