

Problems Leading to Quadratics

Starter

1. **(Review of last lesson)** Solve the equation $5x + 12 = (x + 1)(x + 7)$, giving your answers to 3 s.f..
2. Solve the equation $2x + 5 + \frac{1}{x} = 0$, giving your answers exactly

Notes

Quadratic equations can be hidden in worded questions.

- Read the question several times before writing down the equation.
- Rearrange the equation into the form $ax^2 + bx + c = 0$.
- Solve by factorising or using the formula (completing the square is also possible).

E.g. 1 The square of a number plus the original number is 22. Give your answers to 3 s.f..

Working:

The square of a number... $\Rightarrow x^2$
 The square of a number plus the original number... $\Rightarrow x^2 + x$
 The square of a number plus the original number is 22. $\Rightarrow x^2 + x = 22$
 $x^2 + x = 22 \Rightarrow x^2 + x - 22 = 0$
 $a = 1 \quad b = 1 \quad c = -22$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}; \quad x = \frac{-1 \pm \sqrt{1^2 - 4 \times 1 \times (-22)}}{2 \times 1}$$

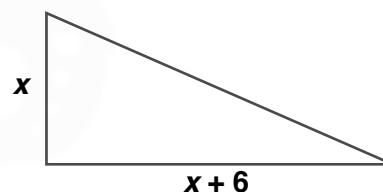
$$x = \frac{-1 \pm \sqrt{1 - -88}}{2}$$

$$x = \frac{-1 + \sqrt{89}}{2} \quad \text{or} \quad x = \frac{-1 - \sqrt{89}}{2}$$

$$x = 4.22 \quad \text{or} \quad x = -5.22 \quad (3 \text{ s.f.})$$

E.g. 2 The sides of a right-angle triangle are x , $x + 7$ and $x + 12$. Find the value of x to 3 s.f..

E.g. 3 The area of this right-angled triangle is 17 m^2 .
 Find the value of x to 3 s.f..



[Solutions to Starter and E.g.s](#)

Exercise

- 9-1 class textbook: p402 E12.7 Qu 1-10
 A*-G class textbook: p361 E12.4 Qu 1-10
 9-1 homework book: p402 E12.7 Qu 1-6
 A*-G homework book: p102 E12.4 Qu 1-6

Homework book answers (only available during a lockdown)