

Week 6

This week in a nutshell:

This week the topics are accessed through previously developed skills, in such a way that more abstract and challenging areas of maths can be seen to be an extension of existing knowledge. Working through these questions will help your students understand that they are truly capable as young mathematicians.

Question 1: Quadratic roots

Question 2: Interpret proportion

Question 3: Theoretical probability

Question 4: Real life reciprocal graphs

Question 5: Derive triangle results

This week's ideas for class discussion include:

Question 1: **Quadratic roots**

- Does a quadratic equation always have two roots?
- How do you verify that the roots you have found are correct?

Question 2: **Interpret proportion**

- Proportion is used to describe multiplicative relationships; what topics have you studied that could be included in this description?

Question 3: **Theoretical probability**

- Does theory always match what we see in the real world? How would you investigate this?

Question 4: **Real life reciprocal graphs**

- Why are real life reciprocal graphs generally in the first quadrant of the axes?

Question 5: **Derive triangle results**

- Why is it so important to be able to derive our own formulas and results?

Week 6: Day 1

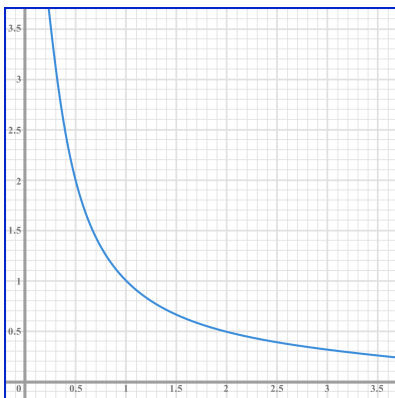
- 1) Determine the roots of the equation

$$x(x - 5) = 0$$

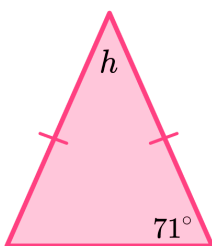
- 2) Raj is paid £7.50 per hour. How much is he paid for 8 hours of work?

- 3) When rolling a 6-sided die, what is the probability of scoring a number less than six?

- 4) What is the value of y when $x=1$?



- 5) Work out the size of angle h .



Week 6: Day 1 Answers

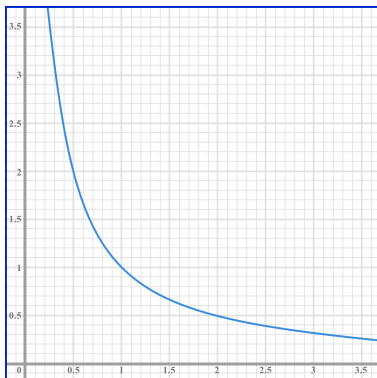
- 1) Determine the roots of the equation

$$x(x - 5) = 0 \quad \mathbf{0 \text{ and } 5}$$

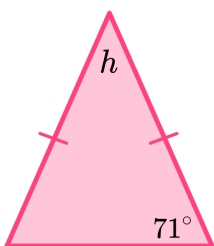
- 2) Raj is paid £7.50 per hour. How much is he paid for 8 hours work? $\mathbf{£60}$

- 3) When rolling a 6-sided die, what is the probability of scoring a number less than six? $\frac{5}{6}$

- 4) What is the value of y when $x=1$? $\mathbf{1}$



- 5) Work out the size of angle h . $\mathbf{38^\circ}$



Week 6: Day 2

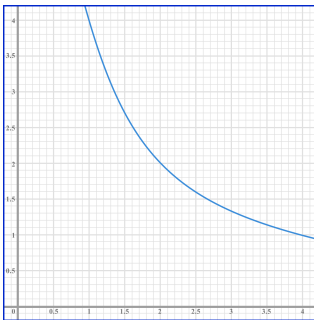
- 1) Determine the roots of the equation

$$(x + 2)(x - 7) = 0$$

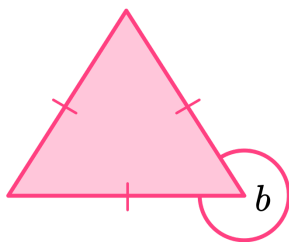
- 2) Sonja worked for 9 hours. She was paid £58.50. What was her hourly rate?

- 3) A bag contains 8 blue balls, 4 yellow balls, and 3 red balls. What is the theoretical probability of getting a red ball?

- 4) What is the value of y when $x=4$?



- 5) Determine the size of angle b .



