

WJEC GCSE MATHS • GRADE 7

MATHS



MODEL ANSWERS

IMPLICIT GRAPHS

SCORE

/128

PERCENTAGE

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STEM UP

- 1 Rearrange $xy = 10$ to make y the subject.

divide both sides by x : $y = \frac{10}{x}$

$$y = \frac{10}{x}$$

/ 1

- 2 The point $(5, k)$ lies on the graph of $x + 2y = 7$.

Find the value of k .

$$1 \times 5 + 2k = 7$$

$$2k = 2$$

$$k = 1$$

/ 1

- 3 The equation of a circle is $x^2 + y^2 = 9$.

(a) Write down the coordinates of the centre of the circle.

(b) Write down the radius of the circle.

the equation is $x^2 + y^2 = r^2$ with centre the origin: (a) $(0, 0)$

(b) $r^2 = 9$ so $r = 3$

(a) $(0, 0)$; (b) 3

/ 1

- 4 Rearrange $xy = 12$ to make y the subject.

divide both sides by x : $y = \frac{12}{x}$

$$y = \frac{12}{x}$$

/ 1

- 5 The point $(3, k)$ lies on the graph of $5x + 4y = 23$.

Find the value of k .

$$5 \times 3 + 4k = 23$$

$$4k = 8$$

$$k = 2$$

/ 1

- 6 Here are three points: $(0, 7)$, $(-1, 7)$, $(-6, 9)$.

Write down which of the points lie on the graph of $2x + 5y = 33$.

$$(0, 7): 2 \times 0 + 5 \times 7 = 35, \text{ not on the graph}$$

$$(-1, 7): 2 \times -1 + 5 \times 7 = 33, \text{ on the graph}$$

$$(-6, 9): 2 \times -6 + 5 \times 9 = 33, \text{ on the graph}$$

$$(-1, 7), (-6, 9)$$

/ 1

- 7 Rearrange $x + 4y = 12$ to make y the subject.

$$4y = 12 - 1x$$

$$y = -\frac{1}{4}x + 3$$

/ 1

- 8 The graph of $y^2 = x$ has one line of symmetry.
Write down the equation of the line of symmetry.

y and -y give the same x, so the graph is symmetrical in the x axis, $y = 0$

$$y = 0 \text{ (the x axis)}$$

/ 1

- 9 Here are three points: $(-4, -3)$, $(4, 4)$, $(-2, -6)$.
Write down which of the points lie on the graph of $xy = 12$.

$(-4, -3)$: $-4 \times -3 = 12$, on the graph

$(4, 4)$: $4 \times 4 = 16$, not on the graph

$(-2, -6)$: $-2 \times -6 = 12$, on the graph

$$(-4, -3), (-2, -6)$$

/ 1

- 10 Rearrange $3x - y = 4$ to make y the subject.

$$3x - y = 4$$

$$3x - 4 = y$$

$$y = 3x - 4$$

1 / 1

- 11 The graph of $xy = 10$ has two lines of symmetry.
Write down the equations of the two lines of symmetry.

*the branches are reflections of each other in
the lines $y = x$ and $y = -x$*

$$y = x \text{ and } y = -x$$

1 / 1

- 12 The graph of $2x + 3y = 12$ crosses the x axis at A and the y axis at B.

(a) Find the coordinates of A.

(b) Find the coordinates of B.

(a) put $y = 0$: $2x = 12$ so $x = 6$

(b) put $x = 0$: $3y = 12$ so $y = 4$

$$(a) (6, 0); (b) (0, 4)$$

1 / 1

- 13 The point (18, k) lies on the graph of $y^2 = 2x$.
Find the two possible values of k.

$$k^2 = 2 \times 18 = 36$$

$$k = \pm 6$$

$$k = 6 \text{ or } k = -6$$

2

 / 2

- 14 The graph of $xy = 6$ has two lines of symmetry.
Write down the equations of the two lines of symmetry.

*the branches are reflections of each other in
the lines $y = x$ and $y = -x$*

$$y = x \text{ and } y = -x$$

1

 / 1

- 15 The graph of $xy = 8$ does not cross either axis.
Explain why, by considering $x = 0$ and $y = 0$.

