

2.6 Solving equations

The main rule when solving equations is

‘Do the same thing to both sides’.

You can *add* the same thing to both sides.

You can *subtract* the same thing from both sides.

You can *multiply* both sides by the same number.

You can *divide* both sides by the same number.

Solve the equations. The operations circled are performed on both sides.

(a) $3x - 1 = 5$

$$\begin{array}{cc} (+1) & (+1) \\ \hline 3x - 1 & + 1 \\ \hline 3x & = 6 \end{array}$$

$$3x = 6$$

$$\begin{array}{cc} (\div 3) & (\div 3) \\ \hline 3x & = 6 \\ \hline x & = 2 \end{array}$$

$$x = 2$$

(b) $2x + 3 = 4$

$$\begin{array}{cc} (-3) & (-3) \\ \hline 2x + 3 & = 4 \\ \hline 2x & = 1 \end{array}$$

$$2x = 1$$

$$\begin{array}{cc} (\div 2) & (\div 2) \\ \hline 2x & = 1 \\ \hline x & = \frac{1}{2} \end{array}$$

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

(c) $10 + 4x = 6$

$$\begin{array}{cc} (-10) & (-10) \\ \hline 10 + 4x & = 6 \\ \hline 4x & = -4 \end{array}$$

$$4x = -4$$

$$\begin{array}{cc} (\div 4) & (\div 4) \\ \hline 4x & = -4 \\ \hline x & = -1 \end{array}$$

$$x = -1$$

(d) $6 = 14 - x$

$$\begin{array}{cc} (+x) & (+x) \\ \hline 6 = 14 - x & \\ \hline 6 + x & = 14 \end{array}$$

$$6 + x = 14$$

$$\begin{array}{cc} (-6) & (-6) \\ \hline 6 + x & = 14 \\ \hline x & = 8 \end{array}$$

$$x = 8$$

Note: Always make the x term positive.

Exercise 1

Solve the equations

1. $3x - 2 = 13$

2. $5x + 2 = 12$

3. $7x - 4 = 3$

4. $2x + 7 = 7$

5. $7 + 2x = 11$

6. $3 + 5x = 33$

7. $6 + 4x = 8$

8. $6x - 3 = 15$

9. $2x - 11 = 10$

10. $8x - 9 = 15$

11. $8 + 3x = 5$

12. $4x + 1 = 2$

Questions 13 to 24 are more difficult.

13. $3x - 2 = 0$

14. $4x + 1 = 25$

15. $7x - 2 = -1$

16. $5 + 2x = 6$

17. $7 + 3x = 22$

18. $3 = 4x + 1$

19. $5 = 3x - 1$

20. $7 = 15 - 2x$

21. $10 = 12 - 3x$

22. $4 = 6x + 5$

23. $7x - 1 = -8$

24. $3 - x = 10$