Week 6: Day 2 Answers

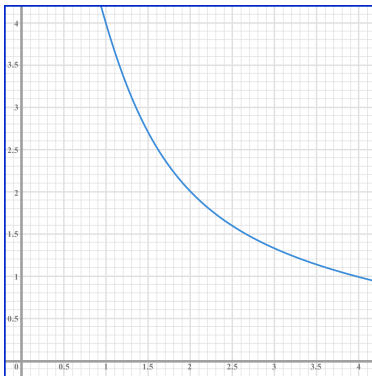
- 1) Determine the roots of the equation

$$(x + 2)(x - 7) = 0 \quad -2 \text{ and } 7$$

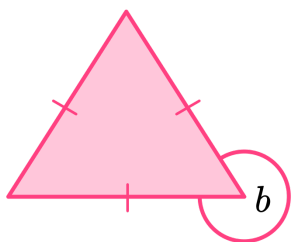
- 2) Sonja worked for 9 hours. She was paid £58.50. What was her hourly rate? £6.50

- 3) A bag contains 8 blue balls, 4 yellow balls, and 3 red balls. What is the theoretical probability of getting a red ball? $\frac{3}{15}$ or $\frac{1}{5}$

- 4) What is the value of y when $x=4$? 1



- 5) Determine the size of angle b . 300°



Week 6: Day 3

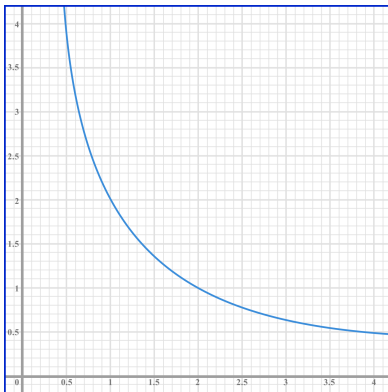
- 1) Determine the roots of the equation

$$(2x - 1)(x - 4) = 0$$

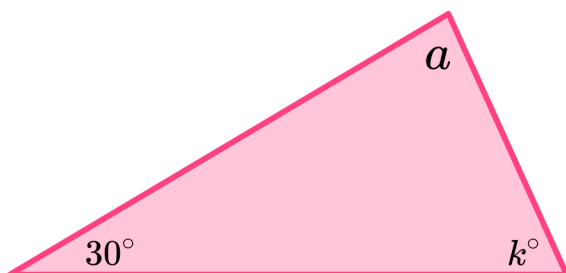
- 2) Three bottles of cola costs £3.60. How much would eight bottles of cola cost?

- 3) If a 6-sided die is rolled once, find the probability of getting a prime number.

- 4) What is the value of y when $x=1$?



- 5) Derive a formula that could be used to calculate the size of angle a .



Week 6: Day 3 Answers

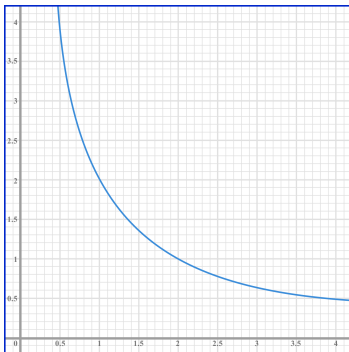
- 1) Determine the roots of the equation

$$(2x - 1)(x - 4) = 0 \quad \frac{1}{2} \text{ and } 4$$

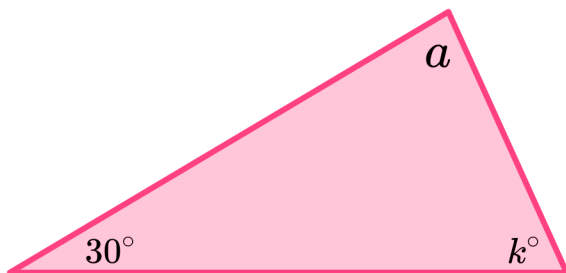
- 2) Three bottles of cola costs £3.60. How much would eight bottles of cola cost? £9.60

- 3) If a 6-sided die is rolled once, find the probability of getting a prime number. $\frac{3}{6}$ or $\frac{1}{2}$

- 4) What is the value of y when $x=1$? 2



- 5) Derive a formula that could be used to calculate the size of angle a .



$$a = 150 - k$$

Week 6: Day 4

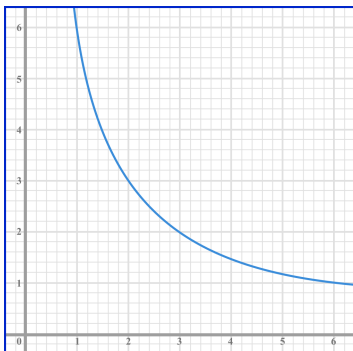
- 1) Determine the roots of the equation

$$x^2 - 9 = 0$$

- 2) Plasterboard costs £3.25 per m². How much would it cost to board a ceiling that is 5m by 6m?

