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# National 5 Maths Quadratic Graphs

SQA past paper and specimen paper  
questions and answers by topic

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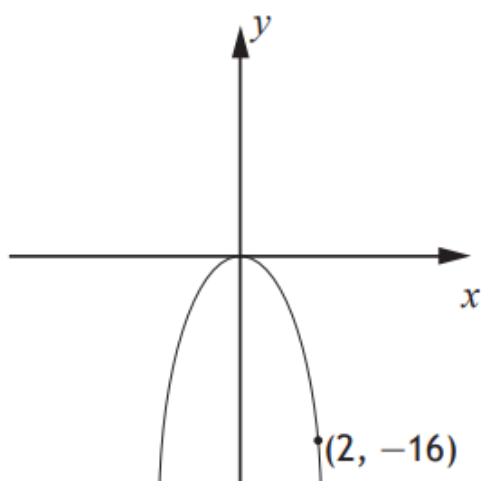
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The graph with equation  $y = kx^2$  is shown below.



The point  $(2, -16)$  lies on the graph.

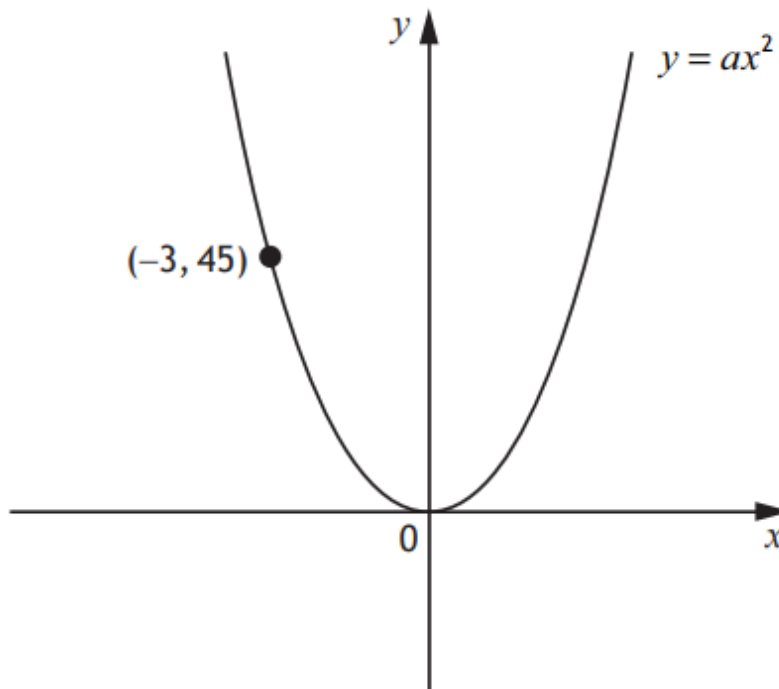
Determine the value of  $k$ .

2

Answer:

-4

The diagram below shows part of the graph of  $y = ax^2$



Find the value of  $a$ .

2

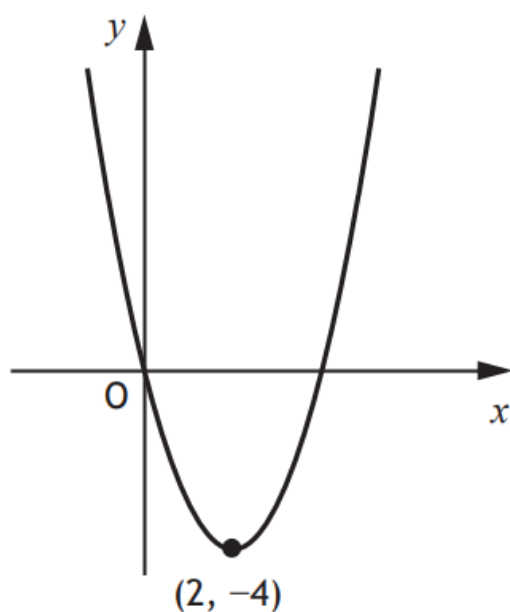
Answer:

$$a = 5$$



The graph below shows part of the parabola with equation of the form

$$y = (x + a)^2 + b.$$



The minimum turning point  $(2, -4)$  is shown in the diagram.

