AQA
Realising potential

TOPIC TEST

A-level MATHS

Functions and transformations

Specification content coverage: B6, B7, B8, B9

In this test you will be assessed on:

- using the modulus function
- using composite and inverse functions
- using combinations of transformations.

The test comprises two sections. The questions in section A will test you on the basics of the topic. Those in section B require a bit more thinking.

Section A: The basics

1 $4x^3 + 2x^2 - 12$ is divided by $2x - 3$, find the quotient and remainder.

[3 marks]

2 (a) Factorise $2x^2 - 5x - 12$

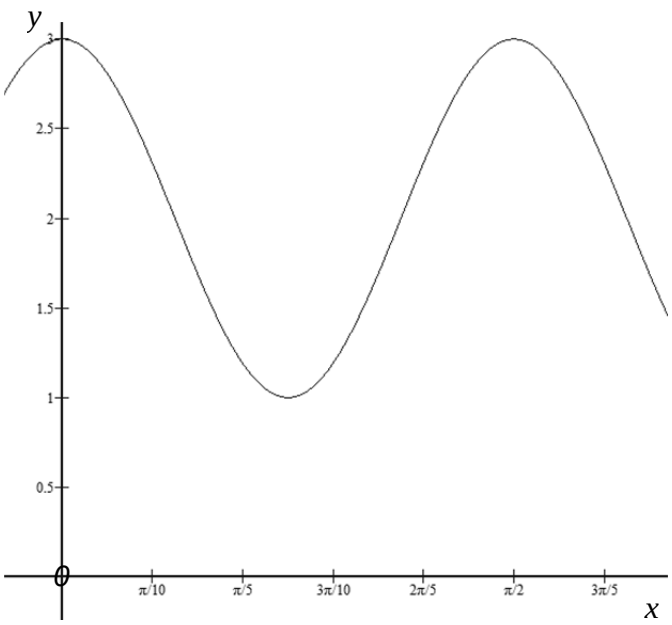
[1 mark]

2 (b) Hence simplify $\dfrac{2x^2 - 5x - 12}{x^2 - x - 12}$

[2 marks]

3 The diagram shows the graph $y = a + \cos bx$

State the values of a and b.



[2 marks]

4 The function $g(x) = \dfrac{1}{1-x}$

Find the function $g^{-1}(x)$ and the function $g^2(x)$

[4 marks]

Section B: A bit more thinking

5 Solve $|3x - 4| = 5 - x$

[4 marks]

6 The functions $f(x) = 3x - 11$ and $g(x) = \sqrt{x - 3}$

Solve $f^{-1}(x) = g^{-1}(x)$

[6 marks]

7 On the same axes, sketch the graphs $y = |2x - 5|$ and $y = |3 - x|$

Hence solve $|2x - 5| < |3 - x|$ exactly.

[4 marks]

8 The functions $f(x) = 3\sin x$ and $g(x) = 2x - 1$

On separate axes, sketch the graphs $fg(x)$ and $gf(x)$ for $0 \leq x \leq 2\pi$ stating the equation of each graph.

In each case, state the exact coordinates of the first maximum value for $x > 0$.

[6 marks]