

# Solving Equations. (part 1)

Solving is when the variable needs to be by itself

eg1.  $3.1 + (x) = 8.2$

$(+3.1)$   $3.1 - 3.1 + x = 8.2 - 3.1$   
 $x = 5.1$

eg 2.  $2.5 (x) = 10$

$(\times 2.5)$   $\frac{2.5x}{2.5} = \frac{10}{2.5}$

$x = 4$

eg 3  $\frac{(x)}{3.2} = 4.1$

$(\div 3.2)$   $3.2 \times \frac{x}{3.2} = 4.1 \times 3.2$

$x = 13.12$

## Discussion

- Need  $x$  by itself (circle)
- Have a scale (equation) that has to remain balanced

$$\underline{3.1 + x = 8.2}$$



- Inverse operations  
(reminder of these)

$$\begin{array}{cc} + & - \\ \times & \div \\ \square^2 & \sqrt{\square} \end{array}$$

- ? What needs to be undone to get  $x$  by itself?

(want number and operation) *in red.*

*note*  
eg!  $3.1 - 3.1 = 0$   
so  $0 + x = x$

eg2  $\frac{2.5}{2.5} x = 1$  → so in fact we are just multiplying by 1

*algebraic*

eg 3  $\frac{3.2 \times x}{3.2}$

(Look for the ones)

# Solving Equations (part 2)

eg1.  $3(x) + 17 = 8$

( $3x$  and  $+17$ )

$$3x + 17 - 17 = 8 - 17$$

$$\frac{3x}{3} = \frac{-9}{3}$$

$$x = -3$$

Discussion (<sup>Note</sup> don't give example with obvious answers - it is the process that is important)

• combining ideas from last lesson).

? What needs to be undone?

? Which one first?

(Last one, first off  
ie BEDMAS backwards  
or SAMDEB)

eg2.  $5 = 4 + 7(x)$

$$7x + 4 = 5$$

( $+4$  and  $\times 7$ )

$$7x + 4 - 4 = 5 - 4$$

$$\frac{7x}{7} = \frac{1}{7}$$

$$x = \frac{1}{7}$$

Discussion of swinging scales around  $\rightarrow$   
? does it make a difference?

## Expanding Brackets

eg:  $2(x+5)$



- $2 \times x + 2 \times 5$
- $2(x+5)$
- $2 \times (x+5)$
- $(x+5) \times 2$

eg:  $3x(y-5) + 2x$

$= 3x \times y + 3x \times -5 + 3x \times 2x$

$= 3xy - 15x + 6x^2$

$$\begin{aligned} 2m &= 2 \times m \\ &= m \times 2 \\ &= m^2 \\ &= m + m \end{aligned}$$

$$\begin{aligned} 2(x+5) &= x+5 + x+5 \\ &= x+x+5+5 \\ &= 2x+10 \end{aligned}$$

\* The sign belongs to the number following.

Everything inside the bracket gets multiplied by the term in front.

## Solving Equations - Variable both sides

eg:  $3x+5 = 6x-9$

$3x - 6x + 5 = 6x - 6x - 9$

$7x + 5 = -9$

$7x + 5 - 5 = -9 - 5$

$\frac{7}{7}x = \frac{-14}{7}$

$x = -2$

eg:  $3x+5 = 7x-4$

$7x - 4 = 3x + 5$

$7x - 3x - 4 = 3x - 3x + 5$

(+4)  $4x - 4 = 5$

(-4)  $4x - 4 + 4 = 5 + 4$

$\frac{4}{4} \frac{9}{4}$

$x = 2\frac{1}{4}$