

SOLVING EQUATIONS



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POLYNOMIAL

- **linear**
collect x terms on LHS, factorise out x , divide to get $x = \dots$
- **quadratic**
make it $= 0$
(1) factorise & put each factor $= 0$ individually
(2) complete the square & rearrange to get $x =$
(3) use formula.
- **cubic/quartic**
make it $= 0$
factorise & put each factor $= 0$ individually

ROOTS & POWERS

- $x^n = \dots$
 $\Rightarrow x = \sqrt[n]{\dots}$
- $\sqrt[n]{x} = \dots$
 $\Rightarrow x = (\dots)^n$

LOGS & EXPONENTIALS

- $a^x = \dots$
 $\Rightarrow x = \log_a(\dots)$
- $\ln x = \dots$
 $\Rightarrow x = e^{\dots}$

TRIGONOMETRY

- $\sin x = \dots$
 $\Rightarrow x = \sin^{-1}(\dots)$

Solve (a) $2^{2x+1} + 3(2^x) = 0$

(b) $\sin^3 x + 2\sin^2 x + \sin x = 0$

put $p =$

$$2^{2x+1} = 2^{2x} \cdot 2^1$$

$$= (2^x)^2 \times 2^1$$

$$= p^2 \times 2$$

$$2p^2 + 3p = 0$$

$$p(2p + 3) = 0$$

$$p = 0 \quad 2p + 3 = 0$$

$$p = -\frac{3}{2}$$

$2^x = 0$
no solutions
(\cap)

$2^x = -\frac{3}{2}$
no solutions
(\cap)

put $p =$

$$p^3 + 2p^2 + p = 0$$

$$p(p^2 + 2p + 1) = 0$$

$$p(p+1)^2 = 0$$

$$p = 0 \quad p = -1$$

$$\sin x = 0$$

$$\underline{\underline{x = 0, \pi, \dots}}$$

$$\sin x = -1$$

$$\underline{\underline{x = \frac{3\pi}{2}, \dots}}$$



Sorry, this was a silly example!