

Sketching Graphs - Worksheet

Skill

Group A - Sketching linear and quadratic graphs

Sketch the graphs of the following functions. Indicate where they cross the y-axis:

1) $y = 8x + 3$

2) $y = 4x + 3$

3) $y = 3 - 8x$

4) $y = 3 - 4x$

5) $y = 8x$

6) $y = 4x$

7) $y = x^2 - 7x + 12$

8) $y = x^2 - 8x + 12$

9) $y = x^2 - x - 12$

10) $y = x^2 - x - 20$

11) $y = x^2 - 2x$

12) $y = x^2 + 2x$

Group B - Sketching cubic, reciprocal and exponential graphs

Sketch the graphs of the following functions. Indicate where they cross the axes:

1) $y = x^3$

2) $y = x^3 + 4$

3) $y = x^3 - 4$

4) $y = -x^3$

5) $y = -x^3 - 4$

6) $y = 4 - x^3$

7) $y = \frac{2}{x}$

8) $y = \frac{2}{x} + 4$

9) $y = \frac{2}{x} - 4$

10) $y = 3^x$

11) $y = 4^x$

12) $y = 8^x$

Group C - Sketching trigonometric and circle graphs

Sketch the graphs of the following functions. Indicate where they cross the axes:

1) $y = \tan(x)$

2) $y = \sin(x)$

3) $y = \cos(x)$

for $0 \leq x \leq 360$

for $0 \leq x \leq 360$

for $0 \leq x \leq 360$

4) $x^2 + y^2 = 81$

5) $x^2 + y^2 = 9$

6) $x^2 + y^2 = 36$

7) $x^2 + y^2 = 144$

8) $x^2 + y^2 = 16$

9) $x^2 + y^2 = 49$

10) $x^2 + y^2 - 64 = 0$

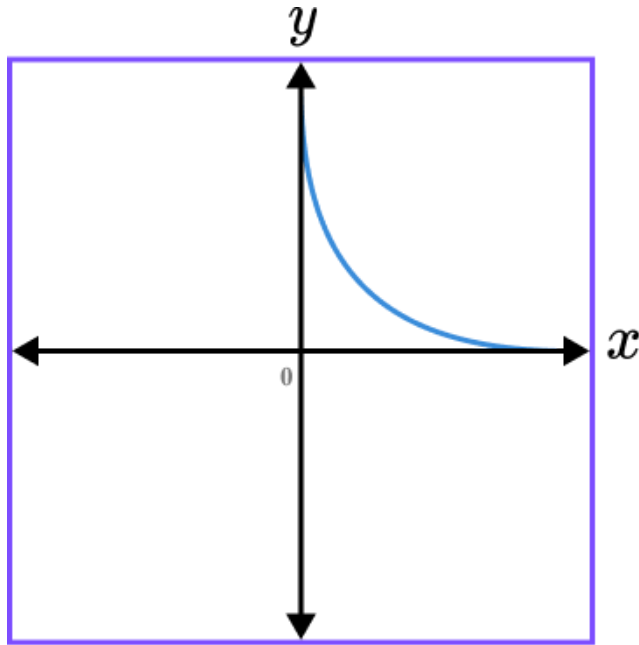
11) $x^2 + y^2 - 121 = 0$

12) $x^2 + y^2 - 4 = 0$

Sketching Graphs - Worksheet

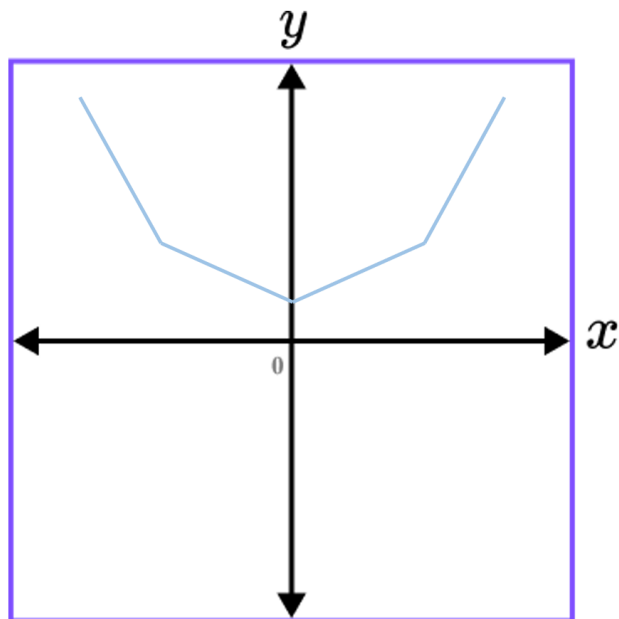
Applied

- 1) Adam has sketched the graph of $y = \frac{1}{x}$ below.



Make two comments about the accuracy of this sketch.

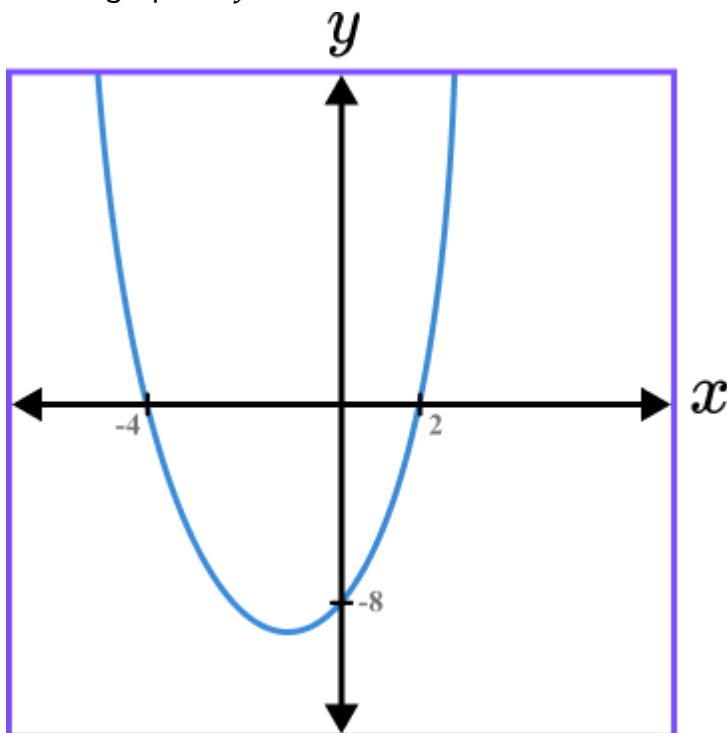
- 2) Laura has sketched the graph of $y = x^2$ below.



Make two comments about the accuracy of her sketch.

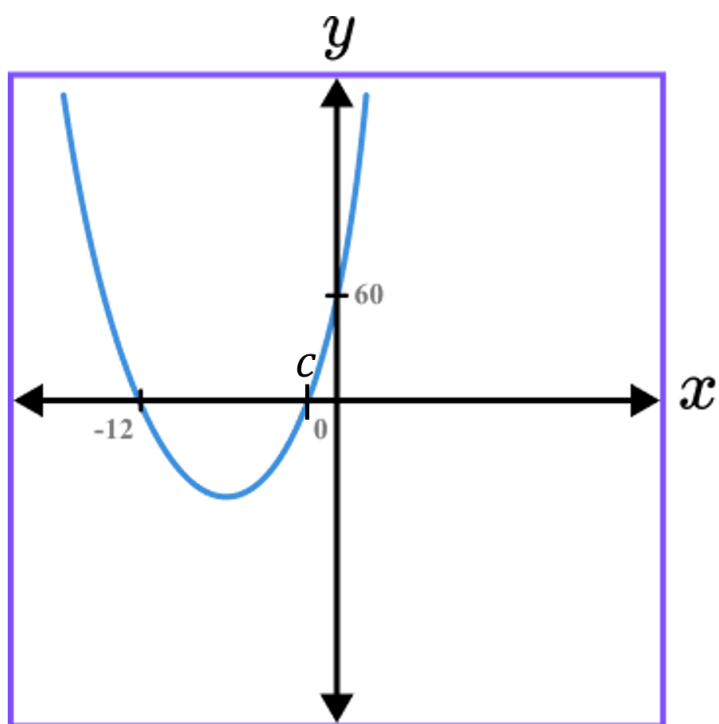
Sketching Graphs - Worksheet

- 3) Louis sketches the graph of $y = x^2 - 2x - 8$.



