"Find solutions of quadratic equations." (Standard)

Question 1

Solve

$x^2 + x - 30 = 0$

Question 2

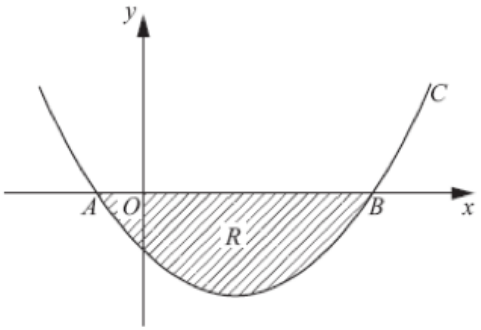


Figure 1

Figure 1 shows a sketch of part of the curve C with equation

$y = (x + 1)(x - 5)$

The curve crosses the x-axis at the points A and B.

Write down the x-coordinates of A and B.

(1 mark)

Question 3

Solve the equation $x^2 - 6x - 2 = 0$, giving your answers in simplified surd form.

(6 marks)

Question 4

Solve

$2x^2 - 7x - 1 = 0$

giving your solutions correct to 2 decimal places.

Question 5

Given that $4x^2 + 8x + 3 \equiv 4(x+1)^2 - 1$, determine the roots of $f(x) = 4x^2 + 8x + 3$.

(4 marks)

Question 6

Solve

$x - \frac{12}{x} = -1$

Question 7

Solve

$\frac{4}{x} + x + 5 = 0$

Question 8

$f(x) = x^2 + 3x - 5$ and $g(x) = 4x + k$, where k is a constant.

a) Given that $f(3) = g(3)$, find the value of k.

b) Find the values of x for which $f(x) = g(x)$, giving your solutions in **ascending order.**

Mark scheme

Question 1

$x = 5$ or $x = -6$

Question 2

$x = -1$ or $x = 5$

Seeing -1 and 5. (See note below.)	B1

Question 3

$x = 3 - \sqrt{11}$ or $x = 3 + \sqrt{11}$

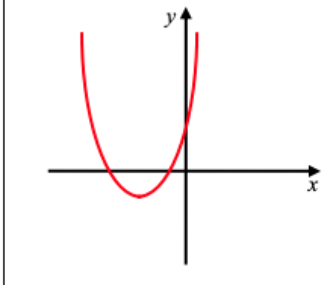
$\frac{6 \pm \sqrt{(-6)^2 - 4\times1\times-2}}{2\times1}$	M1
$= \frac{6 \pm \sqrt{44}}{2}$	A1
$= 3 \pm \sqrt{11}$	A1
OR:	
$(x-3)^2 - 9 - 2 = 0$	
$x - 3 = \pm\sqrt{11}$	M1 A1
$x = 3 \pm \sqrt{11}$	A1

Question 4

$x = -0.14$ or $x = 3.64$

Question 5

$x = -\frac{3}{2}$ or $x = -\frac{1}{2}$

(b)		
	U shaped quadratic graph.	M1
	The curve is correctly positioned with the minimum in the third quadrant. . It crosses x axis twice on negative x axis and y axis once on positive y axis.	A1
	Curve cuts y-axis at $(\{0\}, 3)$. only	B1
	Curve cuts x-axis at $(-\frac{3}{2}, \{0\})$ and $(-\frac{1}{2}, \{0\})$.	B1

Question 6

$x = 3$ or $x = -4$

Question 7

$x = -1$ or $x = -4$

Question 8

a) $k = 1$
b) $x = -2$
b) $x = 3$
