Lesson 13

Perimeter, Area & Volume : Year 9

Calculator Needed

13.1 Solving Quadratic Equations by Factorisation

Previously, use was made of an amazing formula to solve equations of the form,

$$a\,x^2 + b\,x + c = 0$$

by using the formula;

$$x = \frac{-\,b \pm \sqrt{b^2 - 4ac}}{2\,a}$$

In examinations, the clue to use this formula is a request to give your answer to three significant figures. Clearly a calculator is needed to answer such questions.

Sometimes, however, it is possible to solve a quadratic equation without using a calculator by first trying to factorise the quadratic.

Question : What does factorise mean ?

Answer :

13.2 Example

Solve the following quadratic equations by means of factorisation;

(i)

$$x^2 + 8x + 15 = 0$$

(ii)

$$x^2 - 3x - 28 = 0$$

Notice the VERY CLEVER argument :

If two expressions multiplied together equal zero then **<u>EITHER</u>** the first **<u>OR</u>** the second expression must equal zero.

If $a \times b = 0$ then either $a = 0$ or $b = 0$

13.3 Exercise

Question 1

Solve the following quadratic equations by first factorising the quadratic. Be sure to use the words **EITHER** and **OR** as a part of your solution.

(i)

$x^2 + 9x + 20 = 0$

(ii)

$x^2 + 14x + 33 = 0$

(iii)

$x^2 + 18x + 17 = 0$

(iv)

$x^2 + 11x + 28 = 0$

(v)

$x^2 + 5x - 24 = 0$

(vi)

$x^2 + 6x - 40 = 0$

(vii)

$x^2 - 12x + 35 = 0$

(viii)

$x^2 - 3x - 88 = 0$

Question 2
(Crunchy Cracker)
A rectangle measures x cm by $(x + 5)$ cm.
It has an area of 50 cm^2
Find the dimensions of the rectangle, showing your working.

Question 3
(Fruity Flapjack)
A triangle has a height $2x$ cm and a base of $(x + 3)$ cm.
It has an area of 40 cm^2
Find the dimensions of the triangle, showing your working.

Question 4

(Chewy Sausage)

A trapezium has parallel sides to length $(x + 3)$ cm and $(x + 9)$ cm.
The distance between the parallel sides is x cm
The area of the trapezium in 55 cm
Find the dimensions of the trapezium, showing your working.