Can you spot any mistakes?

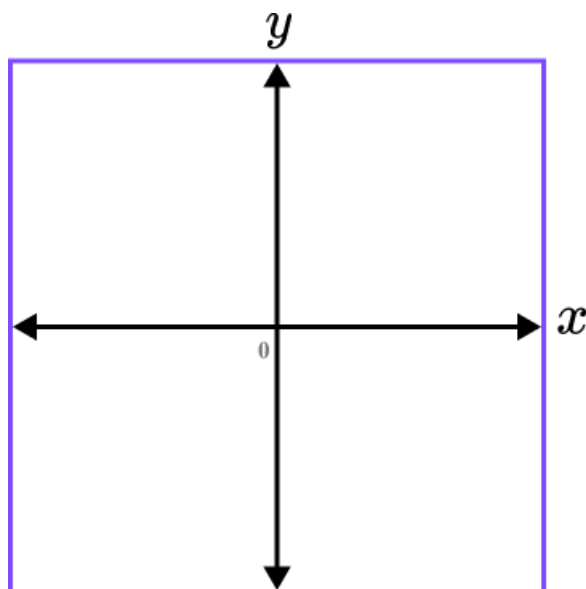
- 4) Shown is the graph of $y = x^2 + ax + b$.



Find the values of a , b and c .

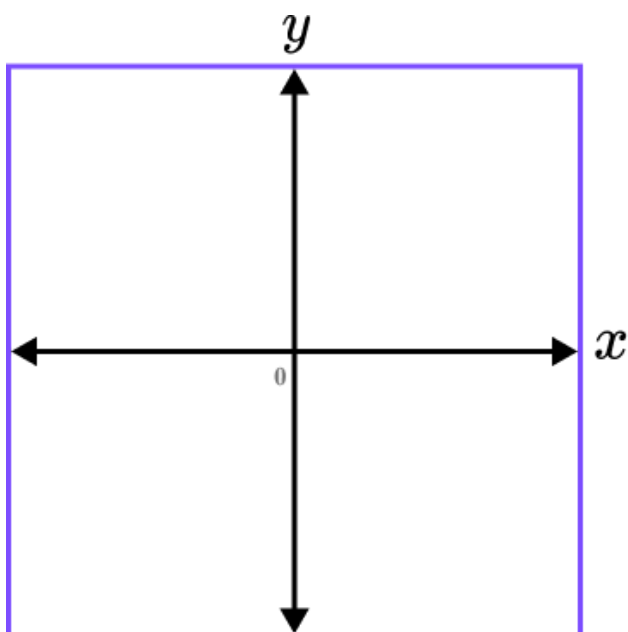
Sketching Graphs - Exam Questions

- 1) Sketch the graph of $y = x^2 + 3x - 4$.
Show clearly values of where the graph crosses the axes.



(4 marks)

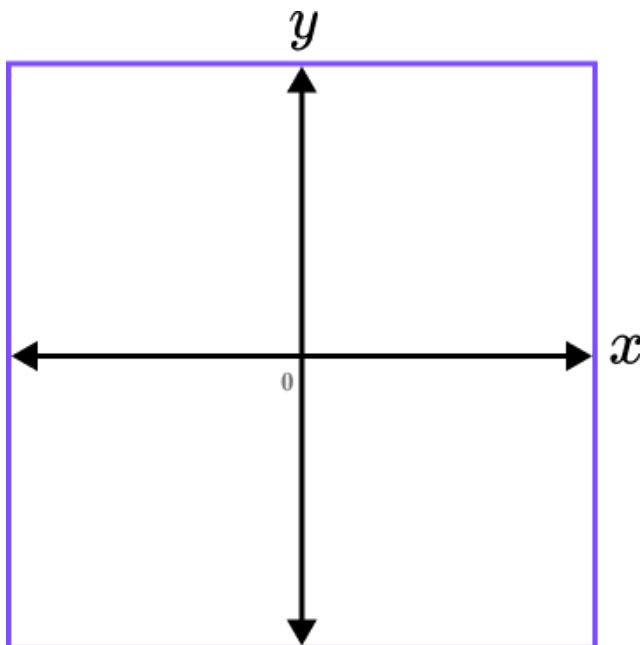
- 2) (a) Sketch a graph on the axes below that shows the function $y = x^3$.



(2)

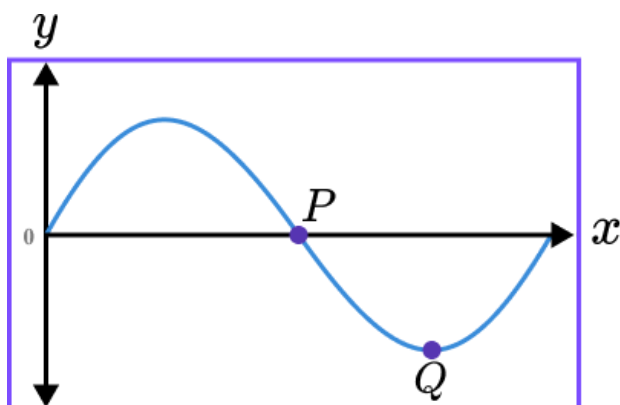
Sketching Graphs - Exam Questions

- (b) Sketch a graph on the axes below that shows the function $y = x^2$.



(2)
(4 marks)

- 3) The diagram shows part of a sketch of the function $y = \sin(x)$.



- (a) Write down the coordinates of the point P .

.....
(1)

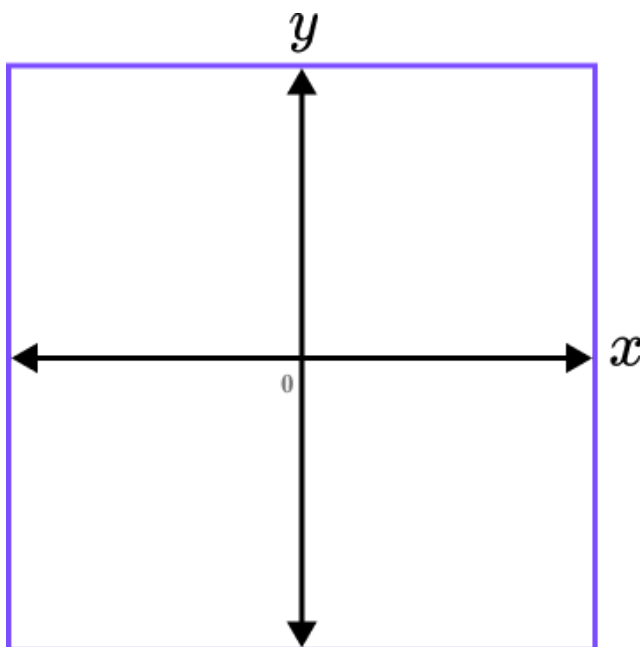
- (b) Write down the coordinates of the point Q .

