Maths.scot

National 5 Maths
Quadratic Graphs

SQA past paper and specimen paper questions and answers by topic

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National 5 Maths
SQA 2013 Specimen
Paper 2 Question 4

National 5 Maths
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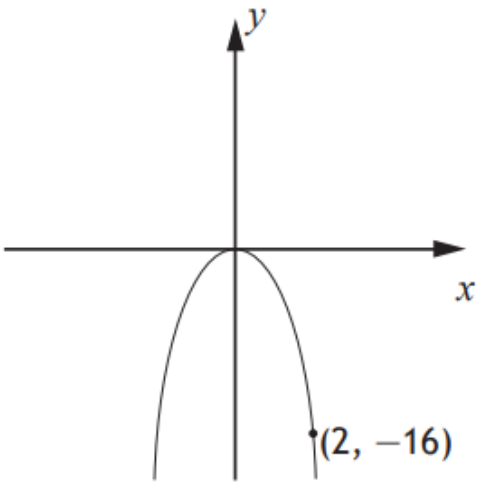
The graph with equation $y = kx^2$ is shown below.



The point (2, −16) lies on the graph.

Determine the value of k. **2**

Answer:

–4

National 5 Maths
SQA 2014 Paper 1
Question 7

National 5 Maths
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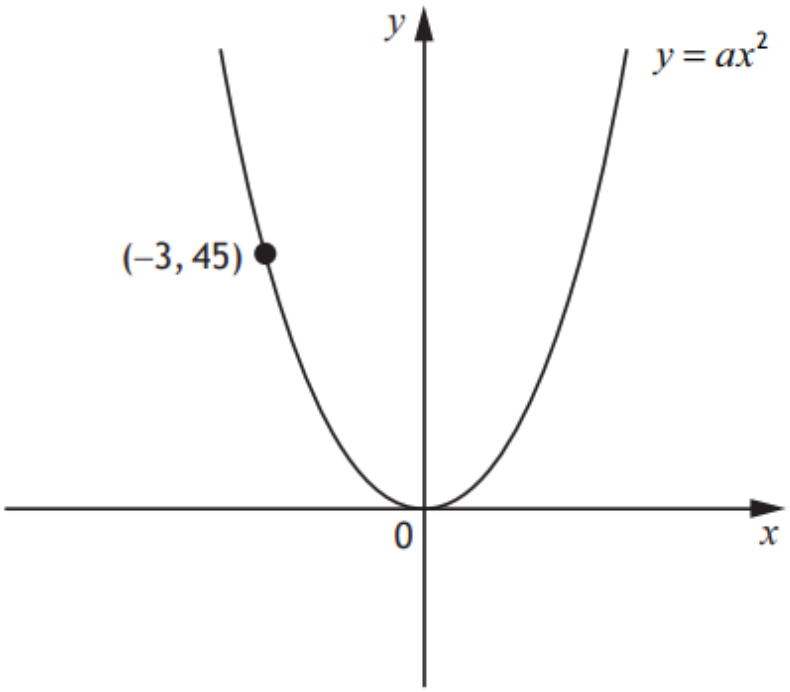
The diagram below shows part of the graph of $y = ax^2$



Find the value of a. **2**

Answer:

$a = 5$

National 5 Maths
SQA 2015 Paper 1
Question 7

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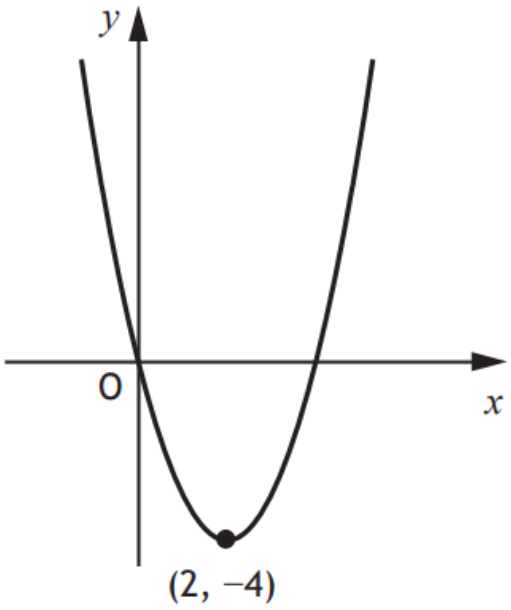
The graph below shows part of the parabola with equation of the form

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



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

National 5 Maths
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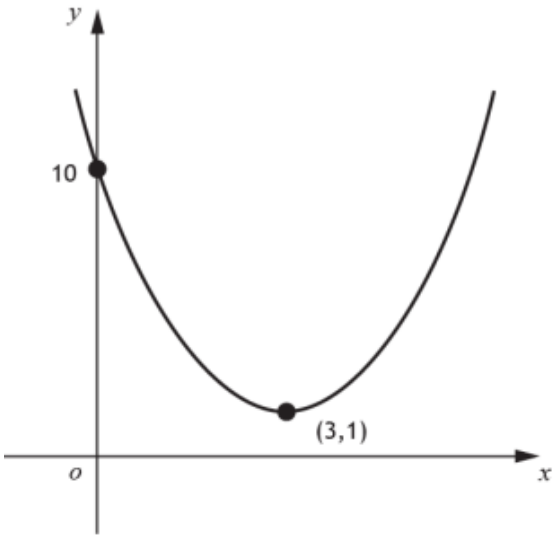
Sketch the graph of $y=(x-3)^2+1$.

