

Maths

Practice Questions

GCSE & A-level
AQA



Instructions

Individual, exam-style questions

The questions contained in this booklet match the style of questions that are typically asked in exams. This booklet is not however, a practice exam. Elevate's research with top students identified that top students do more practice questions than anyone else. They begin the process of testing their knowledge early in the year.

Therefore, we have provided exam-format questions that are sorted by topic so that you can answer them as you learn the information, rather than waiting until the very end of the year to complete exams.

Comments, questions?

Let us know if you need any further advice by visiting www.elevateeducation.com. You can comment on any of our material, or head to the FAQ section and ask us a question. Also, you can find us on social media so you can stay up to date on any brand new tips we release throughout the year.

Other information

Every effort has been made to ensure the accuracy of the information expressed in this booklet, but no warranty or fitness is implied. If you'd like to provide any feedback on this booklet, let us know at admin@elevateeducation.com. No part of this publication may be reproduced, stored in a retrieval system, or transmitted by any means without prior written consent of the publisher.

GCSE

1. Mohinoor is a university student studying French and Spanish.
 - a. He spends a total of 50 hours a week on his university work. 70% of this time is spent studying doing French. How many hours per week does he spend doing studying French?
 - b. Of the total 50 hours, Mohinoor spends 15 hours a week doing homework. What percentage of the total time is this?
 - c. To save time, Mohinoor pays a friend \$45 to do his homework for him. His friend takes 12 hours to finish the homework. How much does he pay his friend per hour?

2. A rectangle has side lengths $a = 4.2 \times 10^{-4}$ cm and $b = 2.0 \times 10^{-4}$ cm. Answers in this question must be given in standard form..
 - a. Work out the perimeter of the rectangle. (ii) Work out the area of the rectangle.
 - b. If a circle has the same area as the rectangle, what radius must the circle have?

3. Question 3
 - a. If $y=3a-2b$ where $a=4$ and $b=3$, what is the value of y ?
 - b. Solve $2x-5=3$ to find the value of x .
 - c. Solve $3^x = 6$ to find the value of x . 5
 - d. Simplify fully $3x+2y-x+3y+4x$.

4. Question 4
 - a. Rearrange $3y-2 = x$ to make y the subject.
 - b. Factorise $16x^2 - 9y^2$.
 - c. Solve the pair of simultaneous equations $y - 4x = -2$ and $2y + 3x = 7$.



5. Clara wants to drive from Bristol to Leeds, which is a 207 mile journey. Rearrange $3y-2 = x$ to make y the subject.
- If her car uses 60 litres of petrol to travel 3.5 miles. How many litres of petrol does it use to travel 1 mile?
 - Each litre of petrol costs \$1.42 and Clara buys 12 litres of petrol. How much does this cost her?
 - Using your answer to part (i), work out if 12 litres of petrol is enough to make the journey to Leeds?

6. Question 6

- Solve the equation $x^3 = 6$. Give your answer to 3 decimal places.
- Use the quadratic formula to solve $3x^2 + 6x - 2 = 0$ for both values of x . Give your answer to 4 decimal places.
- If $\tan(x) = 0.45$, what is the value of x ? Give your answer to 3 significant figures.

A2 Level

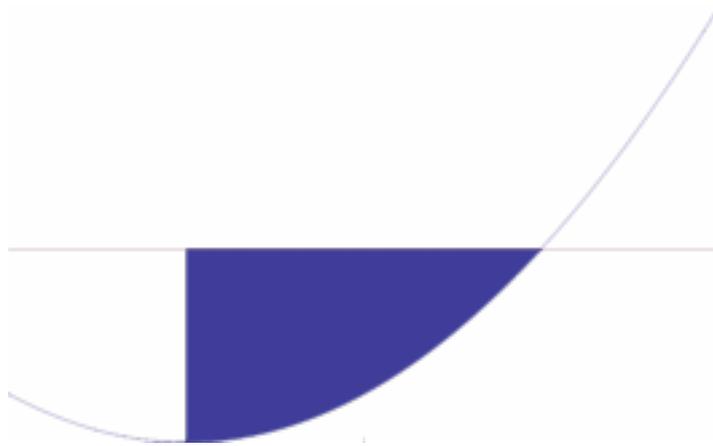
1. A curve has the equation $y = 3x^2 - 24x + 60$
 - a. Express $3x^2 - 24x + 60$ in the form $p(x-q)^2 + r$, where p , q and r are integers.
 - b. Write down the coordinates of the vertex of curve.
 - c. Hence explain why the equation $3x^2 - 24x + 60 = 0$ has no real roots.

2. Consider the function $f(x) = x^3 + x^2 - 16x + 20$
 - a. Using the Remainder Theorem, calculate the remainder when $f(x)$ is divided by $(x - 4)$.
 - b. Using the Factor Theorem, show that $(x + 5)$ is a factor of $f(x)$.
 - c. By writing $f(x) = (x + 5)(x^2 + px + q)$, find p and q , and express $f(x)$ as a product of three linear factors.
 - d. Hence write down the roots of the equation $f(x) = 0$.

3. The line AB is described by the equation $7y - 3x = 42$.
 - a. Find the gradient of the line AB.
 - b. Find the x - and y -axis intercepts of the line AB.
 - c. The line CD goes through the origin and is perpendicular to the line AB. Write down the equation of the line CD.

4. A circle is described by the equation $x^2 + 24x + y^2 - 10y = 0$
 - a. By completing the square, express this equation in the form $(x - a)^2 + (y - b)^2 = c^2$.
 - b. Hence write down the coordinates of the centre of the circle and its radius.

- c. Verify that the circle passes through the origin and find the equation of the tangent to the circle at this point.
5. The curve with the equation $y = x^3 + 6x^2 + 9x + 2$ has two stationary points, one at point P and one at point Q. The value of x at point P is -3.
- Calculate $\frac{dy}{dx}$
 - Verify that the point P is a stationary point on the curve and find the value of y at point P.
 - Find the value of x and y at point Q (the other stationary point on the curve).
 - Calculate $\frac{d^2y}{dx^2}$ and find the value of $\frac{d^2y}{dx^2}$ at point Q.
 - Hence determine whether Q is a maximum or minimum point of the curve.
6. The curve with the equation $y = 2x^2 + 4x + 5$ is sketched below. It has a minimum at point P.
- Find $\frac{dy}{dx}$ and find the x value of the minimum at point P.
 - Calculate $\int (2x^2 + 4x + 5) dx$



- Hence find the area of the shaded region above, bounded by the line $y = 2x^2 + 4x + 5$ and the line $y = 11$.