.....
(1)
(2 marks)

Sketching Graphs - Exam Questions

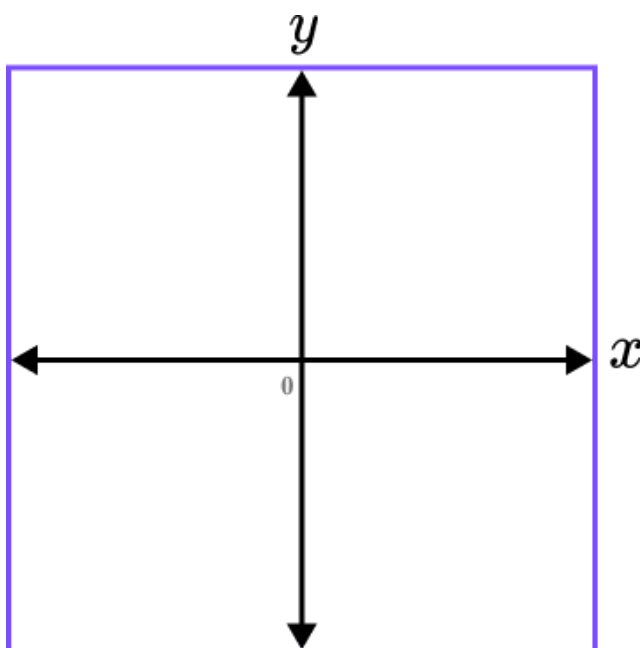
- 4) (a) The equation of Circle C is $x^2 + y^2 = 16$.

Draw a sketch of circle C.



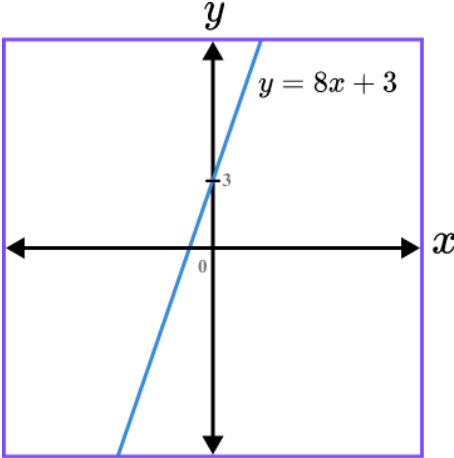
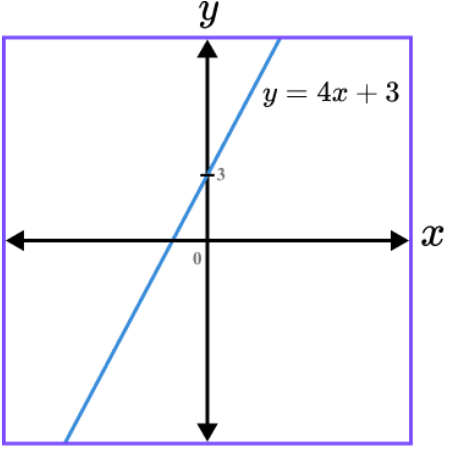
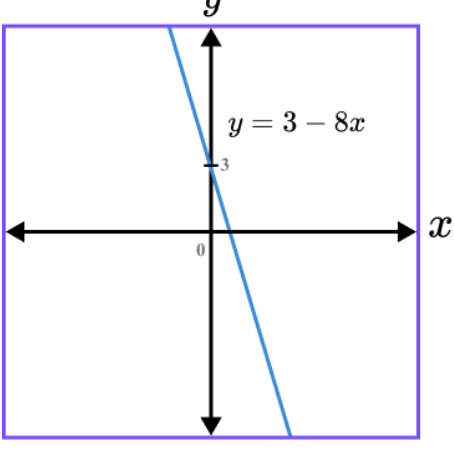
(2)

- (b) The circle C is translated by the vector $\begin{pmatrix} 5 \\ 0 \end{pmatrix}$.
Draw a sketch of circle B.



(2)
(4 marks)

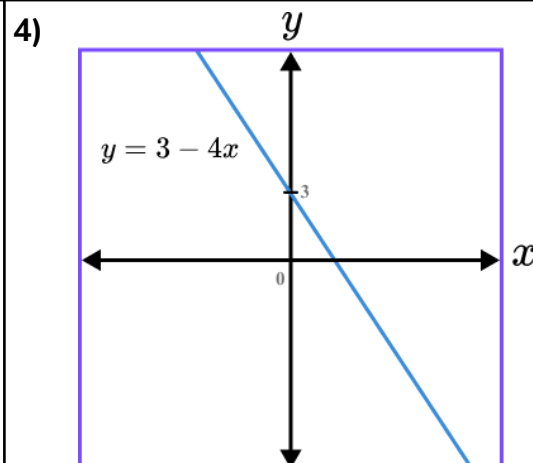
Sketching Graphs - Answers

	Question	Answer
	Skill Questions	
Group A	<p>Sketch the graphs of the following functions. Indicate where they cross the y-axis:</p> <p>1) $y = 8x + 3$</p> <p>2) $y = 4x + 3$</p> <p>3) $y = 3 - 8x$</p>	<p>1) A Cartesian coordinate system with x and y axes. A blue line with a positive gradient is plotted, passing through the y-axis at 3. The line is labeled y = 8x + 3. The origin is marked with 0.</p> <p>2) A Cartesian coordinate system with x and y axes. A blue line with a positive gradient is plotted, passing through the y-axis at 3. The line is labeled y = 4x + 3. The origin is marked with 0.</p> <p>3) A Cartesian coordinate system with x and y axes. A blue line with a negative gradient is plotted, passing through the y-axis at 3. The line is labeled y = 3 - 8x. The origin is marked with 0.</p>