*if $x = 0$ then $0 \times y = 0$, which is not 8, and if
 $y = 0$ then $x \times 0 = 0$, which is not 8*

$$0 \text{ is never equal to } 8$$

2

 / 2

- 16 The point $(-8, k)$ lies on the circle $x^2 + y^2 = 100$.

Find the two possible values of k .

$$-8^2 + k^2 = 100$$

$$64 + k^2 = 100$$

$$k^2 = 36$$

$$k = \pm 6$$

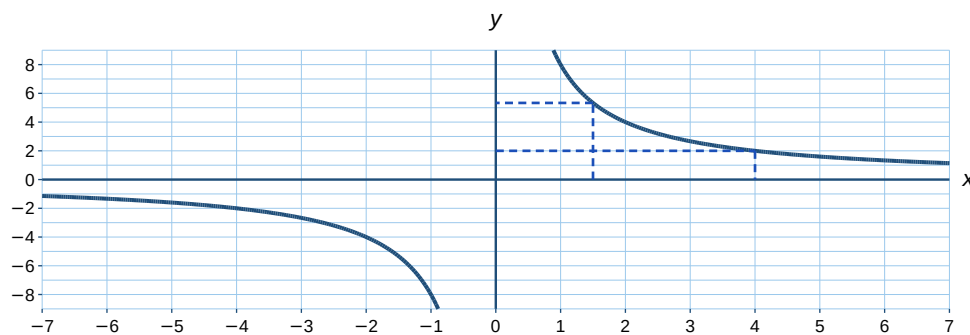
$$k = 6 \text{ or } k = -6$$

2 / 2

- 17 The diagram shows the graph of $xy = 8$.

(a) Use the graph to find the value of y when $x = 1.5$.

(b) Use the graph to find the value of x when $y = 2$.



(a) $y = 5.3$; (b) $x = 4$

2 / 2

- 18 A circle has equation $x^2 + y^2 = 25$.

Write down the coordinates of the four points where the circle crosses the axes.

on the x axis $y = 0$ so $x^2 = 25$, $x = \pm 5$

on the y axis $x = 0$ so $y^2 = 25$, $y = \pm 5$

$(5, 0), (-5, 0), (0, 5), (0, -5)$

2 / 2

- 19 The equation of a straight line is $x + 2y = 8$.
- (a) Rearrange the equation into the form $y = mx + c$.
- (b) Write down the gradient of the line.
- (c) Write down the coordinates of the point where the line crosses the y axis.

(a) $x + 2y = 8$

$2y = 8 - 1x$

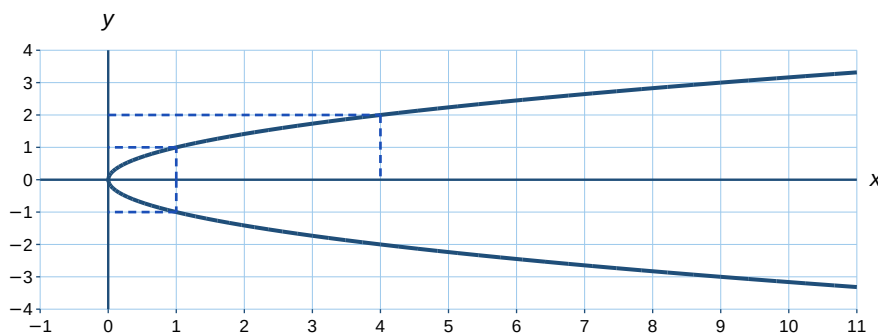
(b) the gradient is the coefficient of x : $-\frac{1}{2}$

(c) the y-intercept is 4 so $(0, 4)$

(a) $y = -\frac{1}{2}x + 4$; (b) $-\frac{1}{2}$; (c) $(0, 4)$

2 / 2

- 20 The diagram shows the graph of $y^2 = x$.
- (a) Use the graph to find the two values of y when $x = 1$.
- (b) Use the graph to find the value of x when $y = 2$.



read the values from the graph, as shown by the dashed lines

(a) $y = 1$ or $y = -1$; (b) $x = 4$

2 / 2

- 21 A circle has equation $x^2 + y^2 = 4$.
- Write down the coordinates of the four points where the circle crosses the axes.

on the x axis $y = 0$ so $x^2 = 4$, $x = \pm 2$

on the y axis $x = 0$ so $y^2 = 4$, $y = \pm 2$

$(2, 0), (-2, 0), (0, 2), (0, -2)$

2 / 2

22 The equation of a straight line is $2x + 5y = 11$.

(a) Rearrange the equation into the form $y = mx + c$.

