



National 5 Mathematics

Graphs of Quadratic Functions - Questions

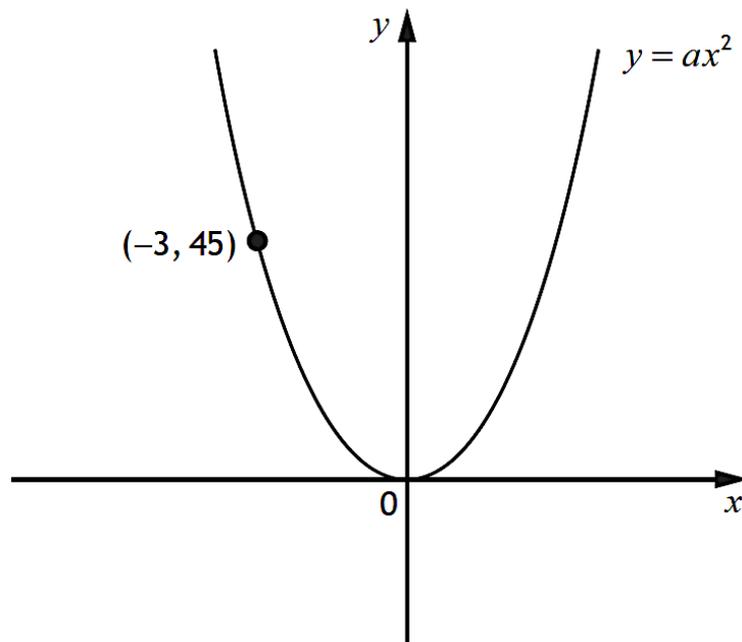
Marks are indicated in brackets after each question number

2014 Paper 1 Question 3, (2)

Express $x^2 - 14x + 44$ in the form $(x - a)^2 + b$.

2014 Paper 1 Question 7, (2)

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



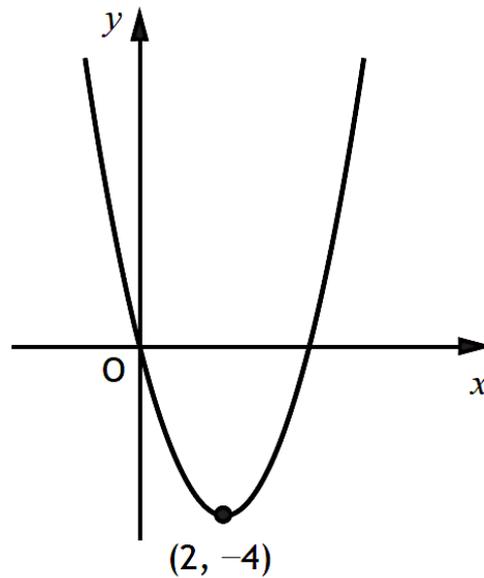
Find the value of a .



2015 Paper 1 Question 7, (1) (1) (1)

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

(ii) b .

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



2016 Paper 1 Question 10, (3)

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

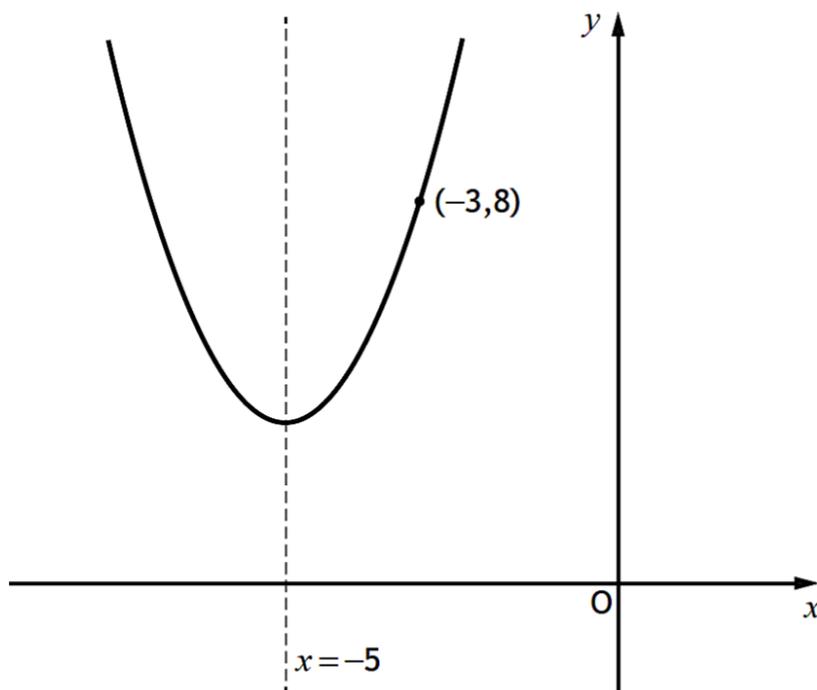
On your sketch, show clearly the coordinates of the turning point and the point of intersection with the y -axis.

