# Walking Talking - Solving Linear Equations

**1.**

(a) Solve $2x + 5 = 5(x + 1)$.

$$2x + 5 = 5x + 5$$
$(-2x)$ $(-2x)$
$$5 = 3x + 5$$
$(-5)$ $(-5)$

$$0 = 3x$$

$$0 = x$$

[2]

(b) Solve $\frac{1}{3}(2x + 3) + 4x = 8$.

$(\times 3)$ $(\times 3)$

$$2x + 3 + 12x = 24$$

$$14x + 3 = 24$$
$(-3)$ $(-3)$

$$14x = 21$$
$(\div 14)$ $(\div 14)$

$$x = \frac{21}{14} = 1\frac{7}{14} = 1\frac{1}{2}$$

[3]

**2.**

(a) Solve $\frac{8x}{5} = 60$.

$(\times 5)$  $8x = 300$  $(\times 5)$

$(\div 8)$  $(\div 8)$

$x = 37.5$

$$\begin{array}{r} 0\ 3\ 7.5 \\ 8\overline{)3^3 0^6 0.^40} \end{array}$$

[2]

(b) Solve $\frac{3}{x} = 12$.

$(\times x)$  $(\times x)$

$3 = 12x$  $x = \frac{3}{12} = \frac{1}{4}$

$(\div 12)$  $(\div 12)$

[1]

(c) Solve $9x - 4 = 7(x + 2)$.

$9x - 4 = 7x + 14$

$(-7x)$  $2x - 4 = 14$  $(-7x)$

$(+4)$  $2x = 18$  $(+4)$

$(\div 2)$  $x = 9$  $(\div 2)$

[3]

(d) Solve the inequality $10x + 5 > 45$.

$(-5)$  $10x > 40$  $(-5)$

$(\div 10)$  $x > 4$  $(\div 10)$

[2]

(e) Write down the smallest whole number that satisfies the inequality $9x > 60$.

$9x > 60$

$(\div 9)$  $(\div 9)$

$x > \frac{60}{9}$

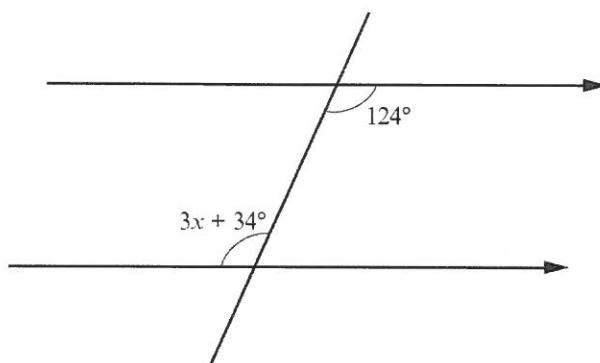$x > 6\frac{6}{9}$

So the smallest whole number is 7

[2]

**3.**



124°

3x + 34°

*Diagram not drawn to scale*

Use the information in the diagram above to find the value of *x*. [3]

$$3x + 34 = 124$$

(−34)   $3x = 90$   (−34)

(÷3)                    (÷3)

$$x = 30$$

*x* = 30 °

**4.**

Solve $\frac{8x-5}{3} + \frac{4x+5}{4} = \frac{149}{12}$.

(×12)                          (×12)

$$\frac{12(8x-5)}{3} + \frac{12(4x+5)}{4} = \frac{12(149)}{12} \longrightarrow 4(8x-5) + 3(4x+5) = 149$$

$$32x - 20 + 12x + 15 = 149$$

$$44x - 5 = 149$$

(+5)                              (+5)

$$44x = 154$$

(÷44)                          (÷44)

$$x = \frac{154}{44} = \frac{77}{22} = \frac{7}{2}$$

[4]

**5.**

(a) Solve $\frac{3x}{4} = 24$.

$\times 4$  $\times 4$

$3x = 96$

$\div 3$  $3x = 96$  $\div 3$

$x = 32$

[2]

(b) Solve $\frac{8}{x} = 16$.