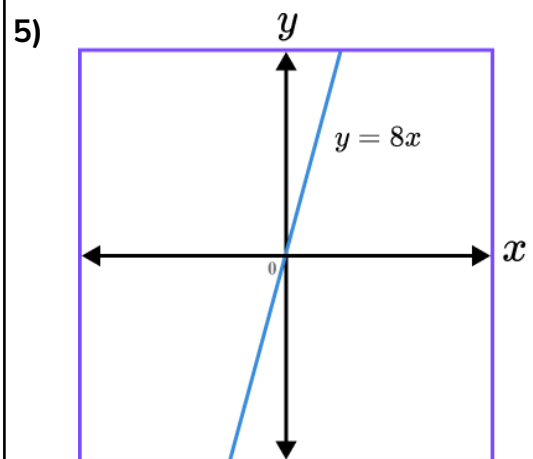
Sketching Graphs - Answers

Group A
contd

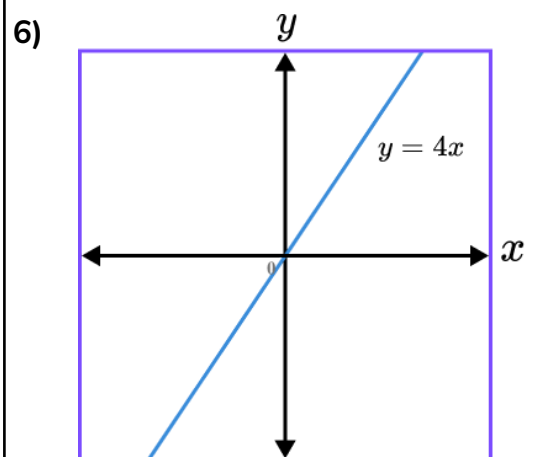
4) $y = 3 - 4x$



5) $y = 8x$



6) $y = 4x$

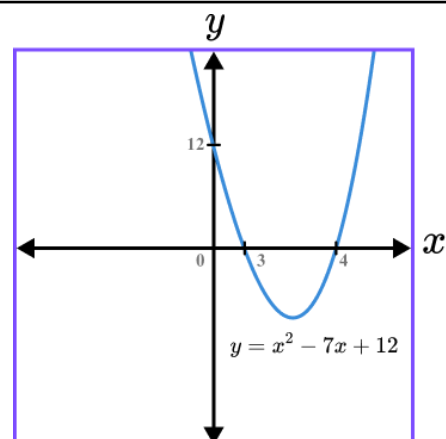


Sketching Graphs - Answers

Group A
contd

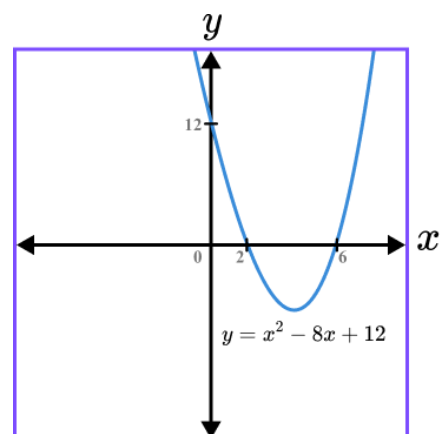
7) $y = x^2 - 7x + 12$

7)



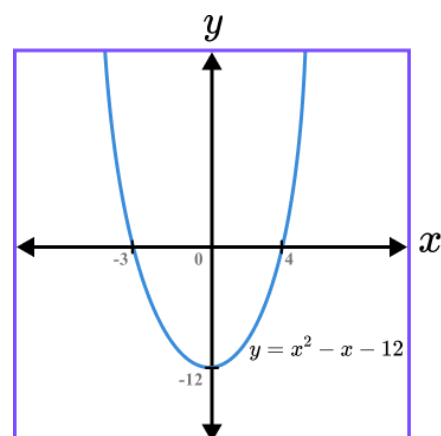
8) $y = x^2 - 8x + 12$

8)



9) $y = x^2 - x - 12$

9)

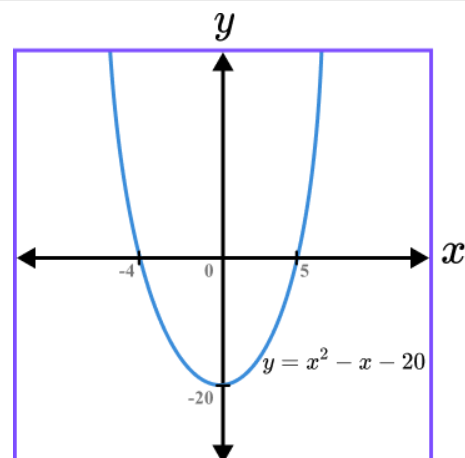


Sketching Graphs - Answers

Group A
contd

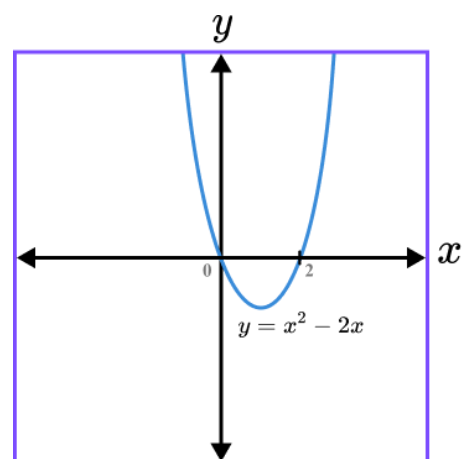
10) $y = x^2 - x - 20$

10)



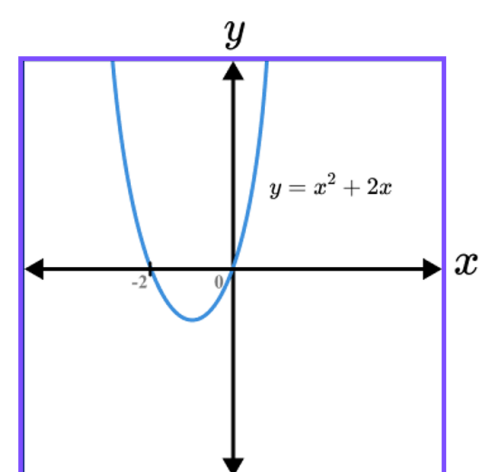
11) $y = x^2 - 2x$

11)

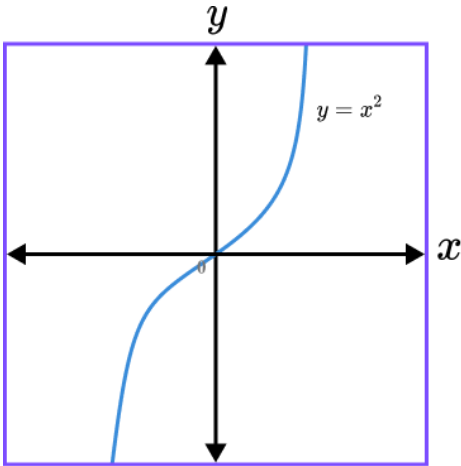
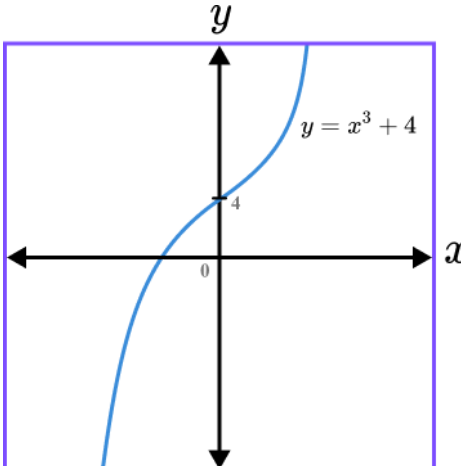
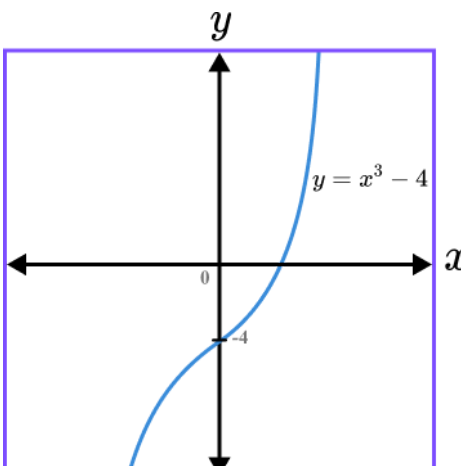


12) $y = x^2 + 2x$

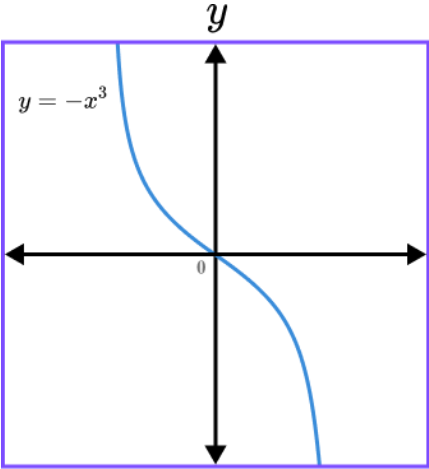
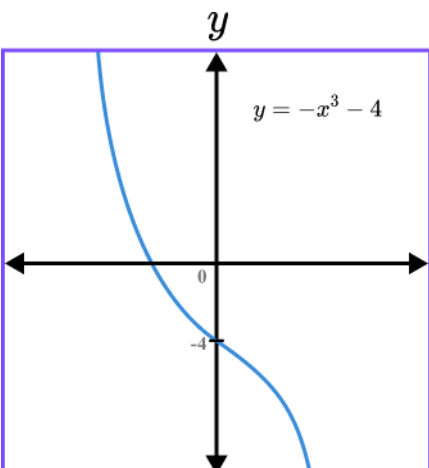
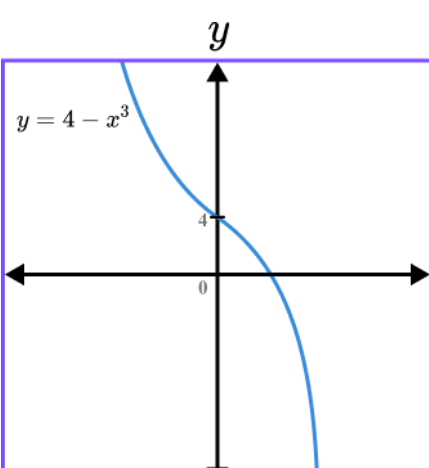
12)