On your sketch, show clearly the coordinates of the turning point and the point of intersection with the y–axis. **3**

Answer:



National 5 Maths
SQA 2017 Specimen
Paper 1 Question 13

National 5 Maths
Maths.scot

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

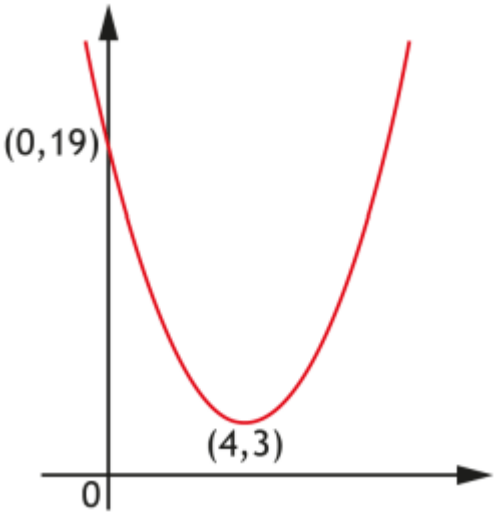
(a) Write the equation in the form $y = (x - p)^2 + q$. **2**

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

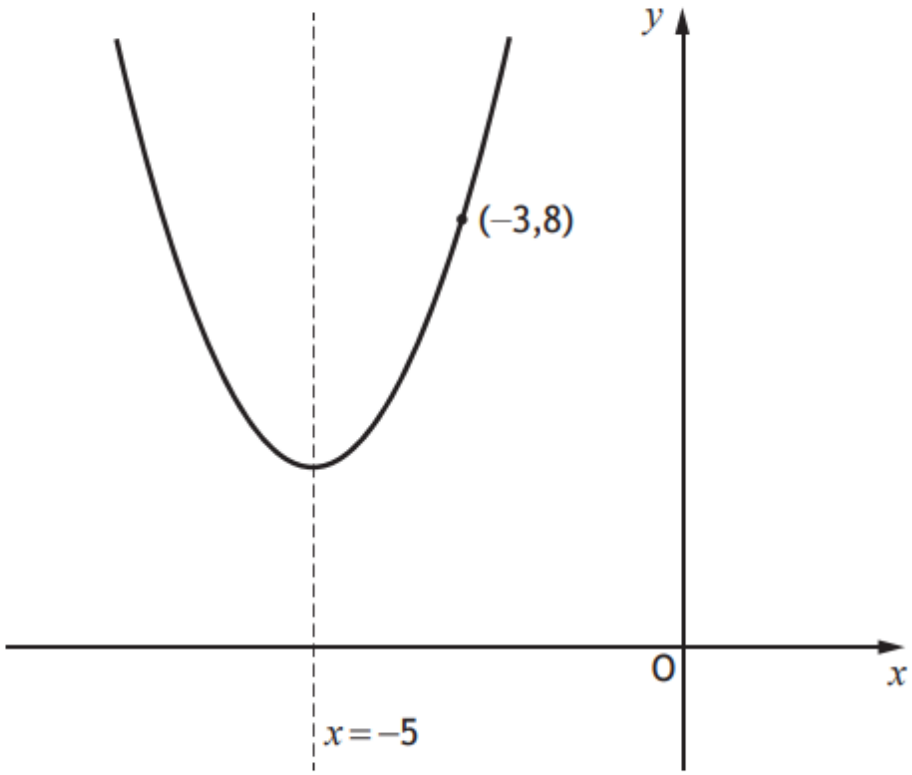
(b)



National 5 Maths
SQA 2017 Paper 1
Question 14

National 5 Maths
Maths.scot

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) $b = 4$

National 5 Maths
SQA 2018 Paper 1
Question 16

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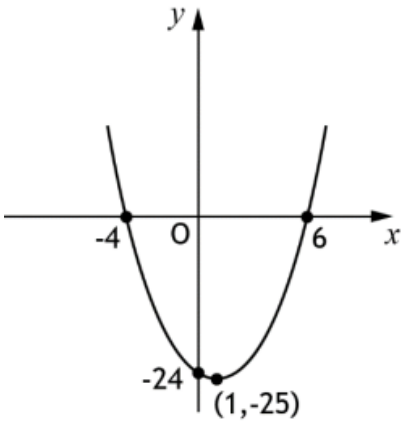
Sketch the graph of $y=(x-6)(x+4)$.

