



## National 5 Mathematics

### Graphs of Quadratic Functions - Solutions

Marks are indicated in brackets after each question number

#### 2014 Paper 1 Question 3, (2)

$$x^2 - 14x + 44 = (x - 7)^2 - 5$$

#### 2014 Paper 1 Question 7, (2)

$$y = ax^2$$

Substituting  $(-3, 45)$  gives

$$45 = a(-3)^2$$

$$= 9a$$

$$a = 5$$

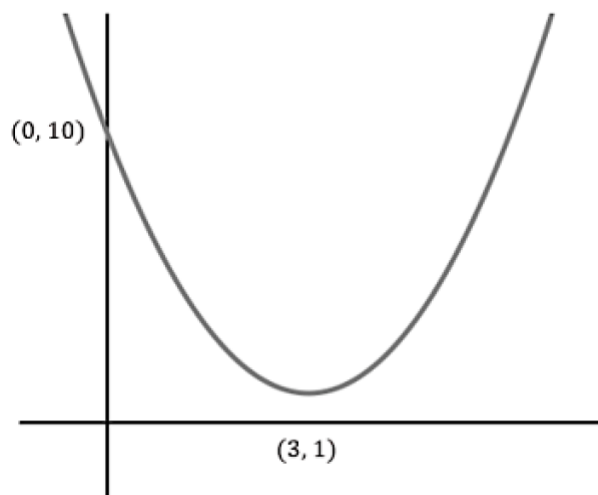
#### 2015 Paper 1 Question 7, (1) (1) (1)

a) i)  $a = -2$

ii)  $b = -4$

b)  $x = -4$

#### 2016 Paper 1 Question 10, (3)





**2016 Paper 2 Question 9, (2)**

$$x^2 + 8x - 7 = (x + 4)^2 - 23$$

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

a)  $a = 5$

b)  $y = (x + 5)^2 + b$

Substituting the point  $(-3, 8)$  gives

$$8 = (-3 + 5)^2 + b$$

$$8 = 4 + b$$

$$b = 4$$

**2018 Paper 1 Question 16, (3)**

$$y = (x - 6)(x + 4)$$

For roots, let  $y = 0$  to give

$$0 = (x - 6)(x + 4)$$

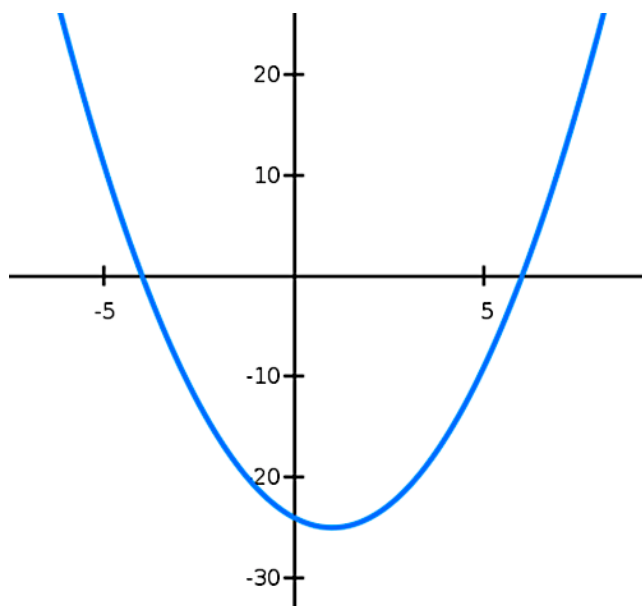
$$x = -4, x = 6$$

For  $y$  - intercept, let  $x = 0$  to give

$$y = (0 - 6)(0 + 4)$$

$$= (-6)(4)$$

$$= -24$$





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

a) i)  $x^2 - 6x - 81 = (x - 3)^2 - 9 - 81$   
 $= (x - 3)^2 - 90$

ii)  $x = 3$

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

a)  $x = 4$

b) i)  $a = -4$

ii)  $b = 20$

**2019 Paper 2 Question 10, (2)**

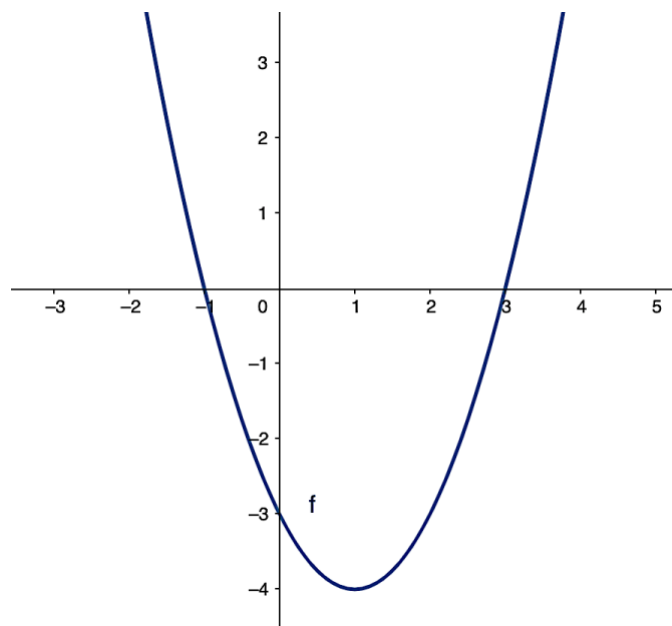
$$x^2 + 10x - 15 = (x + 5)^2 - 40$$

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

a)  $x^2 + 8x + 15 = (x + 4)^2 - 4^2 + 15$   
 $= (x + 4)^2 - 1$

b)  $(-4, -1)$

**2022 Paper 1 Question 14, (3)**





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

**a) i)**  $a = -3$

**ii)**  $b = 2$

**b)**  $y = (x - 3)^2 + 2$

Let  $x = 0$  to give

$$y = (0 - 3)^2 + 2$$

$$y = 9 + 2$$

$$y = 11$$

So,  $c = 11$