

Sketching curves and transformations

AS Pure Mathematics | Edexcel 8MA0 | 12 questions, 63 marks

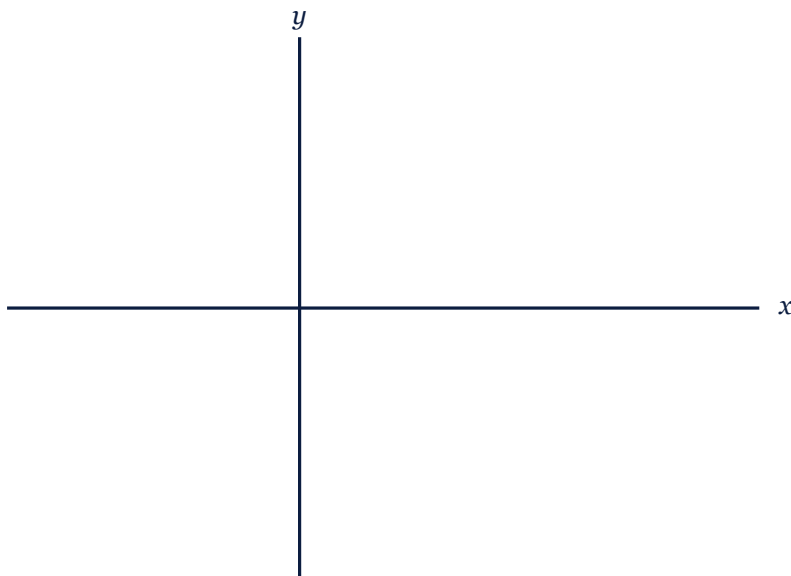
A-level Maths topic practice



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Name: _____ **Date:** _____ **Score:** _____ / 63

- 1** Sketch the curve with equation $y = (x + 2)(x - 1)(x - 4)$, showing the coordinates of the points where the curve meets the coordinate axes.

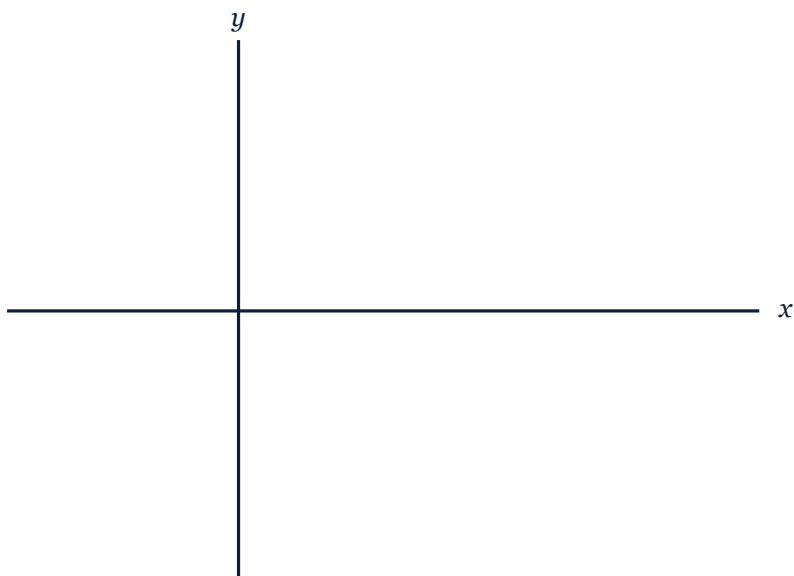


(3 marks)

Answer _____

2

Sketch the curve with equation $y = x^2(3 - x)$, showing the coordinates of any points where the curve meets the coordinate axes.