(b) Write down the gradient of the line.

(c) Write down the coordinates of the point where the line crosses the y axis.

(a) $2x + 5y = 11$

$5y = 11 - 2x$

(b) the gradient is the coefficient of x: $-\frac{2}{5}$

(c) the y-intercept is $\frac{11}{5}$ so $(0, \frac{11}{5})$

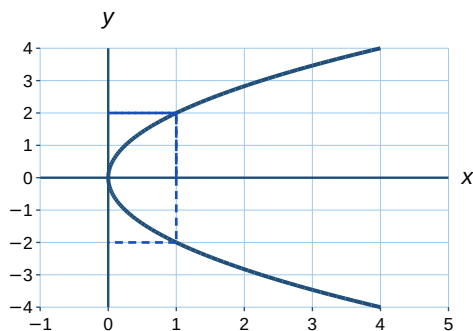
(a) $y = -\frac{2}{5}x + \frac{11}{5}$; (b) $-\frac{2}{5}$; (c) $(0, \frac{11}{5})$

2 / 2

23 The diagram shows the graph of $y^2 = 4x$.

(a) Use the graph to find the two values of y when $x = 1$.

(b) Use the graph to find the value of x when $y = 2$.



read the values from the graph, as shown by the dashed lines

(a) $y = 2$ or $y = -2$; (b) $x = 1$

2 / 2

24 A circle has equation $x^2 + y^2 = 64$.

Write down the coordinates of the four points where the circle crosses the axes.

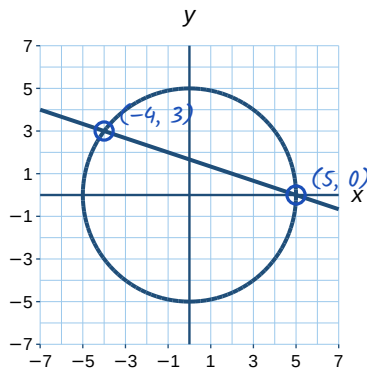
on the x axis $y = 0$ so $x^2 = 64$, $x = \pm 8$

on the y axis $x = 0$ so $y^2 = 64$, $y = \pm 8$

$(8, 0)$, $(-8, 0)$, $(0, 8)$, $(0, -8)$

2 / 2

- 25 The diagram shows the graphs of $x^2 + y^2 = 25$ and $x + 3y = 5$.
Use the diagram to find the coordinates of the points where the line meets the circle.

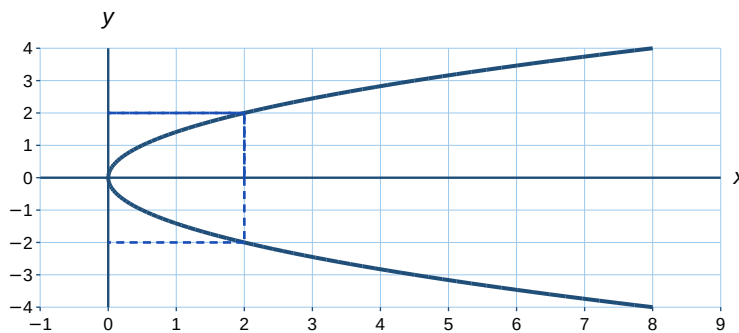


read the two places where the straight line crosses the circle: $(5, 0)$ and $(-4, 3)$

$(5, 0)$ and $(-4, 3)$

2 / 2

- 26 The diagram shows the graph of $y^2 = 2x$.
(a) Use the graph to find the two values of y when $x = 2$.
(b) Use the graph to find the value of x when $y = 2$.



read the values from the graph, as shown by the dashed lines

(a) $y = 2$ or $y = -2$; (b) $x = 2$

2 / 2

- 27 The equation of a straight line is $x + 3y = 9$.
(a) Rearrange the equation into the form $y = mx + c$.
(b) Write down the gradient of the line.
(c) Write down the coordinates of the point where the line crosses the y axis.

