National 5 Mathematics

Quadratic Equations - Questions

Marks are indicated in brackets after each question number

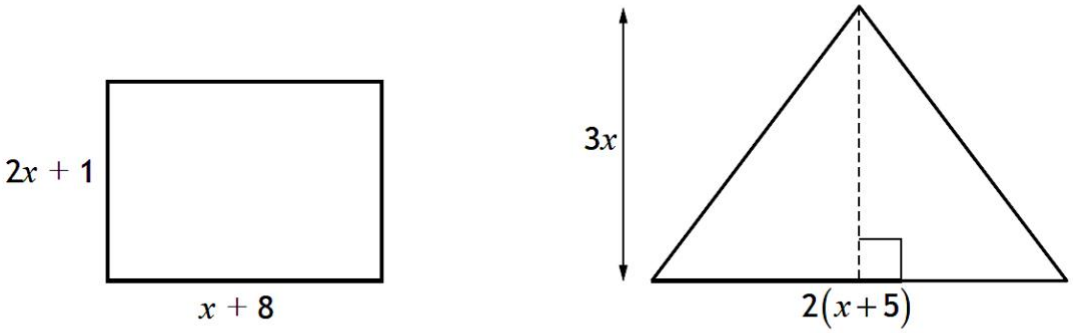
2016 Paper 1 Question 6, (2)

Determine the nature of the roots of the function $f(x) = 7x^2 + 5x - 1$.

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

The diagrams below show a rectangle and a triangle.

All measurements are in centimetres.



(a) Find an expression for the area of the **rectangle**.

(b) Given that the area of the rectangle is equal to the area of the triangle, show that $x^2 - 2x - 8 = 0$.

(c) Hence find, **algebraically**, the length and breadth of the rectangle.

2017 Paper 2 Question 4, (3)

Solve the equation $2x^2 + 5x - 4 = 0$.

Give your answers correct to one decimal place.

2018 Paper 1 Question 5, (2)

Solve

$$x^2 - 11x + 24 = 0.$$

2018 Paper 1 Question 8, (2)

Determine the nature of the roots of the function $f(x) = 2x^2 + 4x + 5$.

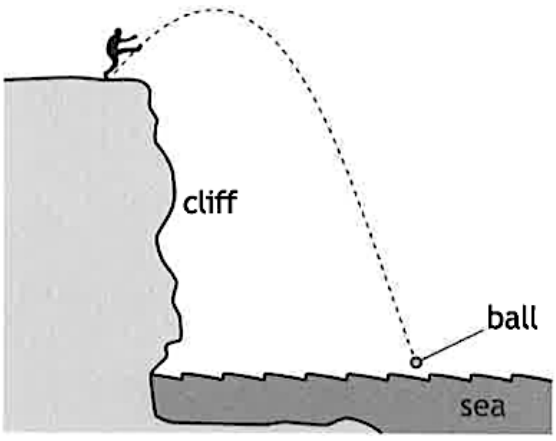
2018 Paper 1 Question 19, (2) (1) (4)

(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.

2019 Paper 1 Question 15, (1) (4)

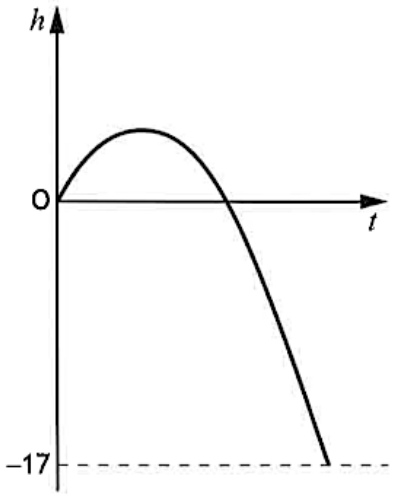
A ball is kicked from a clifftop.



The height, h metres, of the ball relative to the clifftop after t seconds is given by $h = 12t - 5t^2$.

(a) Calculate the height of the ball above the clifftop after 2 seconds.

The graph below represents the height, h metres, of the ball relative to the clifftop after t seconds.



The sea is 17 metres below the clifftop.

(b) After how many seconds will the ball hit the sea?

2019 Paper 2 Question 6, (3)

Solve the equation $3x^2 + 9x - 2 = 0$.

Give your answers correct to 1 decimal place.