Sketching Graphs - Answers

Group B	<p>Sketch the graphs of the following functions. Indicate where they cross the axes:</p> <p>1) $y = x^3$</p> <p>2) $y = x^3 + 4$</p> <p>3) $y = x^3 - 4$</p>	<p>1) A Cartesian coordinate system with x and y axes. A blue curve representing the function y = x^3 is plotted, passing through the origin (0,0). The curve is S-shaped, passing through the third and first quadrants. The equation y = x^3 is labeled next to the curve in the first quadrant.</p> <p>2) A Cartesian coordinate system with x and y axes. A blue curve representing the function y = x^3 + 4 is plotted. The curve is S-shaped and passes through the y-axis at (0,4). The origin is marked with 0. The equation y = x^3 + 4 is labeled next to the curve in the first quadrant.</p> <p>3) A Cartesian coordinate system with x and y axes. A blue curve representing the function y = x^3 - 4 is plotted. The curve is S-shaped and passes through the y-axis at (0,-4). The origin is marked with 0. The equation y = x^3 - 4 is labeled next to the curve in the first quadrant.</p>
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Sketching Graphs - Answers

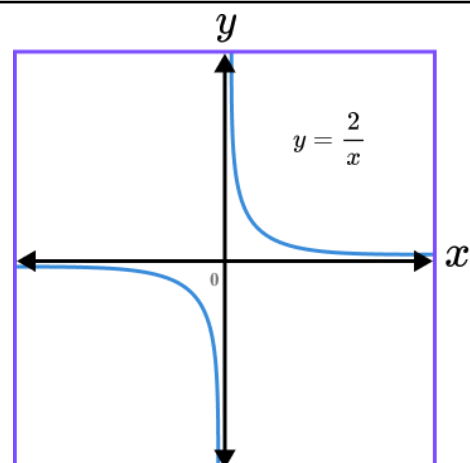
Group B contd	4) $y = -x^3$	4)  <p>A Cartesian coordinate system showing the graph of the function $y = -x^3$. The curve is a blue line passing through the origin (0,0) and is symmetric about the origin. It is labeled $y = -x^3$ in the upper left quadrant.</p>
	5) $y = -x^3 - 4$	5)  <p>A Cartesian coordinate system showing the graph of the function $y = -x^3 - 4$. The curve is a blue line passing through the point (0, -4) on the y-axis. It is labeled $y = -x^3 - 4$ in the upper right quadrant. The y-axis is marked with -4.</p>
	6) $y = 4 - x^3$	6)  <p>A Cartesian coordinate system showing the graph of the function $y = 4 - x^3$. The curve is a blue line passing through the point (0, 4) on the y-axis. It is labeled $y = 4 - x^3$ in the upper left quadrant. The y-axis is marked with 4.</p>

Sketching Graphs - Answers

Group B
contd

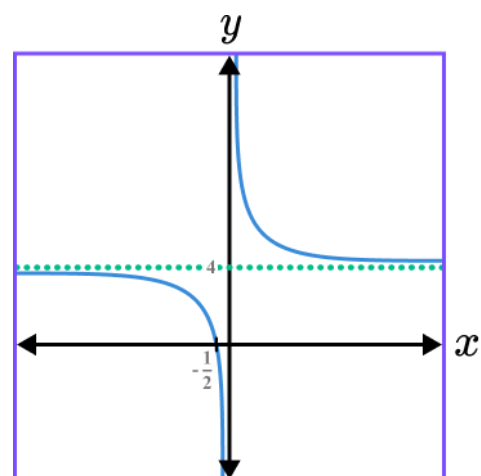
7) $y = \frac{2}{x}$

7)



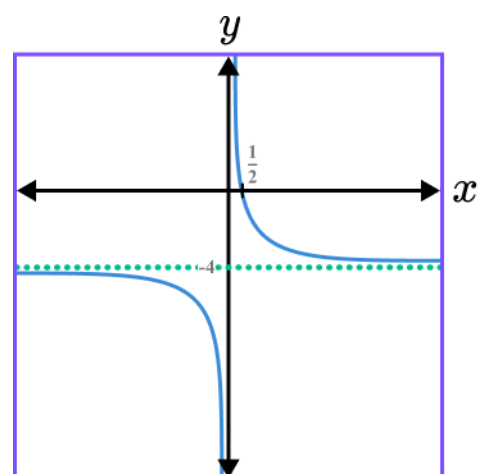
8) $y = \frac{2}{x} + 4$

8)

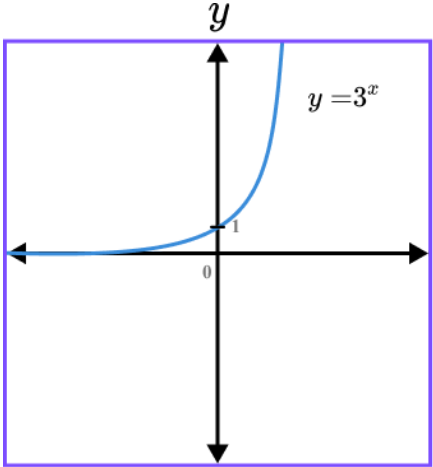
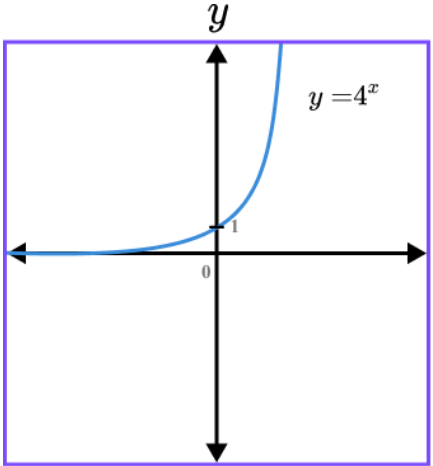
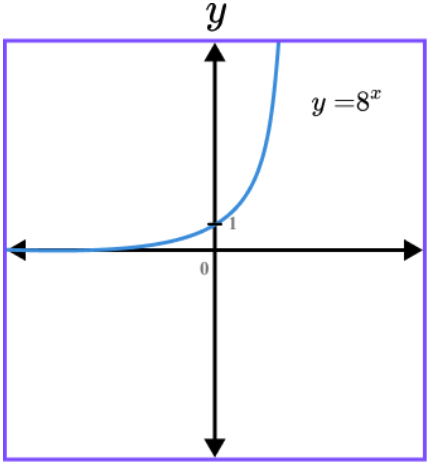