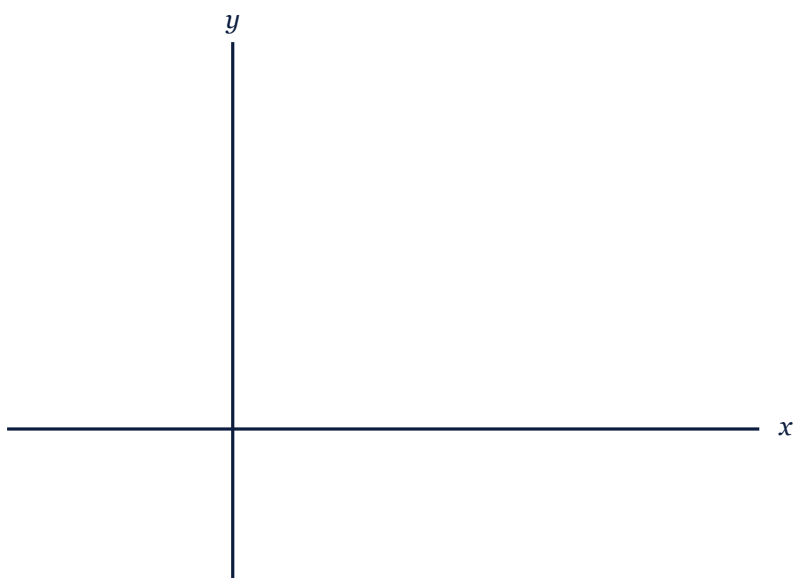


(3 marks)

Answer

3

Sketch the curve with equation $y = \frac{1}{x-2} + 3$. On your sketch show the equations of the asymptotes and the coordinates of the points where the curve crosses the coordinate axes.

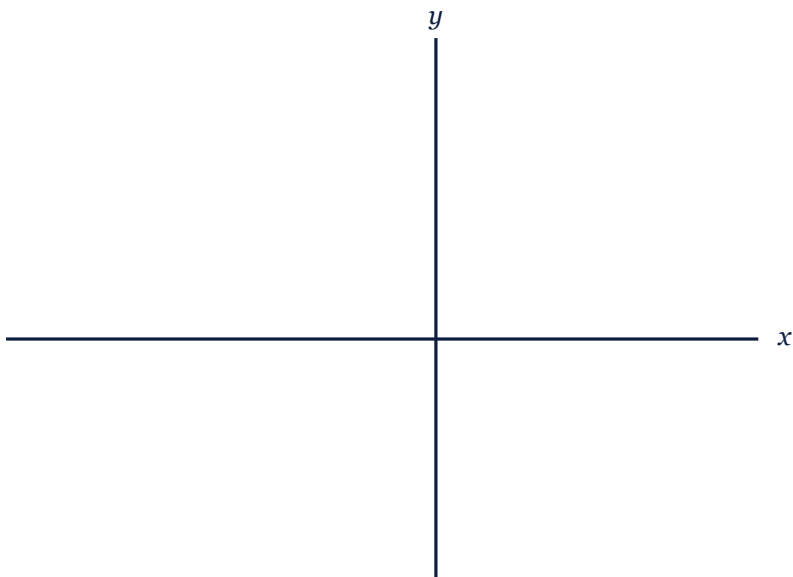


(4 marks)

Answer

4

Sketch the curve with equation $y = x^2(x - 2)(x + 3)$, showing the coordinates of the points where the curve meets the coordinate axes.



(3 marks)

Answer _____

5

The curve with equation $y = f(x)$ has a maximum point at $(3, 8)$. Write down the coordinates of the turning point on the curve with equation

a. $y = f(x - 2)$

b. $y = f(x) + 3$

c. $y = f(3x)$

d. $y = -f(x)$

e. $y = 2f(x + 1) - 4$

(5 marks)

Answer _____

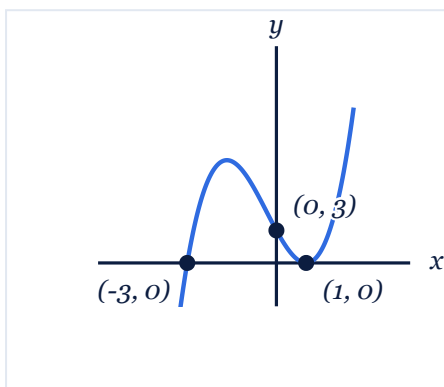
6

The diagram shows a sketch of the cubic curve with equation $y = f(x)$. The curve crosses the x -axis at $(-3, 0)$, touches it at $(1, 0)$ and crosses the y -axis at $(0, 3)$. On separate diagrams, sketch the curves with the following equations, showing the coordinates of the points where each curve meets the coordinate axes.