(a) State the values of

(i)  $a$  1

(ii)  $b$ . 1

(b) Write down the equation of the axis of symmetry of the graph. 1

Answers:

(a) (i)  $a = -2$

(ii)  $b = -4$

(b)  $x = 2$

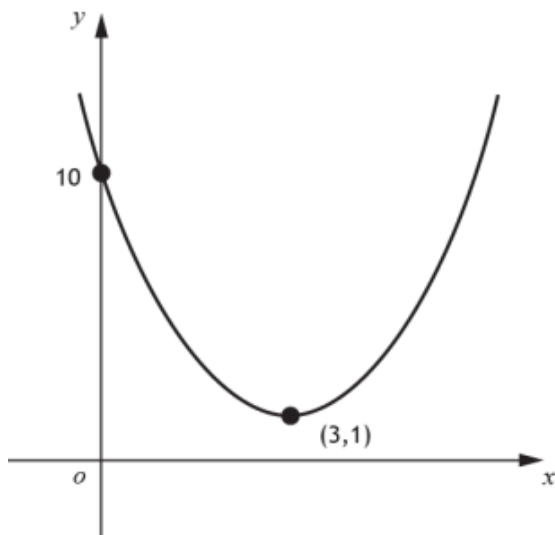
National 5 Maths  
SQA 2016 Paper 1  
Question 10

Sketch the graph of  $y = (x - 3)^2 + 1$ .

On your sketch, show clearly the coordinates of the turning point and the point of intersection with the  $y$ -axis.

3

Answer:



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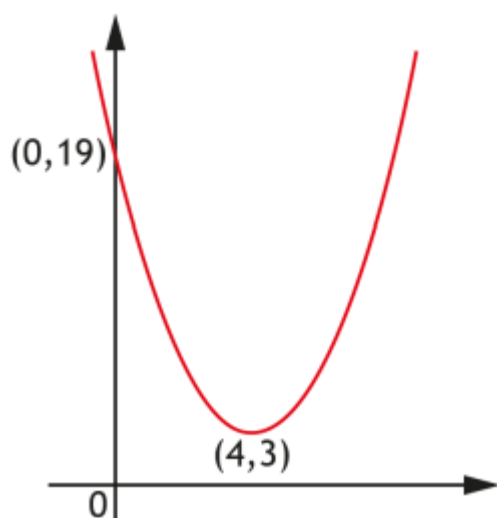
A parabola has equation  $y = x^2 - 8x + 19$ .

- (a) Write the equation in the form  $y = (x - p)^2 + q$ . 2
- (b) Sketch the graph of  $y = x^2 - 8x + 19$ , showing the coordinates of the turning point and the point of intersection with the  $y$ -axis. 3
- 

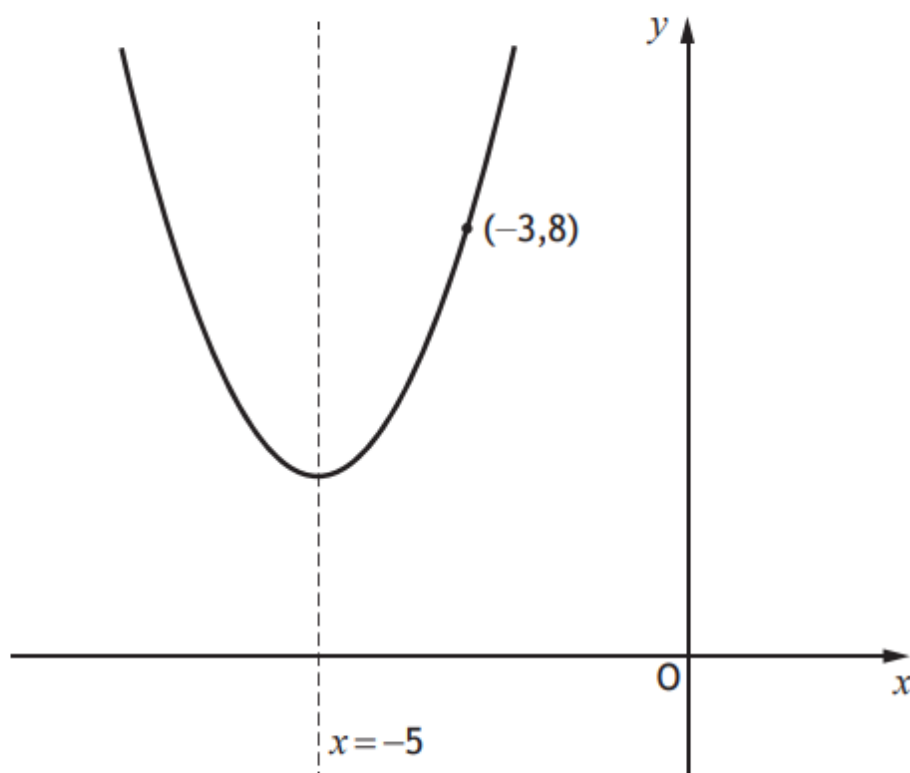
Answers:

(a)  $y = (x - 4)^2 + 3$

(b)



The graph below shows a parabola with equation of the form  $y = (x + a)^2 + b$ .