(a) $x + 3y = 9$

$3y = 9 - 1x$

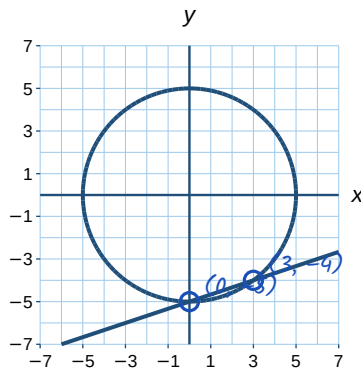
(b) the gradient is the coefficient of x : $-\frac{1}{3}$

(c) the y -intercept is 3 so $(0, 3)$

(a) $y = -\frac{1}{3}x + 3$; (b) $-\frac{1}{3}$; (c) $(0, 3)$

3 / 3

- 28 The diagram shows the graphs of $x^2 + y^2 = 25$ and $x - 3y = 15$.
Use the diagram to find the coordinates of the points where the line meets the circle.

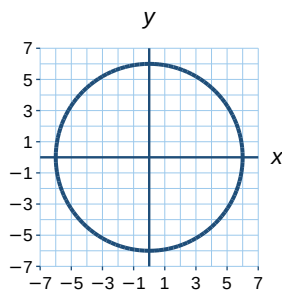


read the two places where the straight line crosses the circle: (0, -5) and (3, -4)

(0, -5) and (3, -4)

3 / 3

- 29 The diagram shows a circle with its centre at the origin.
(a) Write down the radius of the circle.
(b) Write down the equation of the circle.
(c) Use the graph to estimate the two values of y when $x = 1$.



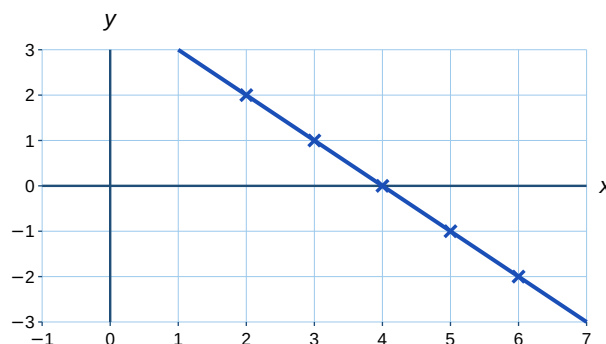
*(a) the circle crosses the x axis at 6 so $r = 6$
(b) $x^2 + y^2 = r^2 = 36$*

(a) 6; (b) $x^2 + y^2 = 36$; (c) $y = 5.9$ or $y = -5.9$ (accept ± 0.2)

3 / 3

- 30 (a) Complete the table of values for $x + y = 4$.
(b) On the grid, draw the graph of $x + y = 4$.

x	y
2	<i>2</i>
3	<i>1</i>
4	<i>0</i>
5	<i>-1</i>
6	<i>-2</i>

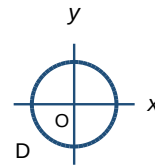
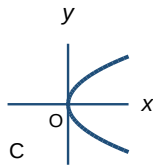
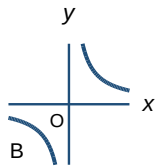
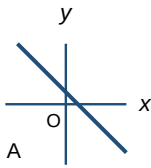


3 / 3

31 Here are four sketch graphs, A, B, C and D.

Match each of these equations to its graph: $x + y = 6$ $x^2 + y^2 = 4$ $xy = 8$ $y^2 = x$

Write the letter of the graph next to each equation.



line has a negative gradient: A

circle is round: D

$xy = 8$ has two separate branches: B

$y^2 = x$ is a sideways parabola: C

$x + y = 6$: A; $x^2 + y^2 = 4$: D; $xy = 8$: B; $y^2 = x$: C

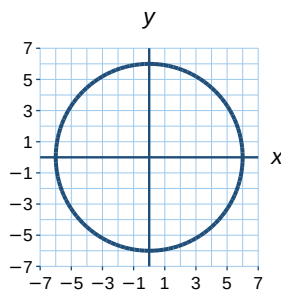
3 / 3

32 The diagram shows a circle with its centre at the origin.

(a) Write down the radius of the circle.

(b) Write down the equation of the circle.

(c) Use the graph to estimate the two values of y when $x = 2$.



