

National 5 Mathematics

Quadratics - Solutions - 2014-2017

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 6, (2)

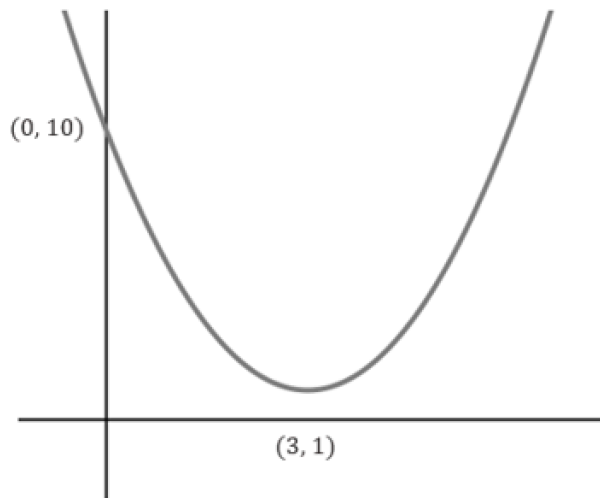
$$f(x) = 7x^2 + 5x - 1$$

$$a = 7, b = 5, c = -1$$

$$b^2 - 4ac = 25 - 4 \times 7 \times (-1) = 53$$

Since  $b^2 - 4ac > 0$  there are two roots

2016 Paper 1 Question 10, (3)



2016 Paper 1 Question 12, (1) (3) (3)

a) Area of rectangle =  $(2x + 1)(x + 8)$

b) Area of triangle =  $\frac{1}{2}(3x)(2(x + 5))$   
 $= 3x(x + 5)$

Area of rectangle = area of triangle

$$(2x + 1)(x + 8) = 3x(x + 5)$$

$$2x^2 + 17x + 8 = 3x^2 + 15x$$

Simplifying gives  $x^2 - 2x - 8 = 0$

c)  $x^2 - 2x - 8 = 0$

$$(x - 4)(x + 2) = 0$$

$$x = -2, x = 4$$

Since  $x$  is a length it cannot be negative, so  $x = 4$

$$\text{Length} = 8 + 4 = 12 \text{ cm}$$

$$\text{Breadth} = (2 \times 4) + 1 = 9 \text{ cm}$$

2016 Paper 2 Question 9, (2)

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

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

a)  $a = 5$

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

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

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

$$8 = 4 + b$$

$$b = 4$$

2017 Paper 2 Question 4, (3)

$$2x^2 + 5x - 4 = 0$$

$$a = 2, b = 5, c = -4$$

$$x = \frac{-5 \pm \sqrt{5^2 - 4 \times 2 \times (-4)}}{2 \times 2}$$

$$x = \frac{-5 \pm \sqrt{25 + 32}}{4}$$

$$x = \frac{-5 + \sqrt{57}}{4} = 0.6$$

$$x = \frac{-5 - \sqrt{57}}{4} = -3.1$$