- 3) What is the probability of selecting a vowel at random from the word "MATHEMATICS"?

- 4) Estimate the value of x when $y=4$.



- 5) Explain why you cannot draw a triangle that contains two obtuse angles?

Week 6: Day 4 Answers

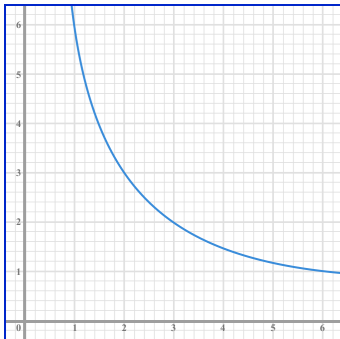
- 1) Determine the roots of the equation

$$x^2 - 9 = 0 \quad -3 \text{ and } 3$$

- 2) Plasterboard costs £3.25 per m². How much would it cost to board a ceiling that is 5m by 6m? **£97.50**

- 3) What is the probability of selecting a vowel at random from the word "MATHEMATICS"? $\frac{4}{11}$

- 4) Estimate the value of x when $y=4$. ≈ 1.5



- 5) Explain why you cannot draw a triangle that contains two obtuse angles?

As an obtuse angle is greater than 90° , the resulting triangle would have an angle sum in excess of 180° .

Week 6: Day 5

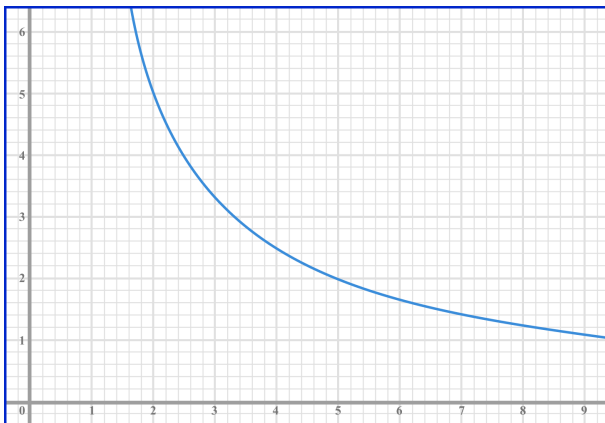
- 1) Determine the roots of the equation

$$x^2 + 10x + 25 = 0$$

- 2) Bill and Ben share £126. Bill gets twice as much as Ben. How much does Ben receive?

- 3) What is the probability of rolling a 6-sided die and getting a number not divisible by three?

- 4) Estimate the value of y when $x=6$.



- 5) The sizes of the angles in a triangle are in the ratio 2:5:11. Sketch a possibility for this triangle and label the sizes of the angles.

Week 6: Day 5 Answers

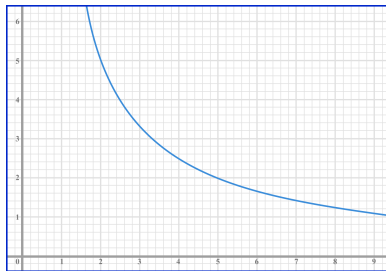
- 1) Determine the roots of the equation

$$x^2 + 10x + 25 = 0 \quad -5 \text{ (repeated)}$$

- 2) Bill and Ben share £126. Bill gets twice as much as Ben. How much does Ben receive? **£42**

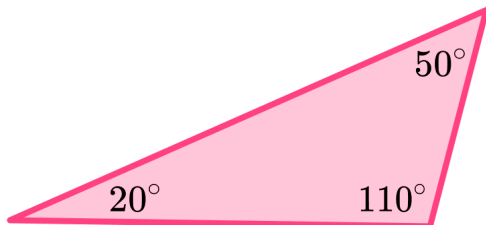
- 3) What is the probability of rolling a 6-sided die and getting a number not divisible by three? $\frac{4}{6}$ or $\frac{2}{3}$

- 4) Estimate the value of y when $x=6$.



≈ 1.7

- 5) The sizes of the angles in a triangle are in the ratio 2:5:11. Sketch a possibility for this triangle and label the sizes of the angles.



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