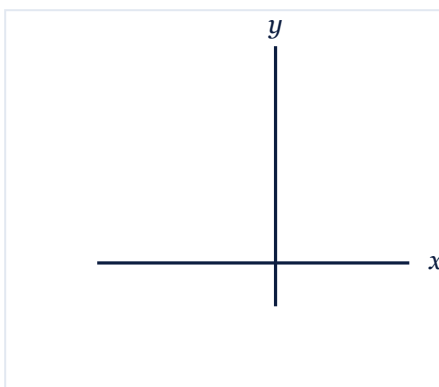
a. $y = f(x + 2)$

b. $y = 2f(x)$

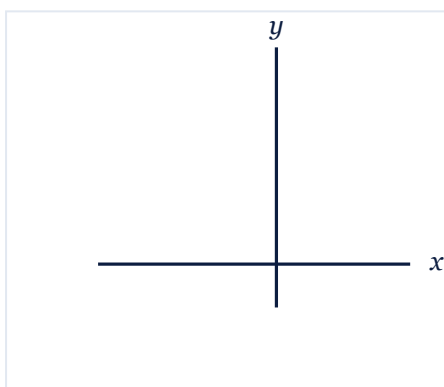
c. $y = f(-x)$



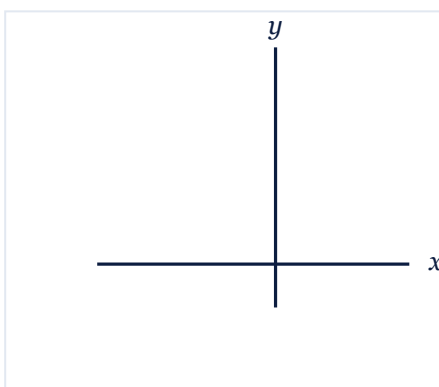
$y = f(x)$



(a)



(b)

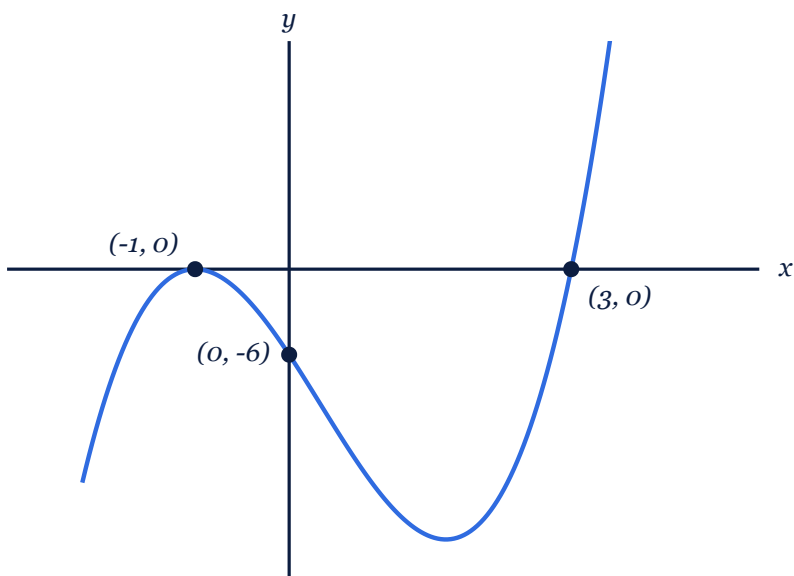


(c)

(7 marks)

Answer

- 7 The diagram shows a sketch of a cubic curve. The curve touches the x -axis at $(-1, 0)$, crosses the x -axis at $(3, 0)$ and crosses the y -axis at $(0, -6)$. Find an equation for the curve.