9) $y = \frac{2}{x} - 4$

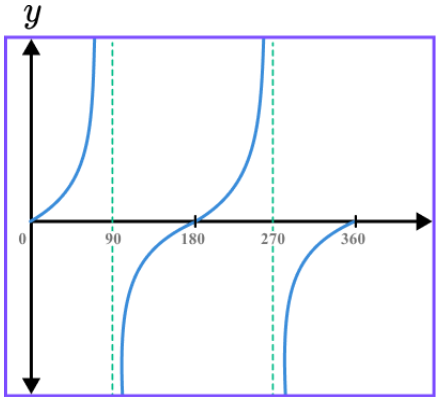
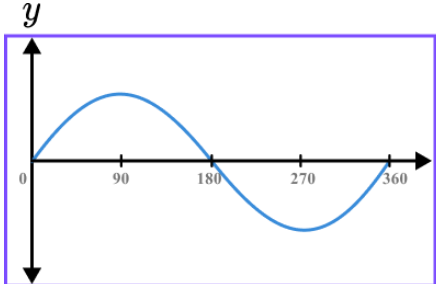
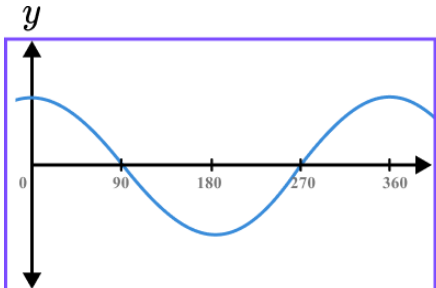
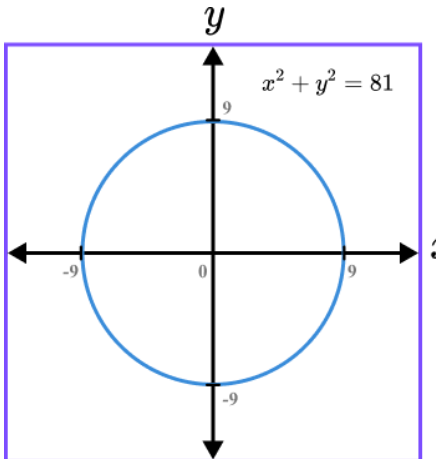
9)



Sketching Graphs - Answers

Group B contd	10) $y = 3^x$	10) 
	11) $y = 4^x$	11) 
	12) $y = 8^x$	12) 

Sketching Graphs - Answers

<p>Group C</p>	<p>Sketch the graphs of the following functions. Indicate where they cross the axes:</p> <p>1) $y = \tan(x)$, for $0 \leq x \leq 360$</p> <p>2) $y = \sin(x)$, for $0 \leq x \leq 360$</p> <p>3) $y = \cos(x)$, for $0 \leq x \leq 360$</p> <p>4) $x^2 + y^2 = 81$</p>	<p>1) </p> <p>2) </p> <p>3) </p> <p>4) </p>
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Sketching Graphs - Answers

Group C
contd

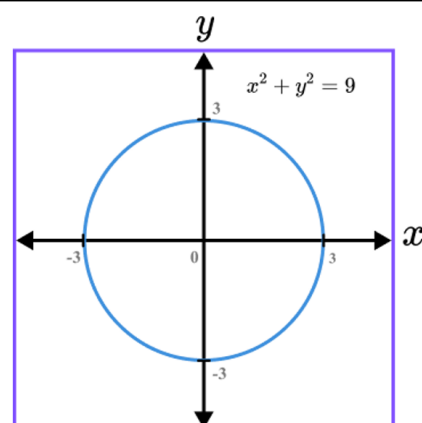
5) $x^2 + y^2 = 9$

6) $x^2 + y^2 = 36$

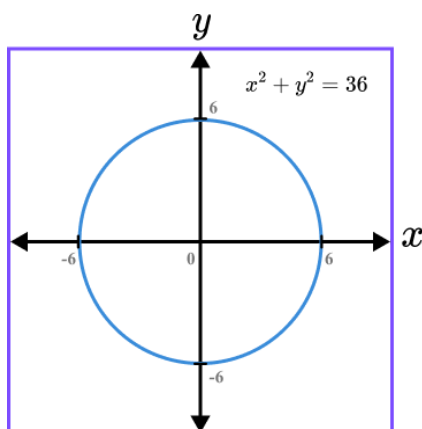
7) $x^2 + y^2 = 144$

8) $x^2 + y^2 = 16$

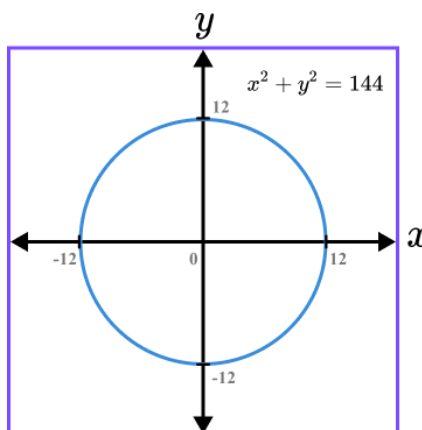
5)



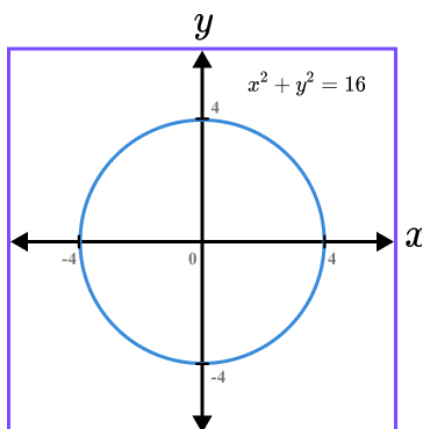
6)



7)



8)

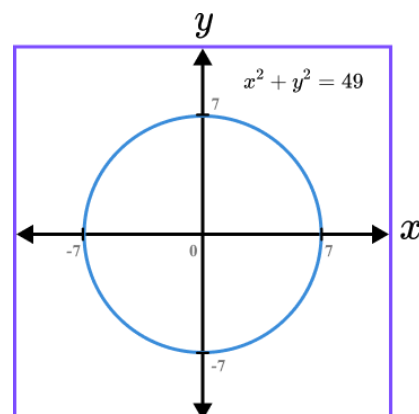


Sketching Graphs - Answers

Group C
contd

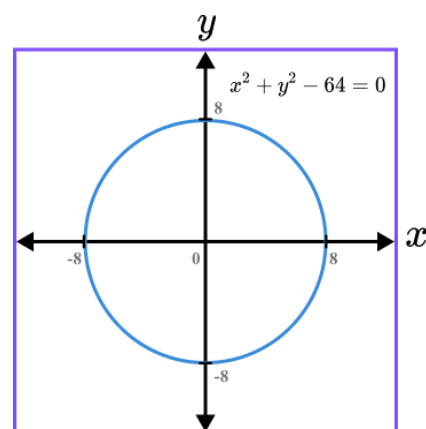
9) $x^2 + y^2 = 49$

9)



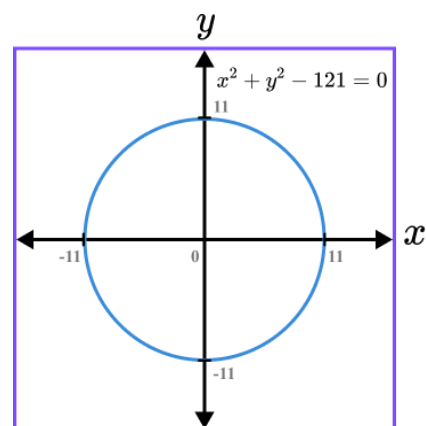
10) $x^2 + y^2 - 64 = 0$

10)



