

## Equation solving

- Isolate the variable by performing the same operation to both sides of the equation

Examples:

$$\begin{array}{r} x+7=11 \\ -7 \quad -7 \\ \hline x=4 \end{array} \quad \leftarrow \text{Subtract 7 from both sides}$$



What you do to one side of the equation, you must do to the other side

$$\begin{array}{r} x-3=12 \\ +3 \quad +3 \\ \hline x=15 \end{array} \quad \leftarrow \text{Add 3 to both sides}$$

$$\begin{array}{r} 5x=30 \\ \frac{5}{5} \quad \frac{5}{5} \\ \hline x=6 \end{array} \quad \leftarrow \text{Divide both sides by 5}$$

$$\begin{array}{r} 3x+7=19 \\ -7 \quad -7 \\ \hline 3x=12 \\ \frac{3}{3} \quad \frac{3}{3} \\ \hline x=4 \end{array} \quad \leftarrow \text{Subtract 7 from both sides}$$

$$\leftarrow \text{Divide both sides by 3}$$

$$\begin{array}{r} 2x+6=7x-24 \\ -2x \quad -2x \\ \hline 6=5x-24 \\ +24 \quad +24 \\ \hline 30=5x \\ \frac{30}{5} \quad \frac{5x}{5} \\ \hline 6=x \end{array} \quad \leftarrow \text{Subtract } 2x \text{ from both sides}$$

$$\leftarrow \text{Add 24 to both sides}$$

$$\leftarrow \text{Divide both sides by 5}$$

$$3(2x-1)+4x-11=8$$

$$6x-3+4x-11=8 \quad \leftarrow \text{Expand}$$

$$10x-14=8 \quad \leftarrow \text{Simplify}$$

$$\begin{array}{r} 10x-14=8 \\ +14 \quad +14 \\ \hline 10x \quad = \quad 22 \\ \frac{10x}{10} \quad = \quad \frac{22}{10} \\ \hline x=2.2 \end{array} \quad \leftarrow \text{Add 14 to both sides}$$

$$\leftarrow \text{Divide both sides by 10}$$



To check your answers, plug in the value for  $x$  into the equation

## Equation solving

Practice: Solve each equation for  $x$

Answers:

a)  $2x - 3 = 15$

a)  $x = 9$

b)  $\frac{2}{3}x = 14$

b)  $x = 21$

c)  $5x + 8 = 23$

c)  $x = 3$

d)  $10 - 2x = 14$

d)  $x = -2$

e)  $3x + 2x + x = 66$

e)  $x = 11$

f)  $2(5x - 8) = 44$

f)  $x = 6$

g)  $4x + 7 - 2 - 6x = 17$

g)  $x = -6$

h)  $7x - 8 = 3x + 12$

h)  $x = 5$

i)  $-3(x - 1) = -21$

i)  $x = 8$

j)  $2(2x + 3) = 3x - 11$

j)  $x = -17$

k)  $-2x + 13 = 22$

k)  $x = -4.5$

l)  $x + x + 3 + x + 5 = 4x - 1$

l)  $x = 9$

m)  $-3(2 - 3x) = 3(x + 2) - 4x$

m)  $x = 1.2$

n)  $-19 = 5 - 8x$

n)  $x = 3$

o)  $2x + 2 + 7x - 9 = x - 2 + 3x + 10$

o)  $x = 3$