The equation of the axis of symmetry of the parabola is  $x = -5$ .

(a) State the value of  $a$ . 1

The point  $(-3, 8)$  lies on the parabola.

(b) Calculate the value of  $b$ . 2

Answers:

(a)  $a = 5$

(b)  $b = 4$

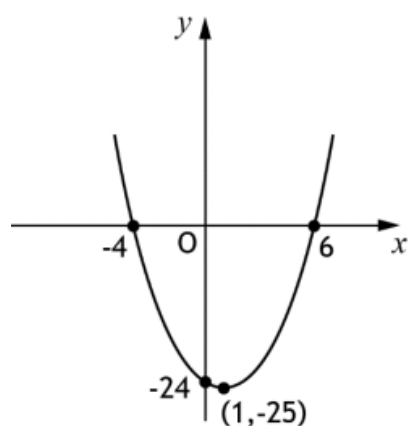


Sketch the graph of  $y = (x - 6)(x + 4)$ .

On your sketch, show clearly the points of intersection with the  $x$ -axis and the  $y$ -axis, and the coordinates of the turning point.

3

Answer:







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(a) (i) Express  $x^2 - 6x - 81$  in the form  $(x - p)^2 + q$ . 2

(ii) Hence state the equation of the axis of symmetry of the graph of  
 $y = x^2 - 6x - 81$ . 1

(b) The roots of the equation  $x^2 - 6x - 81 = 0$  can be expressed in the form  
 $x = d \pm d\sqrt{e}$ .

Find, algebraically, the values of  $d$  and  $e$ . 4

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Answer:

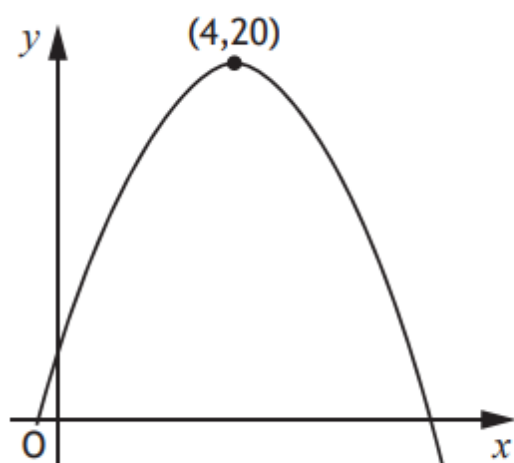
(a) (i)  $(x - 3)^2 - 90$

(ii)  $x = 3$

(b)  $d = 3, e = 10$



The graph shows a parabola.



The maximum turning point has coordinates (4,20) as shown in the diagram.

(a) Write down the equation of the axis of symmetry of the graph. 1

The equation of the parabola is of the form  $y = b - (x + a)^2$ .

(b) State the values of

(i)  $a$  1

(ii)  $b$ . 1

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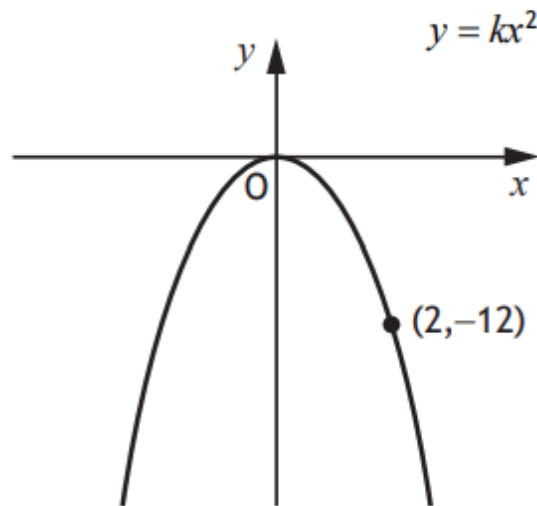
Answers:

(a)  $x = 4$

(b) (i)  $-4$

(ii)  $20$

The diagram below shows part of the graph of  $y = kx^2$ .



Find the value of  $k$ .

2

Answer:

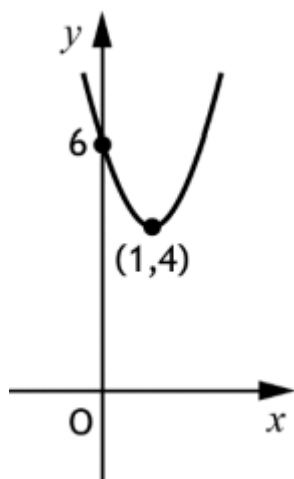
-3

Sketch the graph of  $y = 2(x-1)^2 + 4$ .