(a) the circle crosses the x axis at 6 so $r = 6$

(b) $x^2 + y^2 = r^2 = 36$

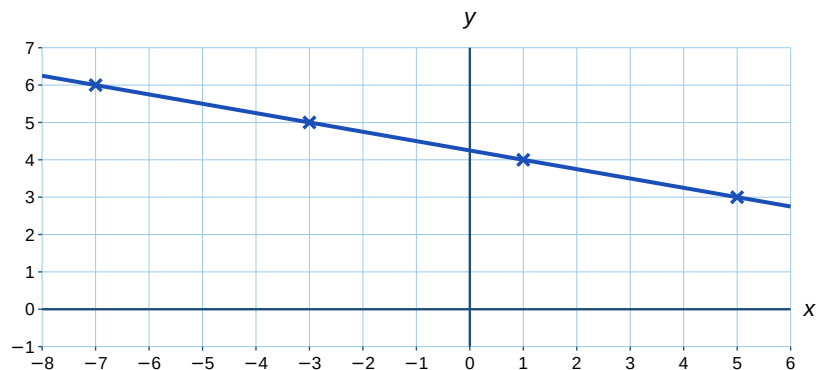
(a) 6; (b) $x^2 + y^2 = 36$; (c) $y = 5.7$ or $y = -5.7$ (accept ± 0.2)

3 / 3

33 (a) Complete the table of values for $x + 4y = 17$.

(b) On the grid, draw the graph of $x + 4y = 17$.

x	y
-7	6
-3	5
1	4
5	3

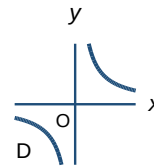
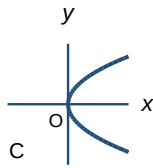
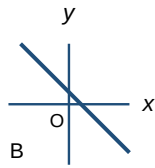
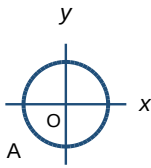


3 / 3

34 Here are four sketch graphs, A, B, C and D.

Match each of these equations to its graph: $x + y = 8$ $x^2 + y^2 = 9$ $xy = 8$ $y^2 = x$

Write the letter of the graph next to each equation.



line has a negative gradient: B

circle is round: A

$xy = 8$ has two separate branches: D

$y^2 = x$ is a sideways parabola: C

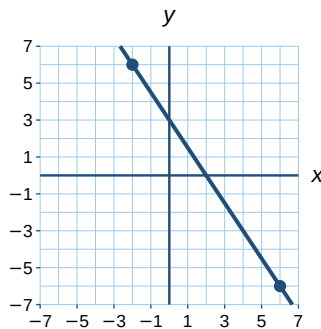
$x + y = 8$: B; $x^2 + y^2 = 9$: A; xy
 $= 8$: D; $y^2 = x$: C

3 / 3

35 The diagram shows a straight line.

Find the equation of the line.

Give your answer in the form $ax + by = c$, where a, b and c are integers.



points $(-2, 6)$ and $(6, -6)$
 gradient $= -\frac{3}{2}$

y-intercept 3
 $y = -\frac{3}{2}x + 3$

multiply by 2: $3x + 2y = 6$

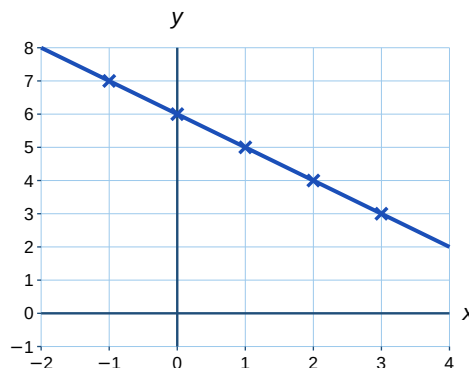
$3x + 2y = 6$

4 / 4

36 (a) Complete the table of values for $x + y = 6$.

