

3. Find the set of values of x for which

(a) $3(x-2) < 8-2x$ **(2)**

(b) $(2x-7)(1+x) < 0$ **(3)**

(c) both $3(x-2) < 8-2x$ and $(2x-7)(1+x) < 0$ **(1)**



Question 4 continued

(Total 6 marks)

Q4



5. A sequence of positive numbers is defined by

$$a_{n+1} = \sqrt{(a_n^2 + 3)}, \quad n \geq 1,$$
$$a_1 = 2$$

(a) Find a_2 and a_3 , leaving your answers in surd form. (2)

(b) Show that $a_5 = 4$ (2)



Question 5 continued

Lined area for writing the answer to Question 5.

(Total 4 marks)

Q5



6.

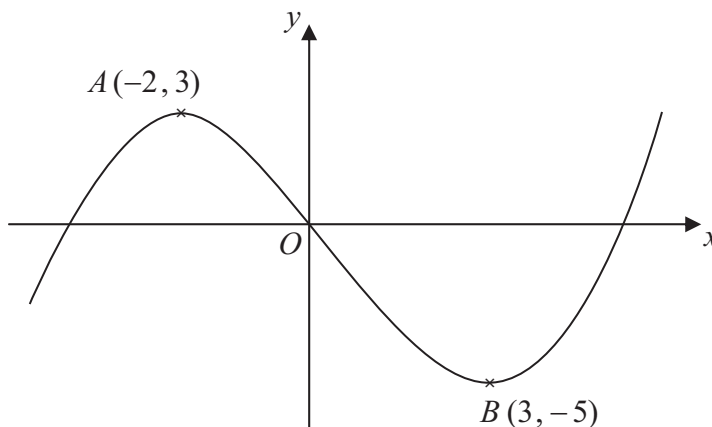


Figure 1

Figure 1 shows a sketch of the curve with equation $y = f(x)$. The curve has a maximum point A at $(-2, 3)$ and a minimum point B at $(3, -5)$.

On separate diagrams sketch the curve with equation

(a) $y = f(x+3)$ **(3)**

(b) $y = 2f(x)$ **(3)**

On each diagram show clearly the coordinates of the maximum and minimum points.

The graph of $y = f(x)+a$ has a minimum at $(3, 0)$, where a is a constant.

(c) Write down the value of a . **(1)**



Question 6 continued

(Total 7 marks)

Q6



Question 8 continued

Lined area for writing the answer to Question 8.

Q8

(Total 8 marks)



9. A farmer has a pay scheme to keep fruit pickers working throughout the 30 day season. He pays £ a for their first day, £ $(a + d)$ for their second day, £ $(a + 2d)$ for their third day, and so on, thus increasing the daily payment by £ d for each extra day they work.

A picker who works for all 30 days will earn £40.75 on the final day.

(a) Use this information to form an equation in a and d . **(2)**

A picker who works for all 30 days will earn a total of £1005

(b) Show that $15(a + 40.75) = 1005$ **(2)**

(c) Hence find the value of a and the value of d . **(4)**



10. (a) On the axes below sketch the graphs of

(i) $y = x(4-x)$

(ii) $y = x^2(7-x)$

showing clearly the coordinates of the points where the curves cross the coordinate axes.

(5)

(b) Show that the x -coordinates of the points of intersection of

$$y = x(4-x) \quad \text{and} \quad y = x^2(7-x)$$

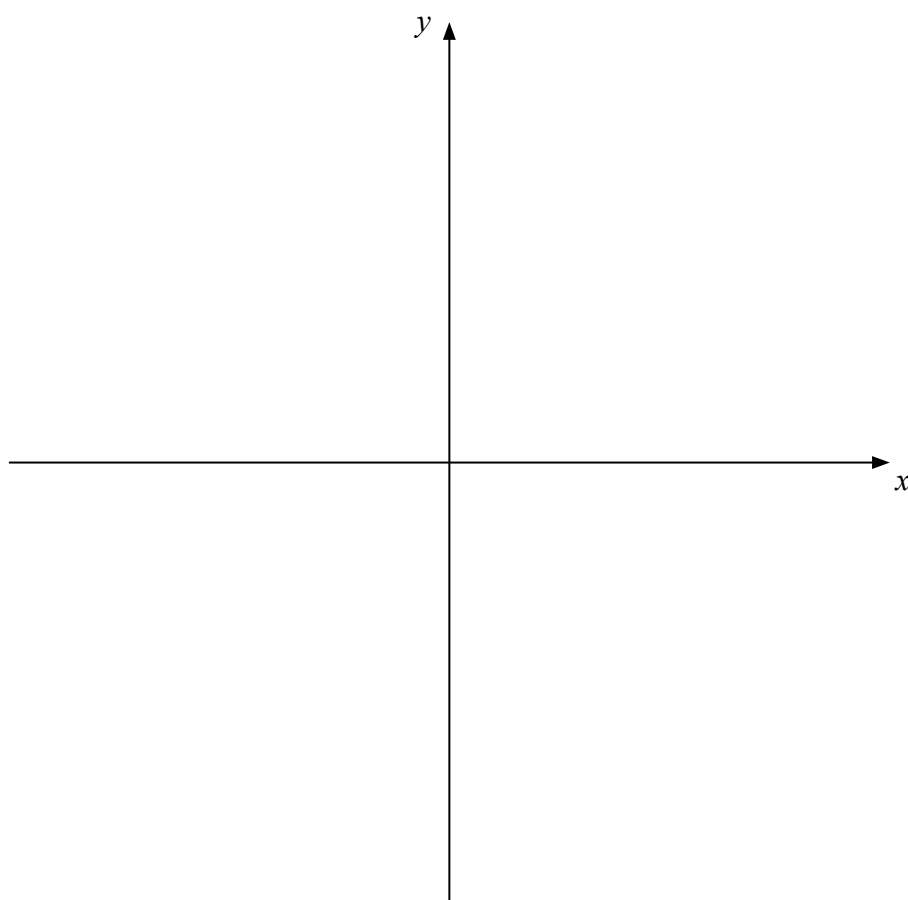
are given by the solutions to the equation $x(x^2 - 8x + 4) = 0$

(3)

The point A lies on both of the curves and the x and y coordinates of A are both positive.

(c) Find the exact coordinates of A , leaving your answer in the form $(p + q\sqrt{3}, r + s\sqrt{3})$, where p, q, r and s are integers.

(7)



Question 10 continued

A series of horizontal lines for writing, consisting of 25 lines.

(Total 15 marks)

Q10

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Question 11 continued

Handwritten response area consisting of multiple horizontal lines.

Q11

(Total 9 marks)

TOTAL FOR PAPER: 75 MARKS

END

