1.2 Quadratics

Question Paper

Course	Edexcel IAL Maths: Pure 1
Section	1. Algebra & Functions
Topic	1.2 Quadratics
Difficulty	Medium

Time allowed: 60

Score: /46

Percentage: /100

Question 1

The curve C has equation $y = x^2 - 3x + 2$.

(a) Find the coordinates of any points where C intersects the coordinate axes.

[3 marks]

Question 1

(b) Sketch the graph of C, showing clearly all points of intersection with the coordinate axes.

[3 marks]

Question 2

(a) Write the quadratic function $y = x^2 + 8x - 9$ in the form $y = a(x + b)^2 + c$ where a, b and c are integers to be found.

[2 marks]

Question 2

(b) Write down the minimum point on the graph of $y = x^2 + 8x - 9$.

[1 mark]

Question 2

(c) Sketch the graph of $y = x^2 + 8x - 9$, clearly labelling the minimum point and any point where the graph intersects the coordinate axes.

[3 marks]

Question 3

(a) Solve the equation $2x^2 + x - 6 = 0$.

[2 marks]

Question 3

(b) Find the coordinates of the turning point on the graph of $y = 2x^2 + x - 6$.

[3 marks]

Question 3

(c) Sketch the graph of $y = 2x^2 + x - 6$, labelling the turning point and any points where the graph crosses the coordinate axes.

[2 marks]

Question 4

(a) Find the minimum value of the function $f(x) = x^2 + 4x + 5$.

[3 marks]

Question 4

(b) Hence, or otherwise, prove that the function $f(x) = x^2 + 4x + 5$ has no real roots.

[2 marks]

Question 5

The function $f(x) = kx^2 + 2kx - 3$ has two distinct real roots.
Show that $k < -3$ or $k > 0$.

[3 marks]

Question 6

The equation $2x^2 - 4x + 3 - 2k = 0$ has real roots.
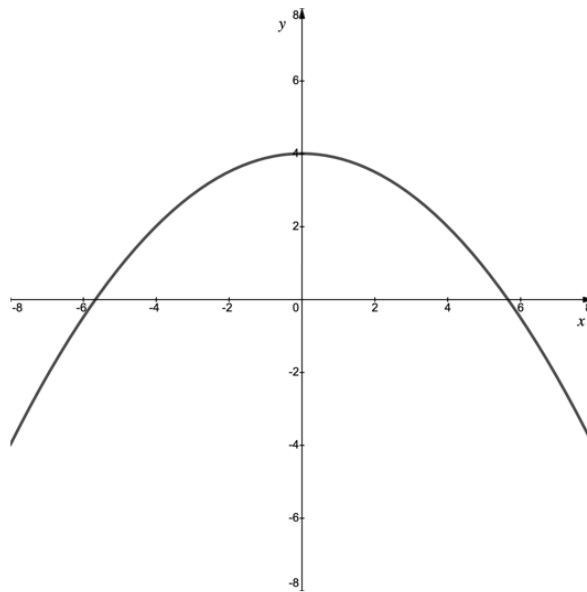Find the possible values of k.

[3 marks]

Question 7

The equation $y = x^2 + px + q$ has no real roots. Show that $p^2 < 4q$.

Question 8

The graph below shows the curve $f(x) = 4 - \dfrac{x^2}{8}$.

The curve is to be used as the model for the arch on a bridge where the water level under the bridge is represented by the x-axis. All measurements are in meters.

(a) Write down the maximum height of the bridge above the water.

Question 8
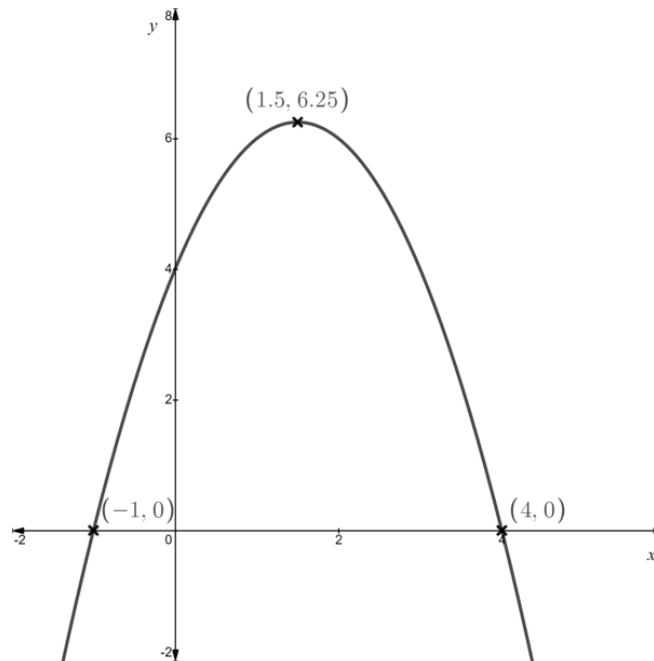
(b) Is the bridge wide enough to span a river of width 11 m?

Question 9

The diagram below shows the graph of $y = f(x)$, where $f(x)$ is a quadratic function. The intercepts with the x-axis and the turning point have been labelled.

Sketch the graph of $y = f(x + 2)$, stating the coordinates of any points that intersect the x-axis and the coordinates of the turning point.

[3 marks]

Question 10

Solve the equation $x^4 - 13x^2 + 36 = 0$.

[3 marks]

Question 11

Solve $x^{\frac{2}{5}} + x^{\frac{1}{5}} = 6$.

[4 marks]