(b) On the grid, draw the graph of $x + y = 6$.

x	y
-1	7
0	6
1	5
2	4
3	3

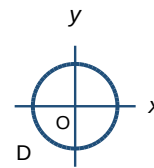
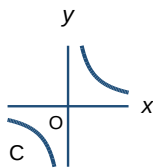
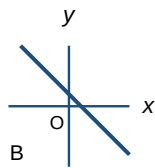
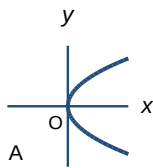


3 / 3

37 Here are four sketch graphs, A, B, C and D.

Match each of these equations to its graph: $x + y = 6$ $x^2 + y^2 = 25$ $xy = 12$ $y^2 = x$

Write the letter of the graph next to each equation.



line has a negative gradient: B

circle is round: D

$xy = 12$ has two separate branches: C

$y^2 = x$ is a sideways parabola: A

$x + y = 6$: B; $x^2 + y^2 = 25$: D;

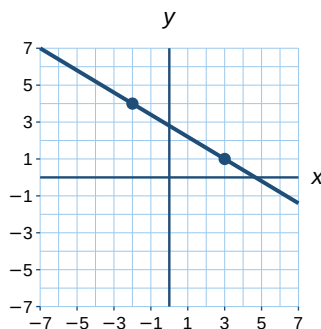
$xy = 12$: C; $y^2 = x$: A

3 / 3

38 The diagram shows a straight line.

Find the equation of the line.

Give your answer in the form $ax + by = c$, where a, b and c are integers.



points $(-2, 4)$ and $(3, 1)$

gradient $= -\frac{3}{5}$

y-intercept $\frac{14}{5}$

$y = -\frac{3}{5}x + \frac{14}{5}$

multiply by 5: $3x + 5y = 14$

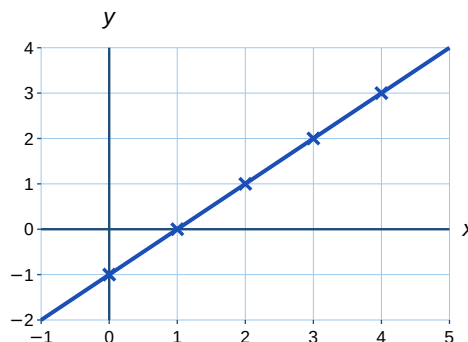
$3x + 5y = 14$

4 / 4

39 (a) Complete the table of values for $x - y = 1$.

(b) On the grid, draw the graph of $x - y = 1$.

x	y
0	-1
1	0
2	1
3	2
4	3

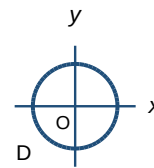
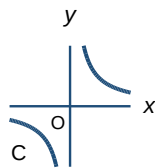
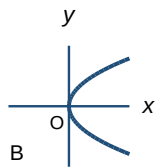
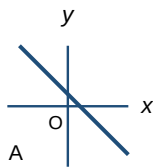


3 / 3

40 Here are four sketch graphs, A, B, C and D.

Match each of these equations to its graph: $x + y = 5$ $x^2 + y^2 = 16$ $xy = 6$ $y^2 = x$

Write the letter of the graph next to each equation.



line has a negative gradient: A

circle is round: D

$xy = 6$ has two separate branches: C

$y^2 = x$ is a sideways parabola: B

$x + y = 5$: A; $x^2 + y^2 = 16$: D;

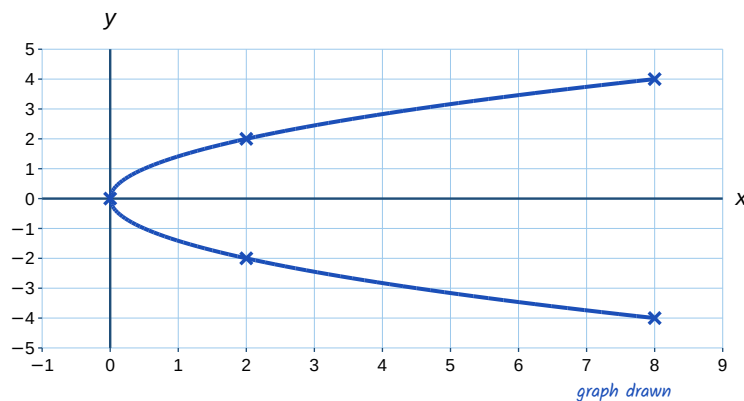
$xy = 6$: C; $y^2 = x$: B

3 / 3

41 (a) Complete the table of values for $y^2 = 2x$.

