FOUNDATION & HIGHER

HIGHER EXTENDS

Name ..... Class .....

A12: Graphs of functions

Solve problems using linear, quadratic, cubic, reciprocal, exponential and trigonometric graphs

20 marks · 25 minutes · Non-calculator

1) Find the two points with positive x-coordinates where $y = x^2$ and $y = 2^x$ meet. (Hint: try whole numbers.)

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[Question 1: 3 marks]

2) $y = \frac{k}{x}$ passes through $(2, 6)$. Find y when $x = 3$

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[Question 2: 2 marks]

3) $y = ab^x$ passes through $(0, 3)$ and $(2, 12)$, with $b > 0$. Find a and b.

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[Question 3: 3 marks]

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4) Find the points where $y = x^3 - 4x$ crosses the x-axis.

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[Question 4: 3 marks]

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5) $\sin 30° = 0.5$. Find another angle between $0°$ and $360°$ with $\sin x = 0.5$

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[Question 5: 2 marks]

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6) $\cos 60° = 0.5$. Use the graph of $y = \cos x$ to find all solutions of $\cos x = -0.5$ for $0° \leqslant x \leqslant 360°$

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[Question 6: 3 marks]

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7) A population is $y = 500 \times 1.2^x$ after x years. After how many whole years does it first exceed 1000?

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[Question 7: 2 marks]

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8) Find where the line $y = 2x$ meets the curve $y = \frac{8}{x}$

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[Question 8: 2 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	$(2, 4)$ and $(4, 16)$	Tries values (P1); each point (A1, A1).
2	4	$k = 12$ (P1); A1.
3	$a = 3, b = 2$	$a = 3$ (P1); $3b^2 = 12$ (P1); A1.
4	$(0, 0)$, $(2, 0)$, $(-2, 0)$	$x(x^2 - 4)$ (P1); $x(x - 2)(x + 2)$ (P1); A1.
5	150	Symmetry about 90° (P1); A1.
6	120 and 240	Symmetry of cosine (P1); $180 - 60$ (A1); $180 + 60$ (A1).
7	4	$1.2^3 = 1.728$, $1.2^4 = 2.07$ (P1); A1.
8	$(2, 4)$ and $(-2, -4)$	$x^2 = 4$ (P1); A1.