



1 Solve $3(x + 4) = 27$

(2 marks)

$$\begin{array}{rcl} \div 3 & x + 4 & = 9 \quad \div 3 \\ -4 & x & = 5 \quad -4 \end{array}$$

$x = 5$

2 Solve $4(2x - 3) = 36$

(3 marks)

Expand the bracket

$$\begin{array}{rcl} & 8x - 12 & = 36 \\ +12 & 8x & = 48 \quad +12 \\ \div 8 & x & = 6 \quad \div 8 \end{array}$$

$x = 6$

3 a. Expand and simplify $3(x + 2) + 2(x - 5)$

b. Solve $5(x - 3) = 20$

(4 marks)

a) $3(x + 2) = 3x + 6$ and $2(x - 5) = 2x - 10$

$3x + 6 + 2x - 10 = 5x - 4$

b) Divide both sides by 5

$$\begin{array}{rcl} & x - 3 & = 4 \\ +3 & x & = 7 \quad +3 \end{array}$$

Check

$5(7 - 3) = 20$

4 Solve $5(x - 2) = 3x + 6$

(3 marks)

Expand the bracket

$$\begin{array}{rcl}
 5x - 10 & = & 3x + 6 \\
 -3x & & -3x \\
 2x - 10 & = & 6 \\
 +10 & & +10 \\
 2x & = & 16 \\
 \div 2 & & \div 2 \\
 x & = & 8
 \end{array}$$

$$x = 8$$

5 a. Expand and simplify $3(x + 4) + 2(x - 1)$

b. Factorise your answer to part (a).

c. Solve $3(x + 4) + 2(x - 1) = 40$

(4 marks)

a)

$$3(x + 4) = 3x + 12$$

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

$$3x + 12 + 2x - 2 = 5x + 10$$

$$5x + 10$$

b)

5 is a common factor

$$5(x + 2)$$

c)

$$\begin{array}{rcl}
 5x + 10 & = & 40 \\
 -10 & & -10 \\
 5x & = & 30 \\
 \div 5 & & \div 5 \\
 x & = & 6
 \end{array}$$

$$x = 6$$

6

a. Solve $2(3x + 4) = 5x + 17$

b. Factorise fully $6y^2 + 9y$

(4 marks)

a) Expand

$$\begin{array}{rcl}
 6x + 8 & = & 5x + 17 \\
 -5x & & \\
 \hline
 x + 8 & = & 17, \text{ so } x = 9
 \end{array}$$

Check

$$2(27 + 4) = 62 \text{ and } 5(9) + 17 = 62$$

b) The highest common factor of $6y$ squared and $9y$ is $3y$

$$6y^2 + 9y = 3y(2y + 3)$$

7

a. Solve $9 - 2x = 3(x - 7)$

b. Simplify $(m^5)^2 \div m^3$

(4 marks)

a) Expand

$$\begin{array}{rcl}
 9 - 2x & = & 3x - 21 \\
 +2x & & \\
 \hline
 9 & = & 5x - 21 \\
 +21 & & \\
 \hline
 30 & = & 5x, \text{ so } x = 6
 \end{array}$$

Check

$$9 - 12 = -3 \text{ and } 3(6 - 7) = -3$$

b) $(m^5)^2 = m^{10}$

$$m^{10} \text{ divided by } m^3 = m^7$$

The original fraction requires $m \neq 0$; keep this restriction after simplifying

8

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

(3 marks)

Expand both brackets

$$\begin{array}{rcl}
 4x + 8 & = & 2x - 6 \\
 -2x & & \\
 \hline
 2x + 8 & = & -6 \\
 -8 & & \\
 \hline
 2x & = & -14 \\
 \div 2 & & \\
 \hline
 x & = & -7
 \end{array}$$

$$x = -7$$

- 9 A rectangle has sides of length $(x + 3)$ cm and $(2x - 1)$ cm.

The perimeter of the rectangle is 34 cm.

- Show that $2(3x + 2) = 34$
- Solve the equation to find x .
- Work out the area of the rectangle.

(4 marks)

a)

$$2[(x + 3) + (2x - 1)] = 2(3x + 2) = 34$$

b)

$$\begin{array}{rclcl} 2(3x + 2) & = & 34 & & \\ \div 2 & & 3x + 2 & = & 17 & \div 2 \\ -2 & & 3x & = & 15 & -2 \\ \div 3 & & x & = & 5 & \div 3 \end{array}$$

$$x = 5$$

c)

$$\text{sides: } 5 + 3 = 8 \text{ and } 2 \times 5 - 1 = 9$$

$$8 \times 9 = 72$$

$$72 \text{ cm}^2$$

- 10 Solve $3(2x - 1) = 2(x + 4)$

Give your answer as a fraction or a decimal.

(3 marks)

Expand both brackets

$$\begin{array}{rclcl} 6x - 3 & = & 2x + 8 & & \\ -2x & & 4x - 3 & = & 8 & -2x \\ +3 & & 4x & = & 11 & +3 \\ \div 4 & & x & = & \frac{11}{4} & \div 4 \end{array}$$

$$x = \frac{11}{4} = 2.75$$

11

a. Simplify $4a + 3b - a + 5b$ b. Solve $\frac{5x-4}{2} = 18$ c. Solve $4(y+3) = 2y+22$

(5 marks)

a) $4a - a = 3a$ and $3b + 5b = 8b$, so the answer is $3a + 8b$

b) Multiply both sides by 2

$$5x - 4 = 36$$

Add 4

$$5x = 40, \text{ so } x = 8$$

c) Expand

$$4y + 12 = 2y + 22$$

Subtract $2y$

$$2y + 12 = 22$$

Subtract 12

$$2y = 10, \text{ so } y = 5$$

Check

$$4(5+3) = 32 \text{ and } 2(5) + 22 = 32$$

12

Solve $3\left(\frac{x-1}{2}\right) = 9$

(3 marks)

$$\begin{array}{rcl}
 \frac{3(x-1)}{2} & = & 9 \\
 \times 2 & & \\
 3(x-1) & = & 18 \\
 \div 3 & & \\
 x-1 & = & 6 \\
 +1 & & \\
 x & = & 7
 \end{array}$$

$$x = 7$$

13

- a. Expand and simplify $(2x + 3)(x + 4)$
 b. Factorise fully $10y^2 - 15y$
 c. Solve $4(2x - 1) = 3x + 16$

(6 marks)

$$a) (2x + 3)(x + 4) = 2x^2 + 8x + 3x + 12$$

Collect like terms: $2x^2 + 11x + 12$

b) The highest common factor of $10y^2$ and $15y$ is $5y$

$$10y^2 - 15y = 5y(2y - 3)$$

c) Expand

$$8x - 4 = 3x + 16$$

Subtract $3x$

$$5x - 4 = 16$$

Add 4

$$5x = 20, \text{ so } x = 4$$

Check

$$4(8 - 1) = 28 \text{ and } 3(4) + 16 = 28$$

14

Solve $2(3x - 1) - 4(x - 2) = 15$

(4 marks)

Expand both brackets: the -4 multiplies -2 to give $+8$

$$6x - 2 - 4x + 8 = 15$$

simplify

$$2x + 6 = 15$$

simplify

-6

$$2x = 9$$

-6

$\div 2$

$$x = 4.5$$

$\div 2$

$$x = 4.5$$