

Simplifying expressions

Show that

$$\frac{1}{3x-15} \div \frac{1}{2x^2-9x-5}$$

simplifies to give

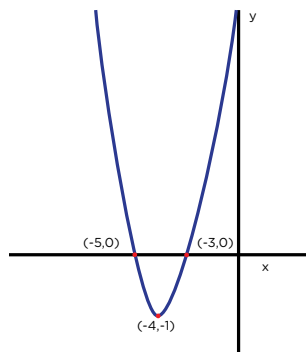
$$\frac{2x+1}{3}$$

Expanding Brackets

Show that $(2x-8)^2 \neq 4x^2-64$

Sketching Quadratic Graphs

Explain why this is not a correct sketch of the curve $y = x^2 - 8x + 15$.



Odd x Odd = Odd

Using algebra, prove that the product of two odd numbers is always odd.

Algebraic Fractions

$$\begin{aligned} \text{Show that } \frac{4x+3}{2} - \frac{2x-1}{3} \\ = \frac{8x+11}{6} \end{aligned}$$

Drinks

These mixed questions will make a great accompaniment to your meal.



Completing the Square

Express $x^2 - 4x + 9$ in the form $(x+a)^2 + b$.

£2

Equation of a Circle

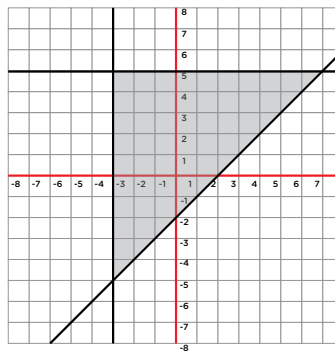
Find the diameter of the circle with equation

$$x^2 + y^2 = 81$$

and centre at (0,0).

Inequalities

Write the inequalities satisfied by the shaded region on the graph.



£2

£2

Equation of a Line

Find the equation of the line going through the points (1,3) and (4,9).

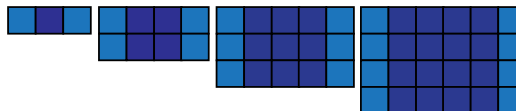
Subject of the Formula

$$\text{Make } y \text{ the subject of the formula} \\ 4 - y = \frac{5 - 3y}{x}$$

£2

Patterns

£3



Adam creates patterns with purple and blue tiles. Find a rule for the number of tiles in the n th pattern.

Thank you for ordering your food with us.

We hope you have enjoyed your meal.

Please come back again soon.

£2

£3

£2

£3

£3

Maths Take-Away Menu

Algebra



GCSE Mathematics
Higher Tier

Using this Take-Away Menu

For each sitting you will need to choose a Starter, Main Course, Dessert & Drink.

The prices vary for each course.



This symbol indicates that a calculator may be used when answering the question.

Remember to ensure that you show your workings clearly.

If you have any questions don't forget to ask your waiter (that's your teacher).
Enjoy your meal!

Starters

These are quick questions designed to warm you up and get your appetite for maths going!



Factorising

Factorise $16x^2 - 36$

Sequences

Find the n th term rule for the following sequence:
17, 13, 9, 5, 1, ...

Expanding brackets

Expand and simplify $(a + 2)(a - 3)$

Solving Linear Equations

Solve $5x - 8 = 2x + 13$

Rules of Indices

Simplify $\frac{4xy^4 \times 5x^2y}{2x^4y^3}$

Solving Inequalities

Find the values of x such that

$$-11 < 3x - 2 \leq 4$$

Main Course

Your main dish is algebra based and is served with 'portions' from other areas of Maths or real life applications. These problem solving questions may take a bit more time to digest.

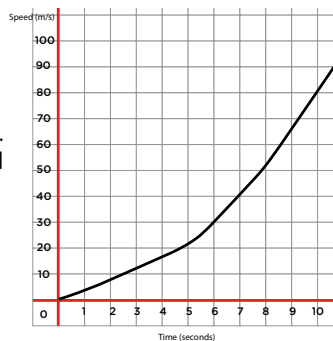


Consecutive numbers

The sum of the squares of three consecutive positive whole numbers is equal to 245. Find the 3 numbers.

Acceleration

The graph shows the speed of a car accelerating over a period of 10 seconds. Use the graph to find the acceleration of the car at 5 seconds and estimate the distance travelled by the car in the first 5 seconds.



Cinema Ticket Prices



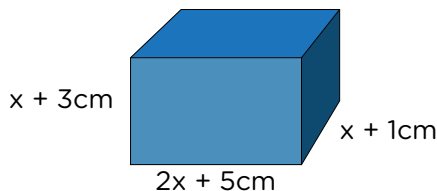
Mr & Mrs Khan take their 3 children to their local cinema. They purchase tickets for the whole family at a cost of £31.15.

Mrs Thomas takes her two friends and their two children to the same cinema. She has a loyalty card and so receives a 20% discount on the price of the tickets. The tickets cost her a total of £28.28.

Use this information to find the regular price of an adult ticket and the regular price of a child ticket at the cinema.

Quadratic Equations

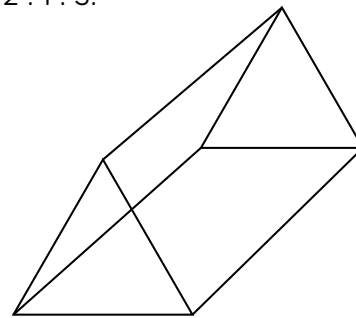
A cuboid with dimensions $(x+1)$ cm, $(x+3)$ cm and $(2x + 5)$ cm has a total surface area of 382cm^2 .



Find the dimensions of the cuboid.

Volume of a Triangular Prism

A triangular prism's base, vertical height and depth are in the ratio 2 : 1 : 3.



$2x + 4\text{cm}$

If the base is $2x + 4\text{cm}$ write an expressions for the volume of the triangular prism.

Calculating Speed

Kelly runs 10km in the same time it takes Lucy to run 6km.

If Kelly runs 3km/h faster than Lucy use an algebraic method to find each girls speed.

Points of Intersection

The straight line $y = x+1$ intersects a circle with radius 5 and centre $(0,0)$ at two different points.

Find the coordinates of these two points.

Dessert

"The proof of the pudding is in the eating".

These questions are designed to test your understanding of key algebra concepts.



Parallel and Perpendicular Lines

Prove that the line $y = 2x - 4$ is perpendicular to the line $y = -0.5x - 1$.