On your sketch, show clearly the coordinates of the turning point and the point of intersection with the  $y$ -axis.

3

Answer:





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(a) Express  $x^2 + 8x + 15$  in the form  $(x + a)^2 + b$ . 2

(b) Hence, or otherwise, state the coordinates of the turning point of the graph of  $f(x) = x^2 + 8x + 15$ . 1

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Answers:

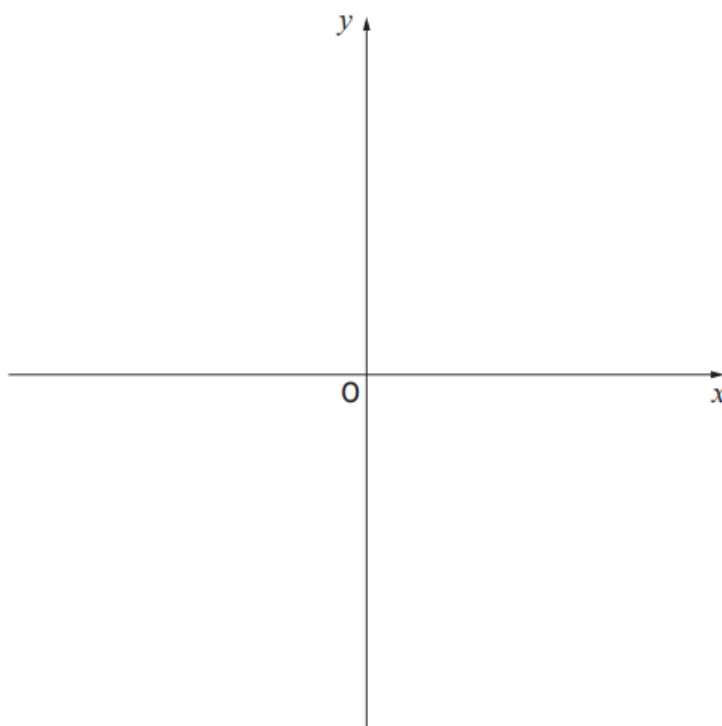
(a)  $(x + 4)^2 - 1$

(b)  $(-4, -1)$

Sketch the graph of  $y = (x + 1)(x - 3)$  using the axes provided below.

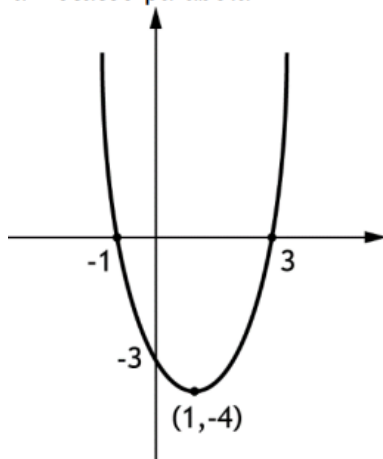
On your sketch, show clearly the points of intersection with the  $x$ -axis and the  $y$ -axis, and the coordinates of the turning point.

3

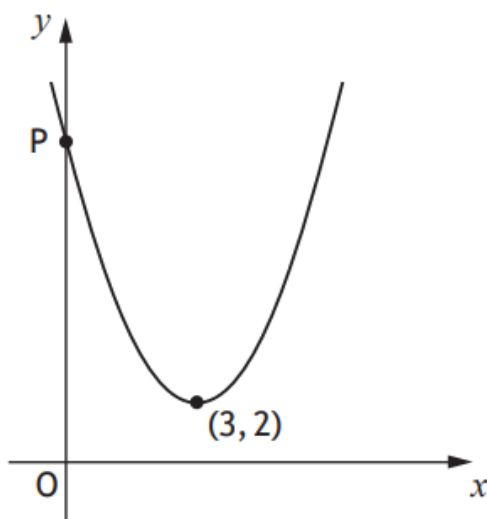


Answer:

$(1, -4)$  AND  $-3$  and a consistently annotated parabola



The graph below shows part of a parabola of the form  $y = (x + a)^2 + b$ .



- (a) (i) State the value of  $a$ . 1
- (ii) State the value of  $b$ . 1
- (b) P is the point  $(0, c)$ .  
Find the value of  $c$ . 1

Answers:

- (a) (i)  $-3$   
(ii)  $2$
- (b)  $11$