

Solving Equations

$2x$  TERM

$2x+5=4$  EQUATION

$2x+y$  EXPRESSION

$2(x+3) = 2x + 6$  **Identity**

waldos equations



$$7b - 12 = 3b$$

$$(-3b) \quad 4b - 12 = 0$$

$$4b = 12$$

$$\underline{\underline{b = 3}}$$

$$7b - 3 = 27 - 3b$$

$$(-3b) \quad 4b - 3 = 27$$

$$4b = 30$$

$$b = \frac{30}{4}$$

$$\underline{\underline{b = 7 \frac{1}{2}}}$$

$$e + 2 = 4e - 10$$

$$2 = 3e - 10 \quad (-e)$$

$$b = \frac{12}{4} \left. \begin{array}{l} 10 + 2 = 3e \\ 12 = 3e \\ \frac{12}{3} = e \\ \underline{\underline{4 = e}} \end{array} \right\} \quad \underline{\underline{e = 4}}$$

$$21 - e = 26 - 5e$$

$$21 = 26 - 4e \quad (+e)$$

$$21 + 4e = 26$$

$$4e = 26 - 21$$

$$4e = 5$$

$$\boxed{e = \frac{5}{4}} = 1 \frac{1}{4}$$

Make up 3 examples for your neighbour.

## Equations with negative n

$$10 - 2n + 2n = 4 + 2n$$

$$10 - 2n = 4$$

$$10 = 4 + 2n$$

$$-4 + 10 = 6$$

$$10 - 4 = 2n$$

$$6 = 2n$$

$$\underline{\underline{n=3}}$$

$$\underline{\underline{3 = n}}$$

$$15 - 3n = 3$$

$$15 = 3 + 3n$$

$$15 - 3 = 3n$$

$$12 = 3n$$

$$\underline{\underline{4 = n}}$$

$$n=4$$

$$10 - 2n = 14$$

$$10 - 2n + 2n = 14 + 2n$$

$$10 = 14 + 2n$$

$$10 - 14 = 2n$$

$$-4 = 2n$$

$$\underline{\underline{-2 = n}}$$

$$\underline{\underline{n=-2}}$$

$$6 - 4n = 8$$

$$6 = 8 + 4n$$

$$6 - 8 = 4n$$

$$-2 = 4n$$

$$\underline{\underline{\frac{-2}{4} = n}}$$

$$\boxed{n = -\frac{1}{2}}$$

$$n=2$$

$$4n=8$$

$$\underline{\underline{15 - 4n = 7}}$$

$$\begin{array}{l} \_ = 6 \\ 4 \\ x = 6 \times 4 \\ \underline{x = 24} \end{array}$$

$$\begin{array}{l} \_ = 10 \\ 3 \\ y = 10 \times 3 \\ \underline{y = 30} \end{array}$$

$$\begin{array}{l} \underline{+6} = 2 \\ 4 \\ a + b = 4 \times 2 \\ a + b = 8 \\ \underline{a = 2} \end{array}$$

$$\begin{array}{l} \underline{18-} = 2 \\ 5 \\ 18 - b = 10 \\ 18 = b + 10 \\ 18 - 10 = b \\ \underline{8 = b} \end{array}$$

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:

$$\frac{+6}{4} = -1$$

$$\frac{2 + 1}{3} = -2$$

$$\frac{10 - 2}{3} = 5 - 8$$

Multiply out the brackets

$$\begin{aligned} 1. \quad & 2(x + 7) = 10 \\ & 2x + 14 = 10 \\ & 2x = 10 - 14 \\ & 2x = -4 \\ & x = -2 \end{aligned}$$

$$\begin{aligned} 2. \quad & 5(8 - x) = 35 \\ & 40 - 5x = 35 \\ & 40 = 35 + 5x \\ & 40 - 35 = 5x \\ & 5 = 5x \quad \underline{x=1} \end{aligned}$$