(3 marks)

Answer _____

- 8 The curve C has equation $y = x^2 - 6x + 13$
- Write $x^2 - 6x + 13$ in the form $(x + a)^2 + b$, where a and b are integers.
 - Hence describe fully the transformation that maps the curve with equation $y = x^2$ onto C .
 - C is translated k units down so that the new curve touches the x -axis. State the value of k .
 - C is instead stretched parallel to the y -axis with scale factor 2. Write down the equation of the new curve.

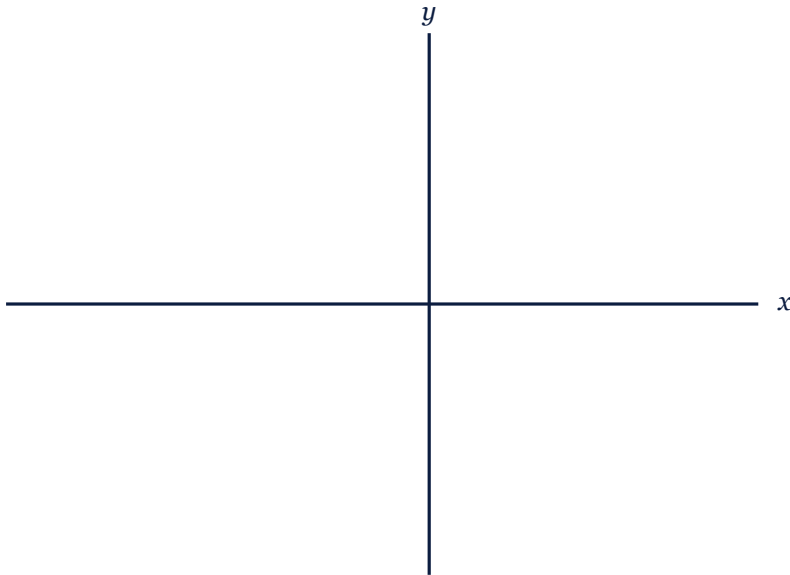
(6 marks)

Answer _____

9

$$f(x) = (x - 2)(x + 1)(x + 3)$$

- Sketch the curve with equation $y = f(x)$, showing the coordinates of the points where it meets the coordinate axes.
- The curve with equation $y = f(x + k)$, where k is a constant, passes through the origin. Find the three possible values of k .
- Write down the coordinates of the points where the curve with equation $y = f(2x)$ meets the x -axis.



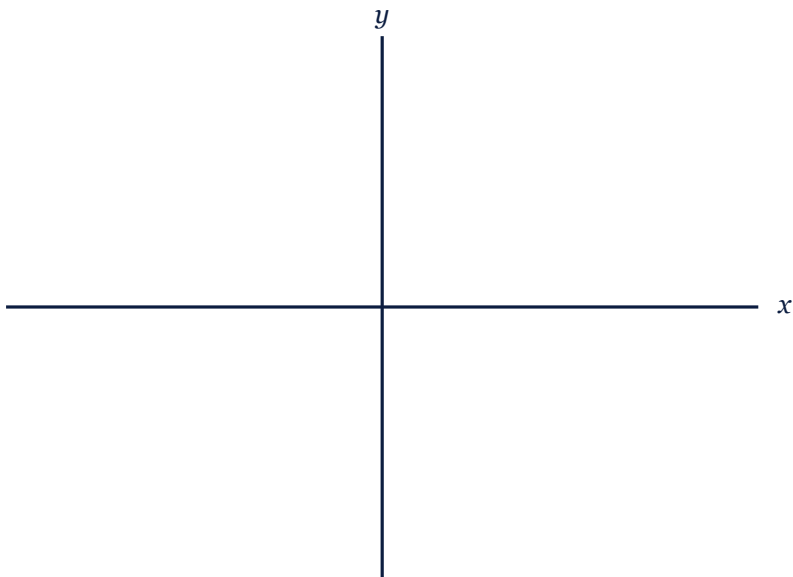
(6 marks)

Answer

10

The curve C has equation $y = x^3 - 4x$ and the line l has equation $y = 5x$

- Factorise $x^3 - 4x$ completely.
- On the same axes, sketch C and l , showing the coordinates of the points where C meets the x -axis.
- Find the coordinates of all the points where C and l meet.