(b) On the grid, draw the graph of $y^2 = 2x$.

y	x
-4	8
-2	2
0	0
2	2
4	8



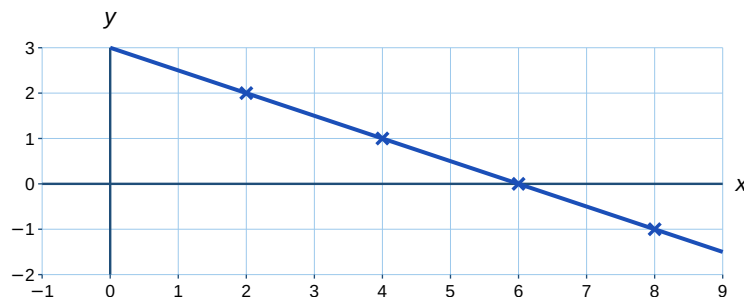
graph drawn

4 / 4

42 (a) Complete the table of values for $x + 2y = 6$.

(b) On the grid, draw the graph of $x + 2y = 6$.

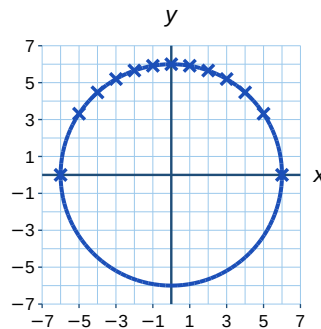
x	y
2	2
4	1
6	0
8	-1



4 / 4

- 43 (a) Complete the table of values for the upper half of the circle $x^2 + y^2 = 36$.
 (b) Use the table and the symmetry of the circle to draw the circle on the grid.
 (c) Write down the radius of the circle.

x	y
0	6
1	5.9
2	5.7
3	5.2
4	4.5
5	3.3
6	0

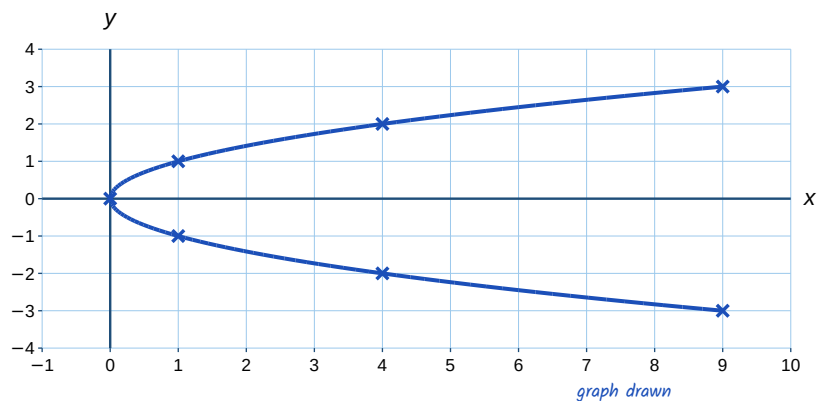


(c) 6

4 / 4

- 44 (a) Complete the table of values for $y^2 = x$.
 (b) On the grid, draw the graph of $y^2 = x$.

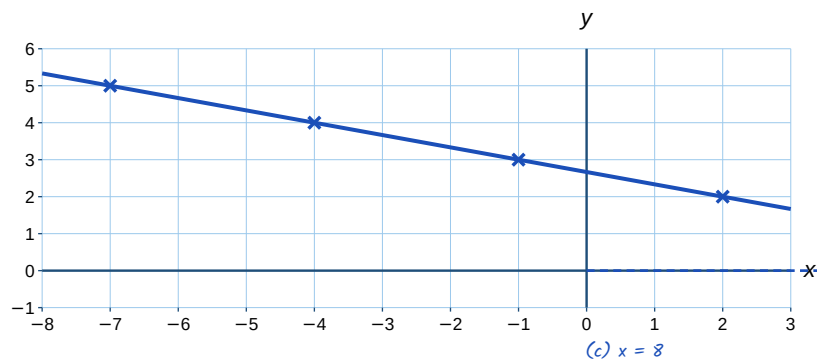
y	x
-3	9
-2	4
-1	1
0	0
1	1
2	4
3	9



4 / 4

- 45 (a) Complete the table of values for $x + 3y = 8$.
 (b) On the grid, draw the graph of $x + 3y = 8$.
 (c) Use your graph to find the value of x when $y = 0$.

