

Solving Quadratics by Factorising

Starter

- (Review of last lesson)** Factorise $25p^2 - 16q^2$.
- (Review of last lesson)** Without a calculator, find the value of $83^2 - 17^2$.
- (Review of Y8 material)**
Solve: (a) $x + 4 = 0$ (b) $x - 7 = 0$ (c) $2x - 5 = 0$
- (Review of Y10 material)**
Factorise: (a) $x^2 + 18x - 19$ (b) $3y^2 + 17y - 6$
- Two numbers, A and B, multiply together to give zero i.e. $A \times B = 0$. What can we say about the two numbers?

Notes

A quadratic equation is of the form $ax^2 + bx + c = 0$: for example, $x^2 + 18x - 19 = 0$ or $3y^2 + 17y - 6 = 0$. Sometimes the expression is not equal to zero, for example, $5x^2 + 3x = 2$.

To solve the equations we need to factorise the quadratic.

Consider $x^2 + 18x - 19 = 0$.

From the starter, we get $(x + 19)(x - 1) = 0$

Two numbers are multiplying together to get zero, so: **either** $x + 19 = 0$ **or** $x - 1 = 0$

Solving these simple linear equations gives: $x = -19$ or $x = 1$

Success Criteria – solving quadratics by factorising

- Make sure the quadratic expression = 0 and the coefficient of x^2 is positive.
- Factorise the quadratic expression.
- Put both brackets equal to zero.
- Solve both linear equations individually.

E.g. 1 Solve $x^2 + 3x + 2 = 0$.

Working:

Firstly, factorise $x^2 + 3x + 2$.

$1 \times 2 = 2 \Rightarrow$ Multiply:
Add:

$2 = 1 \times 2$
 $3 = 1 + 2$

$$x^2 + 3x + 2 = 0$$

$$x^2 + 2x + x + 2 = 0$$

$$x(x + 2) + 1(x + 2) = 0$$

$$(x + 2)(x + 1) = 0$$

$$\therefore x + 2 = 0 \quad \text{or} \quad x + 1 = 0$$

$$\text{So} \quad x = -2 \quad \text{or} \quad x = -1$$

split up 3x into 2x + x
factorise by grouping (same brackets)

put the brackets = 0

E.g. 2 Solve $3y^2 + 17y - 6 = 0$.

N.B. Use 4(b) from the starter.

E.g. 3 Solve $x^2 - 81 = 0$.

E.g. 4 Solve $x^2 + 7x = 0$.

Hint: When factorise the expression, do you need 2 brackets?

Video:

[Solving quadratics by factorising](#)

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

Exercise

9-1 class textbook: p115 M4.10 Qu 1-24 odd

A*-G class textbook: p104 E4.4 Qu 1-24 odd

9-1 homework book: p41 M4.10 Qu 1-14

A*-G homework book: p30 E4.4 Qu 1-14

Summary

Solving quadratics by factorising

1. Make sure the quadratic expression = 0 and the coefficient of x^2 is positive.
2. Factorise the quadratic expression.
3. Put both brackets equal to zero.
4. Solve both linear equations individually.

[Homework book answers \(only available during a lockdown\)](#)