



QUESTION WORKBOOK

Graphs, proportion and transformations

Algebra and functions · Year 12–13

7 questions · 28 marks

PRINT EDITION

SECTION A · Warm-up

- A1** The curve C has equation $y = (x - 1)(x + 2)^2$. State the coordinates of the points where C crosses or touches the x -axis, and the coordinates of its y -intercept.

[3]

- A2** y is directly proportional to x^2 , and $y = 12$ when $x = 2$. Find y when $x = 5$.

[3]

SECTION B · Standard

- B1** y is inversely proportional to x , and $y = 8$ when $x = 3$. Find y when $x = 6$, and state the equations of the asymptotes of the graph of y against x .

[4]

- B2** The curve $y = f(x)$ passes through the point $(4, 3)$. Find the coordinates of the corresponding point on $y = 2f(x)$, and on $y = f(2x)$.

[3]

- B3** The curve $y = f(x)$ has a maximum point at $(2, 5)$ and crosses the x -axis at $(-1, 0)$ and $(4, 0)$. Find the coordinates of the maximum point and of the x -axis crossings of the curve $y = 2f(x + 3)$. [4]

SECTION C · Stretch

- C1** The curve C_1 has equation $y = 4/x$. The curve C_2 has equation $y = 4/(x - 2) + 3$. Describe fully the single transformation that maps C_1 onto C_2 , write down the equations of the asymptotes of C_2 , and find the exact coordinates of the points where C_2 crosses the coordinate axes. [6]

- C2** The period T seconds of a pendulum is directly proportional to the square root of its length L cm. A pendulum of length 25 cm has period 1 second. Find the period of a pendulum of length 81 cm, and find the percentage increase in length needed to double the period of any pendulum. [5]