2016 Paper 2 Question 9, (2)

Express $x^2 + 8x - 7$ in the form $(x + a)^2 + b$.

2017 Paper 1 Question 14, (1) (2)

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 .

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

(b) Calculate the value of b .



2018 Paper 1 Question 16, (3)

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.

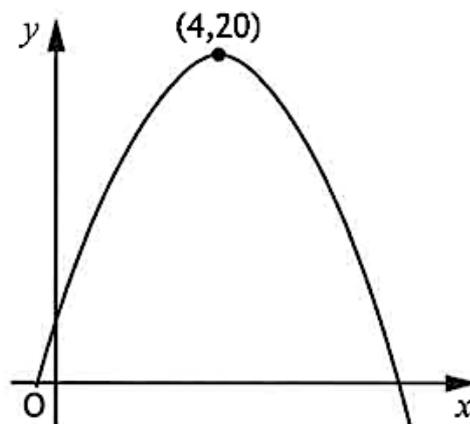
2018 Paper 1 Question 19, (2) (1)

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

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

2019 Paper 1 Question 9, (1) (1) (1)

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.



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

(b) State the values of

(i) a

(ii) b .

2019 Paper 2 Question 10, (2)

Express $x^2 + 10x - 15$ in the form $(x + p)^2 + q$.

2022 Paper 1 Question 5, (2) (1)

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

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

2022 Paper 1 Question 14, (3)

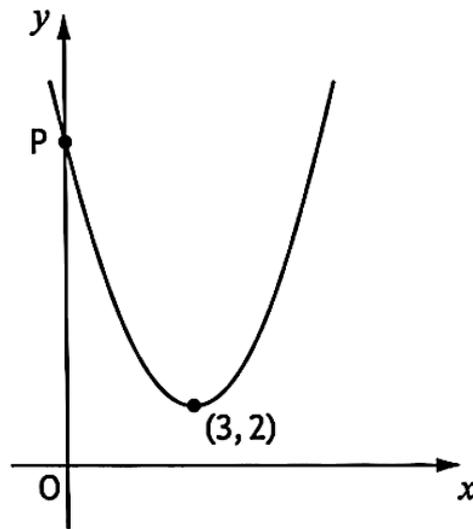
Sketch the graph of $y = (x + 1)(x - 3)$ using the axes provided below.

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



2023 Paper 1 Question 4, (1) (1) (1)

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



(a) (i) State the value of a .

(ii) State the value of b .

(b) P is the point $(0, c)$.

Find the value of c .



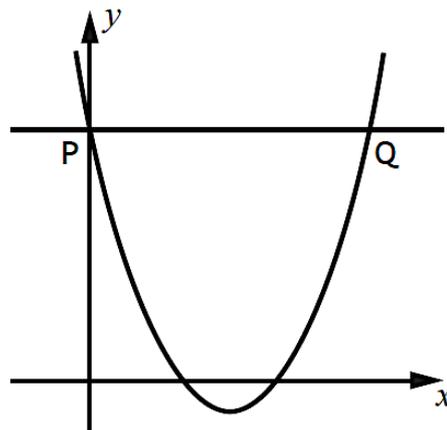
2024 Paper 1 Question 12, (2) (1) (2)

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

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 $y = x^2 - 6x + 8$.

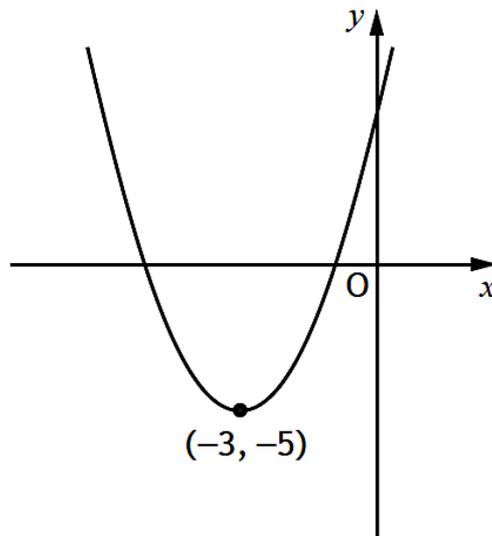


- (c) Find the coordinates of Q.



2025 Paper 1 Question 9, (1) (1)

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



- (a) State the value of a .
- (b) State the value of b .