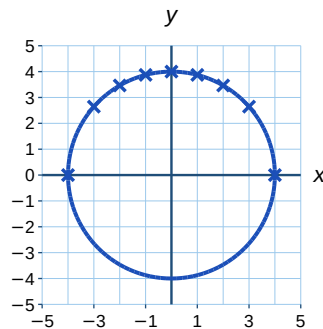
x	y
-7	5
-4	4
-1	3
2	2



4 / 4

- 46 (a) Complete the table of values for the upper half of the circle $x^2 + y^2 = 16$.
 (b) Use the table and the symmetry of the circle to draw the circle on the grid.
 (c) Write down the radius of the circle.

x	y
0	4
1	3.9
2	3.5
3	2.6
4	0

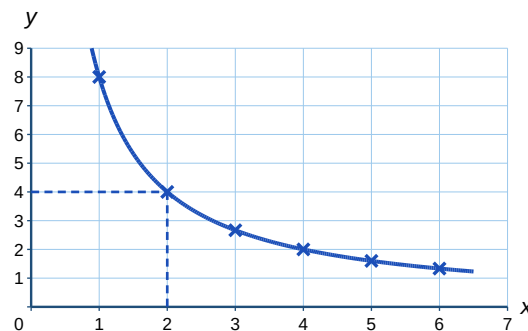


(c) 4

5 / 5

- 47 (a) Complete the table of values for $xy = 8$.
 (b) On the grid, draw the graph of $xy = 8$ for values of x from 1 to 6.
 (c) Use your graph to find the value of x when $y = 4$.

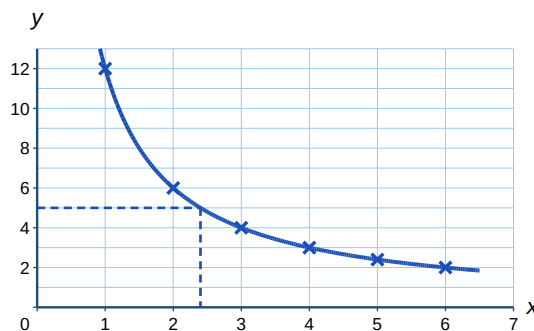
x	y
1	8
2	4
3	2.7
4	2
5	1.6
6	1.3

(c) $x = 2$

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- 48 (a) Complete the table of values for $xy = 12$.
 (b) On the grid, draw the graph of $xy = 12$ for values of x from 1 to 6.
 (c) Use your graph to find the value of x when $y = 5$.

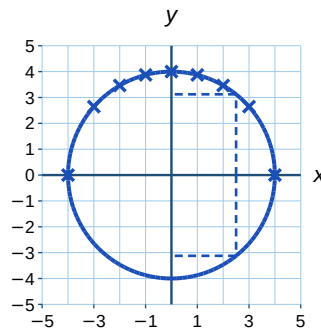
x	y
1	12
2	6
3	4
4	3
5	2.4
6	2

(c) $x = 2.4$

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- 49 (a) Complete the table of values for the upper half of the circle $x^2 + y^2 = 16$.
 (b) Use the table and the symmetry of the circle to draw the circle on the grid.
 (c) Use your graph to find the two values of y when $x = 2.5$.

x	y
0	4
1	3.9
2	3.5
3	2.6
4	0

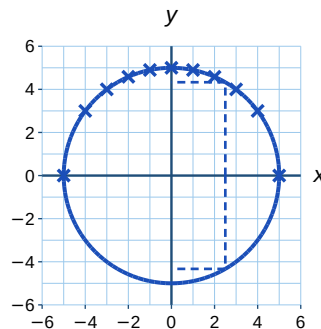


(c) $y = 3.1$ or $y = -3.1$ (accept ± 0.2)

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- 50 (a) Complete the table of values for the upper half of the circle $x^2 + y^2 = 25$.
 (b) Use the table and the symmetry of the circle to draw the circle on the grid.
 (c) Use your graph to find the two values of y when $x = 2.5$.

x	y
0	5
1	4.9
2	4.6
3	4
4	3
5	0



(c) $y = 4.3$ or $y = -4.3$ (accept ± 0.2)

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