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:



National 5 Maths
SQA 2018 Paper 1
Question 19

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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**

Answer:

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

(ii) $x=3$

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

National 5 Maths
SQA 2019 Paper 1
Question 9

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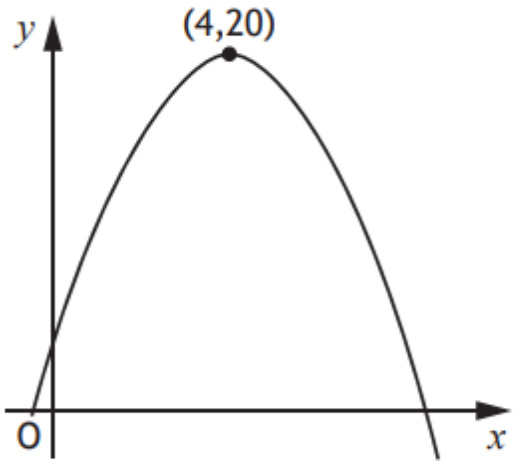
The graph shows a parabola.



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**

Answers:

(a) $x = 4$

(b) (i) –4

(ii) 20

National 5 Maths
SQA 2021 Paper 1
Question 6

National 5 Maths
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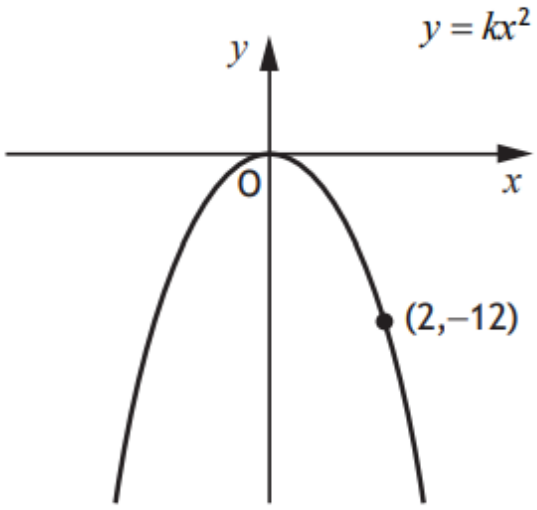
The diagram below shows part of the graph of $y = kx^2$.



Find the value of k. **2**

Answer:

–3

National 5 Maths
SQA 2021 Paper 1
Question 17

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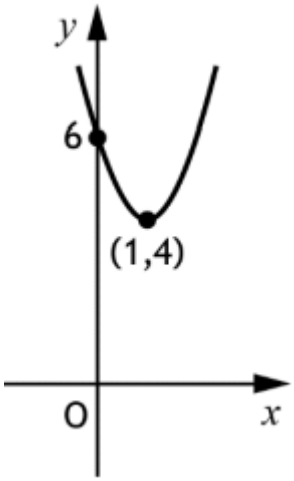
Sketch the graph of $y = 2(x-1)^2 + 4$.

On your sketch, show clearly the coordinates of the turning point and the point of intersection with the y-axis. 3

Answer:



National 5 Maths
SQA 2022 Paper 1
Question 5

National 5 Maths
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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**

Answers:

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

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

National 5 Maths
SQA 2022 Paper 1
Question 14

National 5 Maths
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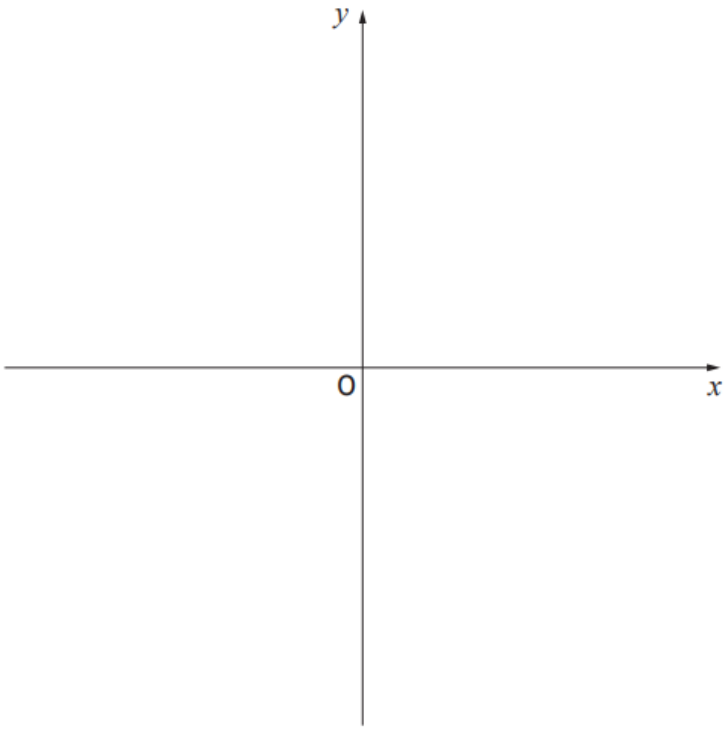
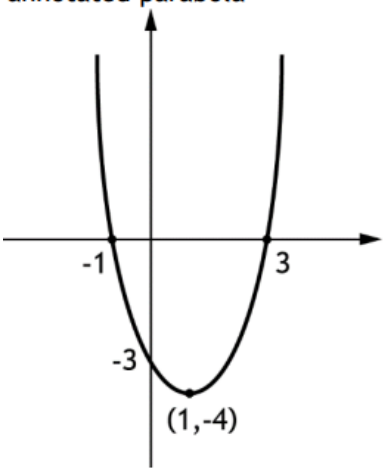
Sketch the graph of $y = (x+1)(x-3)$ using the axes provided below.