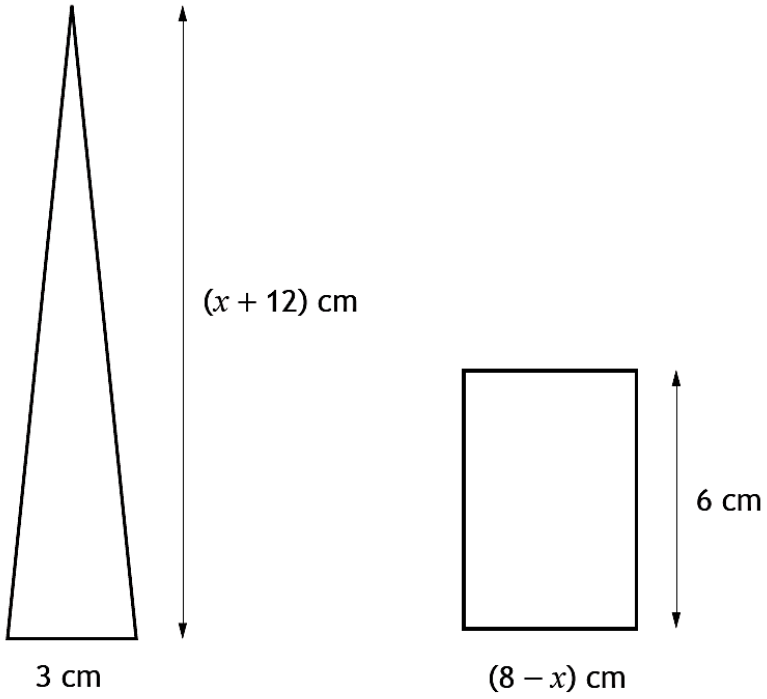
2022 Paper 2 Question 7, (4)

Solve the equation $4x^2 + 2x - 7 = 0$.

Give your answers correct to 2 significant figures.

2022 Paper 1 Question 15, (1) (4)

A triangle and rectangle are shown in the diagram.



(a) Find an expression for the area of the triangle.

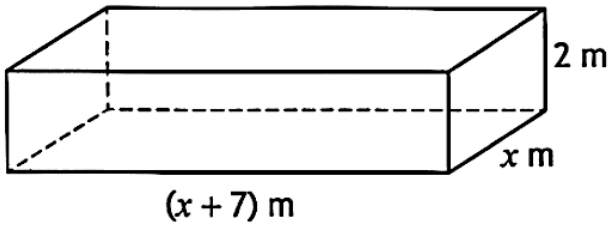
(b) Given that the area of the triangle is equal to the area of the rectangle, find algebraically the value of x.

2023 Paper 1 Question 5, (2)

Determine the nature of the roots of the function $f(x) = 4x^2 + 6x - 1$.

2023 Paper 2 Question 14, (2) (4)

A storage unit, built in the shape of a cuboid, is shown.



It has length $(x+7)$ metres, breadth x metres and height 2 metres.
The volume of this unit is 45 cubic metres.

(a) Show that $2x^2+14x-45=0$.

(b) Calculate x, the breadth of the storage unit.
Give your answer correct to 1 decimal place.

2024 Paper 2 Question 8, (4)

Solve the equation $3x^2+8x+1=0$.
Give your answers correct to 2 decimal places.

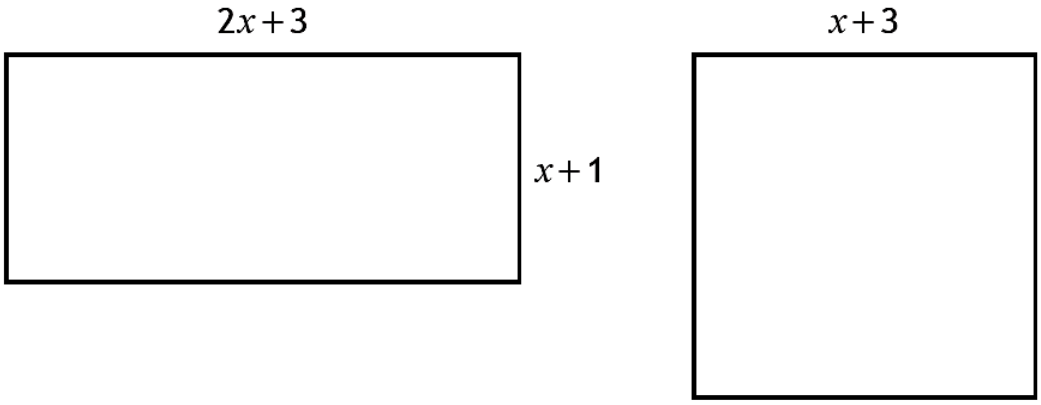
2025 Paper 1 Question 11, (2)

Determine the nature of the roots of the function $f(x)=3x^2+2x+1$.

2025 Paper 1 Question 15, (1) (2) (3)

The diagrams of a rectangle and square are shown below.

All measurements are in centimetres.



(a) Find an expression for the area of the **rectangle**.

(b) Given that the area of the rectangle is equal to the area of the square, show that $x^2 - x - 6 = 0$.

(c) Hence find, algebraically, the length and breadth of the rectangle.