$\times x$  $\times x$

$8 = 16x$

$8 = 16x$

$\div 16$  $\div 16$

$\frac{1}{2} = \frac{8}{16} = x$

[1]

(c) Solve $7(5x - 4) = 77$.

$35x - 28 = 77$

$+28$  $+28$

$35x = 105$

$\div 35$  $\div 35$

$x = \frac{105}{35} = \frac{21}{7} = 3$

[3]

(d) Solve the inequality $6x + 5 < 47$.

$-5$  $-5$

$6x < 42$

$\div 6$  $\div 6$

$x < 7$

[2]

(e) Write down the smallest whole number that satisfies the inequality $3x > 67$.

$\div 3$  $\div 3$

$x > \frac{67}{3}$

$x > 22\frac{1}{3}$

smallest whole number is 23

[2]

**6.**

ABCD is a parallelogram. All the angles are measured in degrees.



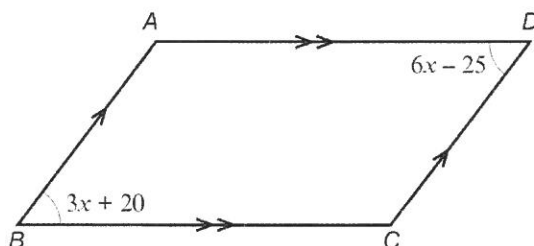*Diagram not drawn to scale*

Find the size of $B\hat{C}D$. [5]

$$6x - 25 = 3x + 20$$

$(-3x)$ ............................. $(-3x)$

$$3x - 25 = 20$$

$(+25)$ ............................. $(+25)$

$$3x = 45$$

$(\div 3)$ ............................. $(\div 3)$

$$x = 15$$

So $\quad C\hat{D}A = 6(15) - 25$

$\qquad\qquad = 90 - 25$

$\qquad\qquad = 65°$

$\therefore \quad B\hat{C}A = 180 - 65 = 115°$

**7.**

(a) Solve $8x - 11 = 3x + 29$.

$-3x$            $-3x$

$$5x - 11 = 29$$

$+11$    $5x = 40$    $+11$

$\div 5$           $\div 5$

$$x = 8$$

[3]

(b) Factorise $7x + 49$.

$$7(x + 7)$$

[1]

(c) Factorise $x^2 - 10x$.

$$x(x - 10)$$

[1]

(d) Expand $2x(x + 6)$.

$$2x^2 + 12x$$

[2]

**8.**

(a) Simplify $3g + 5g - 6g$. [1]

$2g$

(b) Find the value of $7x - 4y$ when $x = 5$ and $y = 6$. [2]

$7(5) - 4(6) = 35 - 24 = 11$

(c) Solve

(i) $6x = 24$, [1]

$(-6)$     $(\div 6)$

$x = 4$

(ii) $x - 7 = 29$. [1]

$(+7)$     $(+7)$

$x = 36$

**9.**

Solve the following equation. [3]

$$\frac{5x-1}{2} - x = \frac{1}{2}$$

(×2)   (×2)

$$5x - 1 - 2x = 1$$

$$3x - 1 = 1$$

(+1)   (+1)

$$3x = 2$$

(÷3)   (÷3)

$$x = \frac{2}{3}$$

**10.**

Yellow, blue and green tickets are sold in a raffle to raise money for charity.
The probability of the winning ticket being a particular colour is given in the following table.

| Colour of ticket | Yellow | Blue | Green |
|---|---|---|---|
| Probability | $2a$ | $0{\cdot}4$ | $3a$ |

Find the probability that the winning ticket is green. [3]

$$2a + 0{\cdot}4 + 3a = 1$$

$$5a + 0{\cdot}4 = 1$$

(−0.4)   (−0.4)

$$5a = 0{\cdot}6$$

(÷5)   (÷5)

$$a = 0{\cdot}12$$

$$5\overline{)0{\cdot}6^{1}0} \quad \frac{0{\cdot}12}{}$$

green $= 3(0{\cdot}12)$
$= 3 \times 0{\cdot}12$
$= 0{\cdot}36$