PEARSON EDEXCEL INTERNATIONAL GCSE MATHEMATICS A (4MA1) · HIGHER TIER

Quadratic and Cubic Graphs: exam questions

10 questions · 25 marks · mark schemes at the end

Name _____ Date _____ Score / 25

- Calculators are allowed on both 4MA1 Higher papers (1H and 2H). Show your working: most marks are for method.
- Mark schemes start after the questions. M marks are for a correct method, A marks for an accurate answer that follows a correct method, and B marks for a correct result on its own.
- Online, with more practice: igcsemathrevision.com/igcse-frontend/4ma1/exam-questions/quadratic-and-cubic-graphs

1. **2 marks**

$y = x^2 - 2x - 3$

Work out the values of y when $x = -2$, $x = 1$ and $x = 4$.

2. **3 marks**

The curve $y = x^2 - 2x - 3$ is drawn.

(a) Write down the coordinates of the point where the curve crosses the y-axis. **(1)**

(b) Find the coordinates of the points where the curve crosses the x-axis. **(2)**

3. **2 marks**

Find the coordinates of the turning point of the curve $y = x^2 - 8x + 12$.

4. **3 marks**

Find the x-coordinates of the points where the curve $y = x^3 - 4x$ crosses the x-axis.

5. **2 marks**

The line $y = k$ touches the curve $y = x^2 - 6x + 5$ at exactly one point.

Find the value of k.

6. **2 marks**

The curve $y = x^2 - x - 6$ has been drawn.

Find the equation of the straight line that should be drawn on the same axes to solve $x^2 - 3x - 4 = 0$.

7. **2 marks**

$y = x^3 - 3x + 1$

Work out the values of y when $x = -2, -1, 0, 1$ and 2.

8. **3 marks**

The curve C has equation $y = (x - 2)(x + 5)$.

(a) Write down the coordinates of the points where C crosses the x-axis. **(1)**

(b) Write down the coordinates of the point where C crosses the y-axis. **(1)**

(c) Is the turning point of C a maximum or a minimum? Give a reason. **(1)**

9. **2 marks**

Find the equation of the line of symmetry of the curve $y = 2x^2 + 12x + 7$.

10. **4 marks**

$y = (x + 1)(x - 2)(x - 4)$

(a) Write down the coordinates of the points where the curve crosses the axes. **(2)**

(b) Expand and simplify $(x + 1)(x - 2)(x - 4)$. **(2)**

Answers and worked solutions

Question 1

2 marks

B2 $5,\ -4,\ 5$

B1 for two values correct.

Answer: 5, -4, 5

Question 2

3 marks

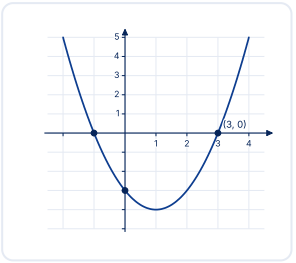
(a)

B1 $(0, -3)$

(b)

M1 $(x-3)(x+1)=0$

A1 $(-1, 0)$ and $(3, 0)$



Answer: (a) $(0, -3)$; (b) $(-1, 0)$ and $(3, 0)$

Question 3

2 marks

M1 $(x-4)^2-4$, or $x=4$ from symmetry of the roots 2 and 6

A1 $(4, -4)$

Answer: $(4, -4)$

Question 4

3 marks

M1 $x(x^2-4)=0$

M1 $x(x+2)(x-2)=0$

A1 $-2,\ 0,\ 2$

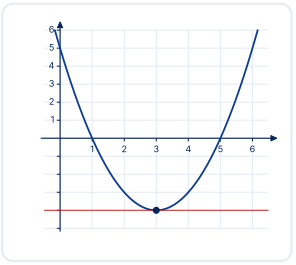
Answer: -2, 0, 2

Question 5

2 marks

M1 $(x-3)^2-4$

A1 $k=-4$



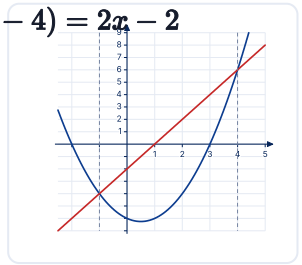
Answer: $k=-4$

Question 6

2 marks

M1 $x^2-x-6-(x^2-3x-4)=2x-2$

A1 $y=2x-2$



Answer: $y=2x-2$

Question 7

2 marks

B2 $-1,\ 3,\ 1,\ -1,\ 3$

B1 for three values correct.

Answer: -1, 3, 1, -1, 3

Question 8

3 marks

(a)

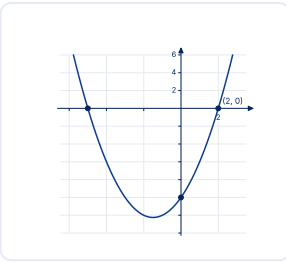
B1 $(2, 0)$ and $(-5, 0)$

(b)

B1 $(0, -10)$

(c)

B1 minimum, because the x^2 term is positive



Answer: (a) $(2, 0)$ and $(-5, 0)$; (b) $(0, -10)$; (c) a minimum

Question 9

2 marks

M1 $2(x+3)^2-11$, or $x=-\dfrac{12}{2\times 2}$

A1 $x=-3$

Answer: $x=-3$

Question 10

4 marks

(a)

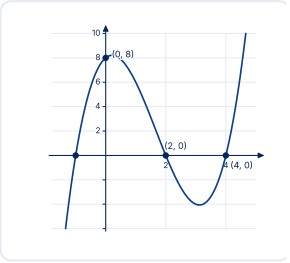
B1 $(-1, 0)$, $(2, 0)$, $(4, 0)$

B1 $(0, 8)$

(b)

M1 two brackets expanded correctly

A1 x^3-5x^2+2x+8



Answer: (a) $(-1, 0)$, $(2, 0)$, $(4, 0)$ and $(0, 8)$; (b) x^3-5x^2+2x+8

Online, with every solution: igcsemathrevision.com/igcse-frontend/4ma1/exam-questions/quadratic-and-cubic-graphs
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