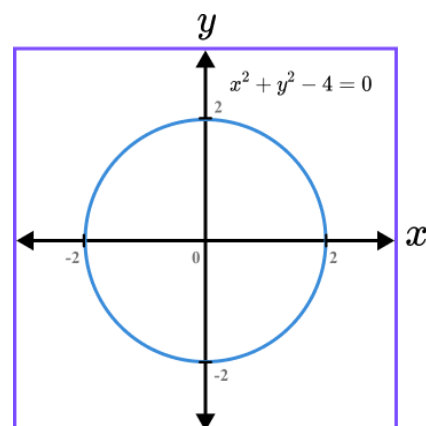
11) $x^2 + y^2 - 121 = 0$

11)

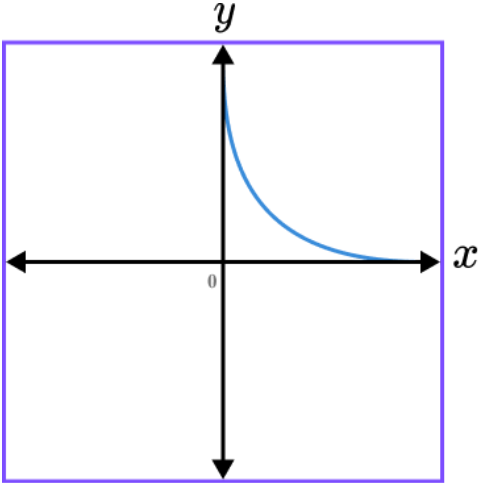
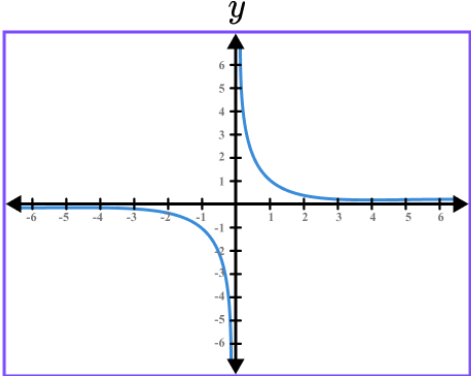
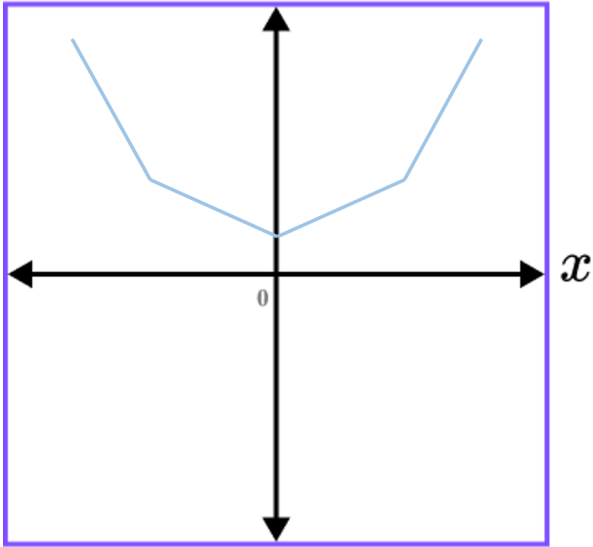
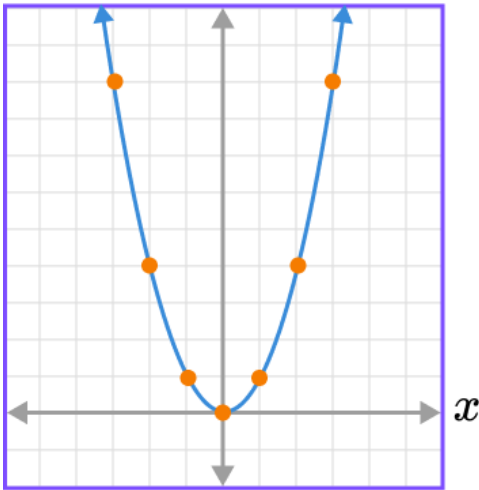


12) $x^2 + y^2 - 4 = 0$

12)



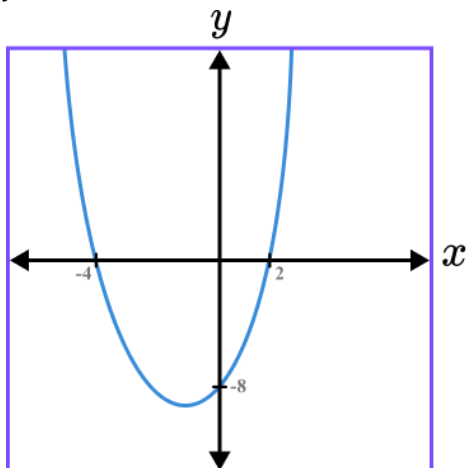
Sketching Graphs - Answers

	Question	Answer
	Applied Questions	
1)	<p>Adam has sketched the graph of $y = \frac{1}{x}$ below.</p>  <p>Make two comments about the accuracy of this sketch.</p>	<p>The graph should not touch the axes.</p> <p>The graph should have a mirror image in quadrant 3.</p> 
2)	<p>Laura has sketched the graph of $y = x^2$ below.</p>  <p>Make two comments about the accuracy of her sketch.</p>	<p>The graph should be a smooth curve, not straight lines joining the points.</p> <p>The graph should have a minimum point at (0, 0).</p> 

Sketching Graphs - Answers

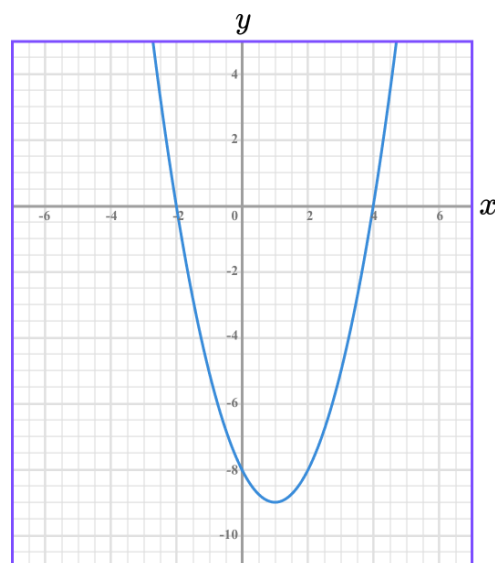
3)

Louis sketches the graph of
 $y = x^2 - 2x - 8$.

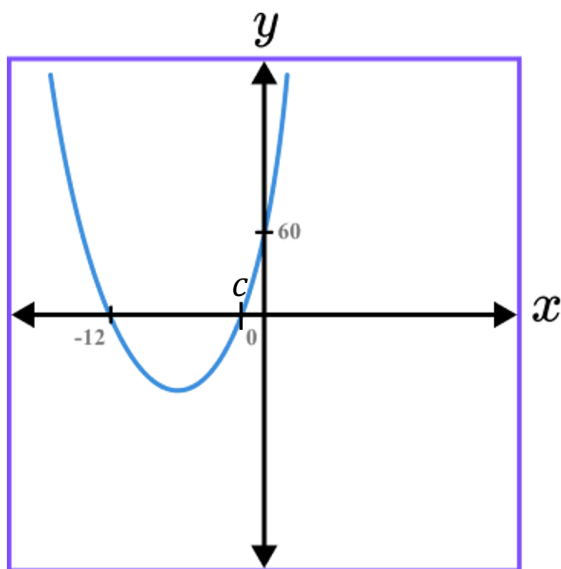


Can you spot any mistakes?

The graph is reflected in the y axis.

**4)**

Shown is the graph of $y = x^2 + ax + b$.