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



National 5 Maths
SQA 2023 Paper 1
Question 4

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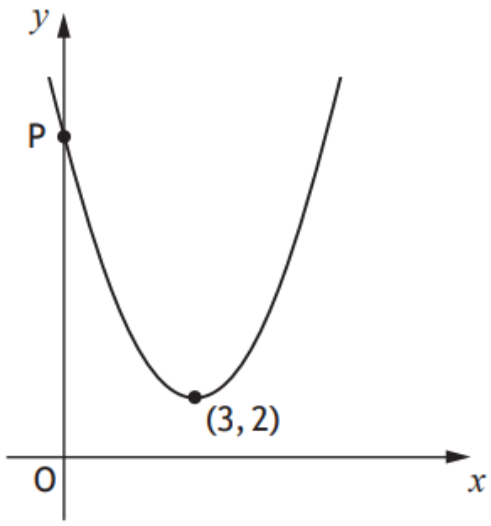
The graph below shows part of a parabola of the form $y = (x + a)^2 + b$.



(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

National 5 Maths
SQA 2024 Paper 1
Question 12

National 5 Maths
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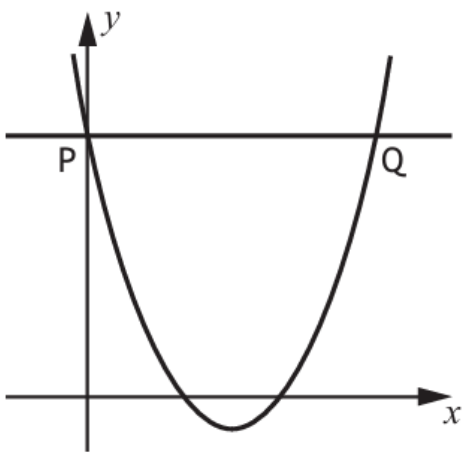
(a) Express $x^2 - 6x + 8$ in the form $(x - a)^2 + b$. **2**

(b) Hence, or otherwise, state the coordinates of the turning point of the graph of $y = x^2 - 6x + 8$. **1**

The diagram shows the graph of $y = x^2 - 6x + 8$.

A line PQ has been drawn parallel to the x-axis, where:

- P lies on the y-axis
- P and Q lie on the graph of $y = x^2 - 6x + 8$.



(c) Find the coordinates of Q. **2**

Answers:

(a) $(x-3)^2 - 1$

(b) (3, –1)

(c) (6, 8)

National 5 Maths
SQA 2025 Paper 1
Question 9

National 5 Maths
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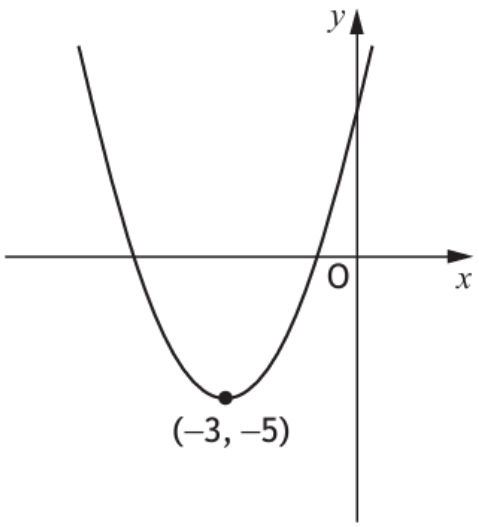
The diagram shows a parabola with equation of the form $y = (x + a)^2 + b$.



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

(b) State the value of b. **1**

Answers:

(a) $a = 3$

(b) $b = -5$