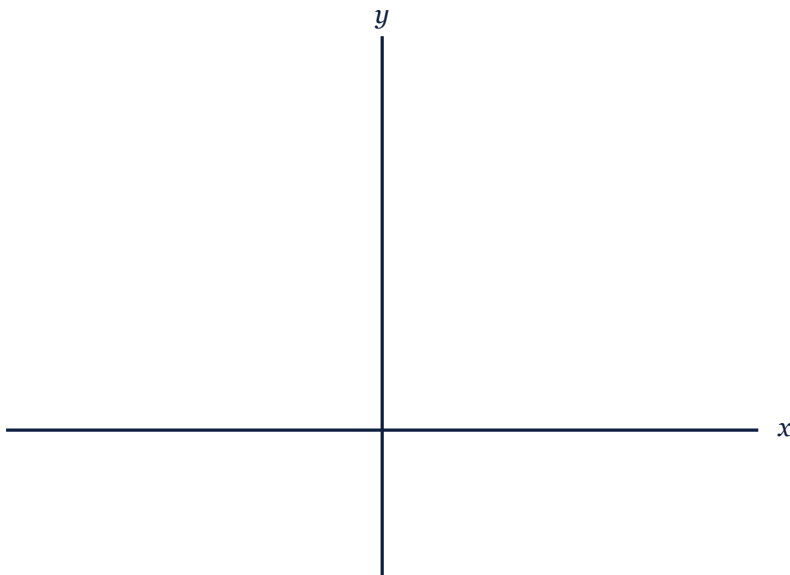
(7 marks)

Answer _____

11

$$f(x) = \frac{4}{x^2}, x \neq 0$$

- Sketch the curve with equation $y = f(x) - 1$, stating the equations of the asymptotes and the coordinates of the points where the curve crosses the x -axis.
- The curve with equation $y = f(x + a)$, where a is a constant, passes through the point $(1, 1)$. Find the possible values of a .
- For each value of a , state the equation of the vertical asymptote of $y = f(x + a)$.



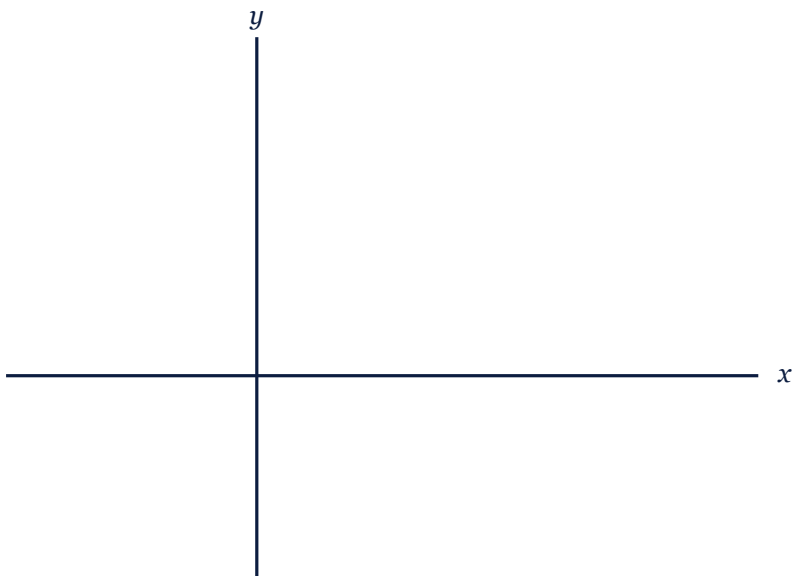
(7 marks)

Answer _____

12

The curve C has equation $y = (x - 2)^2(x + 1)$

- Show that the equation of C can be written as $y = x^3 - 3x^2 + 4$
- Sketch C , showing the coordinates of the points where it meets the coordinate axes.
- Use differentiation to find the coordinates of the turning points of C .
- Hence find the set of values of k for which the equation $(x - 2)^2(x + 1) = k$ has three distinct real roots.



(9 marks)

Answer _____

End of questions | Total 63 marks