$$\begin{aligned} 3. \quad & 7(x + 4) - 3(5 + x) = 25 \\ & 7x + 28 - 15 - 3x = 25 \\ & 4x + 13 = 25 \\ & 4x = 12 \\ & \underline{x=3} \end{aligned}$$

$$\begin{aligned} 4. \quad & 3x(x + 2) - x(3x + 5) = 6 \\ & \cancel{3x^2} + 6x - \cancel{3x^2} - 5x = 6 \\ & 6x - 5x = 6 \\ & \underline{\underline{x=6}} \end{aligned}$$

$$\begin{aligned} 5. \quad & 6(2x + 3) - 2(5 - 3x) = 26 \\ & 12x + 18 - 10 + 6x = 26 \\ & 18x + 8 = 26 \\ & 18x = 18 \end{aligned}$$

$$\begin{aligned} 6. \quad & 2(3n - 5) = n \quad \underline{x=1} \\ & 6n - 10 = n \\ & 6n = n + 10 \\ & 6n - n = 10 \\ & 5n = 10 \\ & \underline{\underline{n=2}} \end{aligned}$$

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### Forming and solving Equations

I think of a number, double it and add 6.  
The answer is 3 times my original number.  
What was my original number?

Let my number be  $n$

$$\begin{aligned}2n + 6 &= 3n \\6 &= 3n - 2n \\ \underline{6} &= \underline{n}\end{aligned}$$

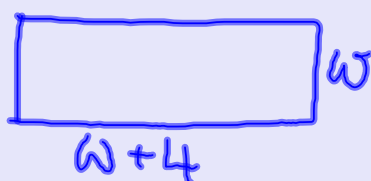
Write the unknown  
as  $n$

A rectangle has a length 4cm longer than its width.

The perimeter of the rectangle is 34cm.

By making an equation in  $x$  and then solving it, find the length of the rectangle.

Let the width be  $w$



Hint:  
Draw a diagram

$$\begin{aligned}(w+4) + (w+4) + w + w &= 34 \\4w + 8 &= 34 \\4w &= 34 - 8 \\4w &= 26 \\w &= 6\frac{1}{2} \text{ cm}\end{aligned}$$

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C3 a) width = 5 cm  
length =  $3x - 1 = 15 - 1 = 14$  cm

b)  $(\cancel{3x} - 1) + (3x - 1) + x + x$   
 $= 8x - 2$

c)  $8x - 2 = 10$   
 $8x = 12$   
 $x = \frac{12}{8} = 1\frac{1}{2}$

d)  $x = 3x - 1$        $x + 1 = 3x$   
 $0 = 3x - x - 1$      $x - x + 1 = 3x - x$   
 $1 = 2x$                        $1 = 2x$   
 $\frac{1}{2} = x$   
 $\frac{1}{2} = x$

waldos equations



## A hotch-potch of equations

$$4x - 3 = 17$$

$$\begin{aligned}4x &= 17 + 3 \\4x &= 20 \\x &= \underline{\underline{5}}\end{aligned}$$

$$4 - 3n = 10$$

$$\begin{aligned}4 &= 10 + 3n \\-10 + 4 &= 3n \\-6 &= 3n \\-\frac{6}{3} &= n\end{aligned}$$

$$3x + 1 = 4x - 6$$

$$\begin{aligned}(-3x) \quad 1 &= x - 6 \\6 + 1 &= x \\7 &= \underline{\underline{x}}\end{aligned}$$

$$\underline{\underline{n = -2}}$$

$$3(2x - 1) = 0$$

$$\begin{aligned}6x - 3 &= 0 \\6x &= 3 \\x &= \frac{3}{6} \\x &= \underline{\underline{\frac{1}{2}}}\end{aligned}$$

$$\frac{8x}{3} = 16$$

$$\begin{aligned}8x &= 16 \times 3 \\8x &= 48 \\x &= \underline{\underline{6}}\end{aligned}$$