Solving Quadratic Equations

Starter

1. **(Review of last lesson)** Rationalise the denominator of $\dfrac{3\sqrt{2}}{5+\sqrt{2}}$.

2. Solve the equation $x^2 - 5x - 2 = 0$ using your Classwiz calculator. The method is below:
   1. Press Menu (top row)
   2. Select '$x\ y = 0$' by highlighting it and pressing '=' (Use the arrow buttons to scroll down/across)
   3. Press 2 (Polynomial)
   4. Press 2 (Degree, since it is a quadratic - power of 2)
   5. (Enter data)
   6. Press '=' to solve

   Video: Classwiz - solving quadratic equations

3. **(Review of GCSE material)** Solve by factorising $2x^2 + 7x + 3 = 0$.

4. Factorise $4 + 3x - x^2$.

Notes

When a question states "Show your full working", do not use your calculator to solve a quadratic. In which case either factorise or use the quadratic formula.

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

Factorising quadratics when the coefficient of x^2 is negative

If you are not able to factorise by inspection (i.e. just by looking), it is possible to use this method

1. Multiply the equation by (-1) and re-order so that the term in x^2 is first
2. Factorise the quadratic as normal
3. Multiply your answer by (-1) — this means changing the ***signs*** in the bracket where the negative sign is

E.g. 1 Factorise $35 - 2x - x^2$.

Working:
Multiply by (-1) and reorder: $x^2 + 2x - 35$
Factorise as normal: $(x - 5)(x + 7)$
Change the signs in the bracket with the $-$ sign:
$(5 - x)(7 + x)$ or $(5 - x)(x + 7)$

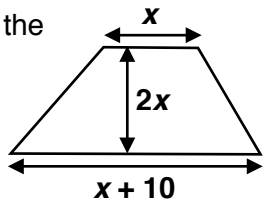
N.B. If a question asks to solve a quadratic equation where the term in x^2 is negative, simply take all the terms on to the other side so that the term in x^2 is positive

E.g. 2 Solve $12 + x - x^2 = 0$.

E.g. 3 Solve the equation $5x = \frac{1}{x} - 9$ giving your answers to 3 s.f. and showing all your working.

E.g. 4 The trapezium has area 50 units². Find the exact value of the height of the trapezium.

N.B. Area of trapezium $= \frac{1}{2}(a+b)h$



E.g. 5 A cylindrical tin of height 6 cm has total surface area of 54π cm². Without using a calculator, find the exact value of the volume of the tin.

N.B. Surface area of a cylinder $= 2\pi r^2 + 2\pi rh$
Volume of cylinder $= \pi r^2 h$
"Exact" in this case means leave your answer in terms of π

Video: Solving quadratics by factorising
Video: Quadratic formula

Quadratic formula EQ

Solutions to Starter and E.g.s

Exercise
p30 3A Qu 1i, 2i, 3-8