Find the values of a , b and c .

$$y = (x + 12)(x + 5)$$

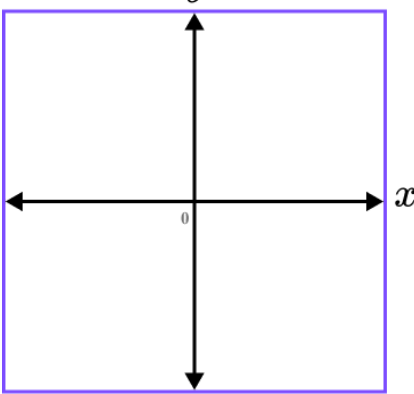
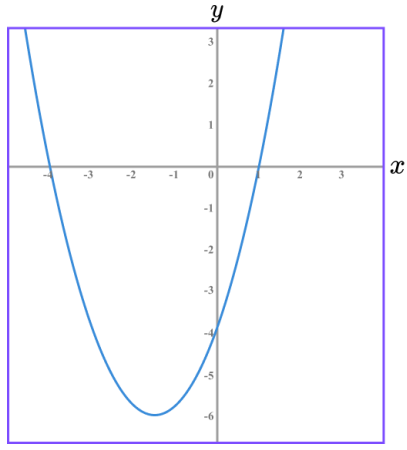
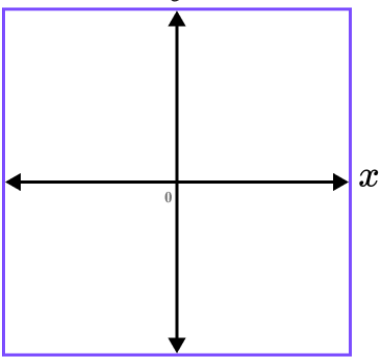
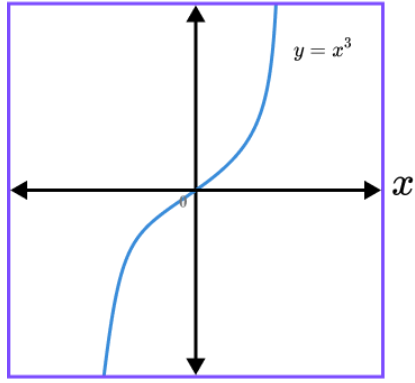
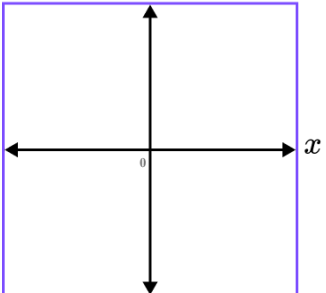
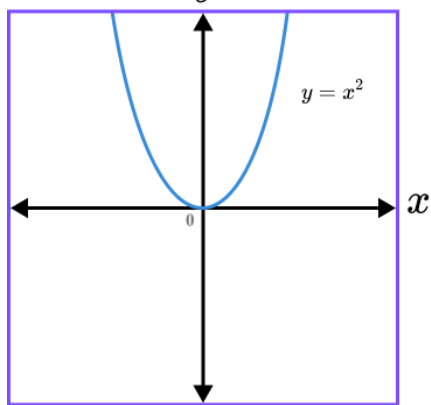
$$y = x^2 + 17x + 60$$

$$a = 17$$

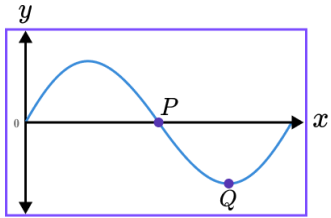
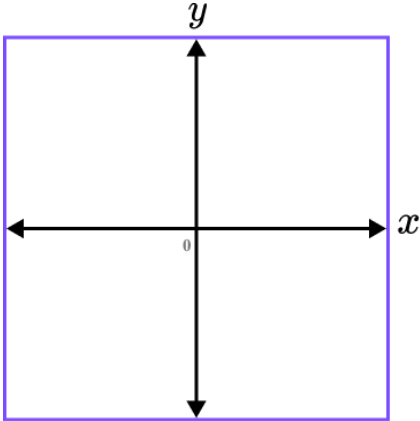
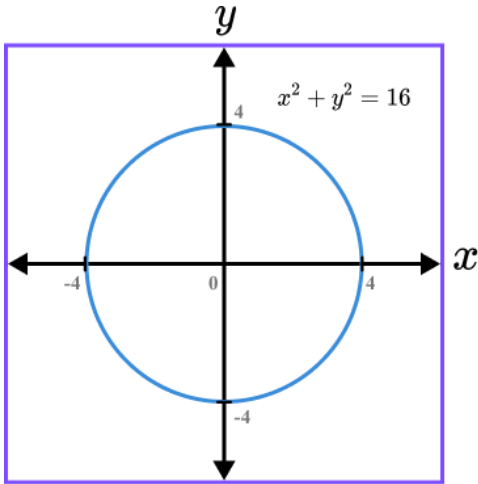
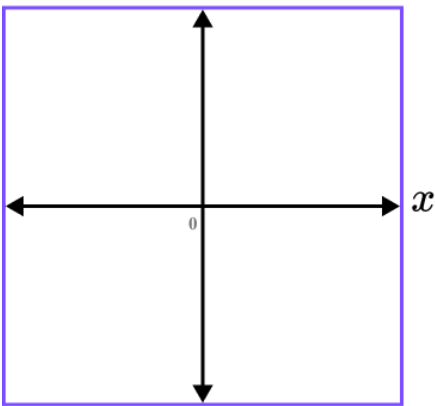
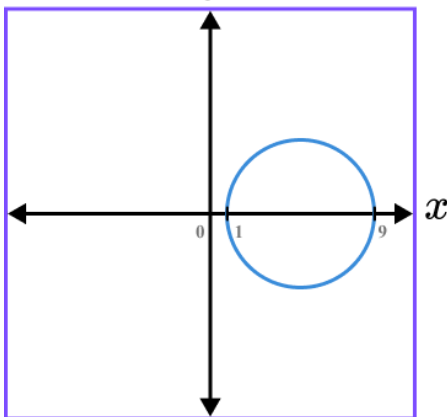
$$b = 60$$

$$c = -5$$

Sketching Graphs - Mark Scheme

	Question	Answer	
	Exam Questions		
1)	<p>Sketch the graph of $y = x^2 + 3x - 4$. Show clearly values of where the graph crosses the axes.</p> 	 <p>Parabola shape y-intercept of -4 $y = (x + 4)(x - 1)$ x-intercepts of -4 and 1</p>	<p>(1)</p> <p>(1)</p> <p>(1)</p> <p>(1)</p>
2) (a)	<p>Sketch a graph on the axes below that shows the function $y = x^3$.</p> 	<p>(a)</p>  <p>Correct shape A curve that cuts through the origin</p>	<p>(1)</p> <p>(1)</p>
(b)	<p>Sketch a graph on the axes below that shows the function $y = x^2$.</p> 	<p>(b)</p> <p>Correct shape A curve that cuts through the origin</p> 	<p>(1)</p> <p>(1)</p>

Sketching Graphs - Mark Scheme

3)	<p>The diagram shows part of a sketch of the function $y = \sin(x)$.</p> 		
(a)	Write down the coordinates of the point P.	(a) (180 , 0)	(1)
(b)	Write down the coordinates of the point Q.	(b) (270 , - 1)	(1)
4) (a)	<p>The equation of Circle C is $x^2 + y^2 = 16$. Draw a sketch of circle C.</p> 	(a) Any circle centre (0, 0) drawn Correct radius 	(1) (1)
(b)	<p>The circle C is translated by the vector $\begin{pmatrix} 5 \\ 0 \end{pmatrix}$. Draw a sketch of circle B.</p> 	(b) Any circle drawn Correct intercepts on x-axis 	(1) (1)

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