

A Linear Equations

3 Solve the equation.

$$x - 11 = -4$$

$$+11 \quad +11$$

$$\underline{x = 7}$$

$$x = \underline{7} \quad [1]$$

3 Solve $7x - 5 = 37$.

$$+5 \quad +5$$

$$7x = 42$$

$$\div 7 \quad \div 7$$

$$\underline{x = 6}$$

$$x = \underline{6} \quad [2]$$

2 Solve the equation.

$$2x - 7 = -3$$

$$+7 \quad +7$$

$$2x = 4$$

$$\div 2 \quad \div 2$$

$$\underline{x = 2}$$

$$x = \underline{2} \quad [2]$$

6 Solve.

(a) $4x = 28$

$$\div 4 \quad \div 4$$

$$\underline{x = 7}$$

$$x = \underline{7} \quad [1]$$

(b) $3(a - 6) = 24$

$$3a - 18 = 24$$

$$+18 \quad +18$$

$$3a = 42$$

$$\div 3 \quad \div 3$$

$$\underline{a = 14}$$

$$a = \underline{14} \quad [2]$$

4 Solve.

$$-3(1-4x) = 9$$

$$\begin{array}{rcl} -3 + 12x & = & 9 \\ +3 & & +3 \end{array}$$

$$\begin{array}{rcl} 12x & = & 12 \\ \div 12 & & \div 12 \end{array}$$

$$\underline{x = 1}$$

$$x = \underline{\quad 1 \quad} [3]$$

6 Solve.

(a) $8x + 7 = 39$

$$\begin{array}{rcl} -7 & -7 & \\ \hline 8x & = & 32 \end{array}$$

$$\begin{array}{rcl} 8x & = & 32 \\ \div 8 & & \div 8 \end{array}$$

$$\underline{x = 4}$$

$$x = \underline{\quad 4 \quad} [2]$$

(b) $2(5y-1) = 24$

$$\begin{array}{rcl} 10y - 2 & = & 24 \\ +2 & & +2 \end{array}$$

$$\begin{array}{rcl} 10y & = & 26 \\ \div 10 & & \div 10 \end{array}$$

$$\underline{y = 2.6}$$

$$y = \underline{\quad 2.6 \quad} [3]$$

2 Solve the equation.

$$\begin{array}{rcl} 7 - 5x & = & -3 \\ -7 & & -7 \end{array}$$

$$\begin{array}{rcl} -5x & = & -10 \\ \div -5 & & \div -5 \end{array}$$

$$\underline{x = 2}$$

$$x = \underline{\quad 2 \quad} [2]$$

6 Solve.

$$5x - 10 = 3x - 6$$

$$\begin{array}{r} -3x \quad -3x \\ 2x - 10 = -6 \end{array}$$

$$\begin{array}{r} +10 \quad +10 \\ 2x = 4 \end{array}$$

$$\begin{array}{r} \div 2 \quad \div 2 \\ x = 2 \end{array}$$

$$x = \dots\dots\dots 2 \dots\dots\dots [2]$$

5 Solve.

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

$$8x - 2 = 6x + 3$$

$$\begin{array}{r} -6x \quad -6x \\ 2x - 2 = 3 \end{array}$$

$$\begin{array}{r} +2 \quad +2 \\ 2x = 5 \end{array}$$

$$\begin{array}{r} \div 2 \quad \div 2 \\ x = \frac{5}{2} \end{array}$$

$$x = \dots\dots\dots \frac{5}{2} \dots\dots\dots [3]$$

2 Solve the equation.

$$2q - 7 = 2 - 7q$$

$$\begin{array}{r} +7q \quad +7q \\ 9q - 7 = 2 \end{array}$$

$$\begin{array}{r} +7 \quad +7 \\ 9q = 9 \end{array}$$

$$\begin{array}{r} \div 9 \quad \div 9 \\ q = 1 \end{array}$$

$$q = \dots\dots\dots 1 \dots\dots\dots [2]$$

4 Solve.

(a) $5 - 2x = 0$

$+2x \quad +2x$

$5 = 2x$

$\div 2 \quad \div 2$

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

$x = \frac{5}{2} \dots\dots\dots [1]$

(b) $-12 + 2x = 5x - 3$

$-2x \quad -2x$

$-12 = 3x - 3$

$+3 \quad +3$

$-9 = 3x$

$\div 3 \quad \div 3$

$-3 = x$

$x = -3 \dots\dots\dots [2]$

4 Solve.

(a) $2 - 4(5 - 2x) = 0$

$2 - 20 + 8x = 0$

$-18 + 8x = 0$

$+18 \quad +18$

$8x = 18$

$\div 8 \quad \div 8$

$x = \frac{18}{8}$

$x = \frac{9}{4}$

$x = \frac{9}{4} \dots\dots\dots [2]$

3 Solve the equation.

$6 - 2x = 3x$

$+2x \quad +2x$

$6 = 5x$

$\div 5 \quad \div 5$

$\frac{6}{5} = x$

$x = \frac{6}{5} \dots\dots\dots [2]$

7 Solve.

(a) $15t + 8 = 4 - t$

$+t \quad +t$

$16t + 8 = 4$

$-8 \quad -8$

$16t = -4$

$16t = -4$

$\div 16 \quad \div 16$

$t = \frac{-4}{16}$

$t = \frac{-1}{4}$

$t = \frac{-1}{4} \quad [2]$

(b) $\frac{25-2u}{3} = 2$

$\times 3 \quad \times 3$

$25 - 2u = 6$

$-25 \quad -25$

$-2u = -19$

$\div -2 \quad \div -2$

$u = \frac{19}{2}$

$u = \frac{19}{2} \quad [2]$

14 Solve the equation.

$\frac{1-x}{3} = 5$

$\times 3 \quad \times 3$

$1 - x = 15$

$-1 \quad -1$

$-x = 14$

$\div -1 \quad \div -1$

$x = -14$

$x = -14 \quad [2]$

8 Solve.

(a) $\frac{30}{x} = 6$

$\times x \quad \times x$

$30 = 6x$

$\div 6 \quad \div 6$

$5 = x$

$x = 5 \quad [1]$

(b) (i) Solve.

$$\frac{3w}{16} - 1 = \frac{1}{2}$$

$+1 \quad +1$

$$\frac{3w}{16} = \frac{3}{2}$$

$$6w = 48$$

$$6w = 48$$

$\div 6 \quad \div 6$

$$\underline{w = 8}$$

$$w = \underline{\quad 8 \quad} [2]$$

(d) Solve.

$$\frac{13-4x}{3} = 6-x$$

$\times 3 \quad \times 3$

$$13-4x = 3(6-x)$$

$$13-4x = 18-3x$$

$+4x \quad +4x$

$$13 = 18+x$$

$-18 \quad -18$

$$\underline{-5 = x}$$

$$x = \underline{\quad -5 \quad} [3]$$

15 Solve.

$$\frac{8-x}{3} = \frac{x+1}{2}$$

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

$$16-2x = 3x+3$$

$+2x \quad +2x$

$$16 = 5x+3$$

$-3 \quad -3$

$$13 = 5x$$

$\div 5 \quad \div 5$

$$\underline{\frac{13}{5} = x}$$

$$x = \underline{\quad \frac{13}{5} \quad} [3]$$

18 Solve.

$$\frac{3y}{2y-1} \times \frac{3}{4}$$

$$4 \times 3y = 3(2y-1)$$

$$12y = 6y - 3$$

$$6y = -3$$

$$y = -\frac{1}{2}$$

$$y = -\frac{1}{2} \quad [3]$$

(b) Solve the equation.

$$\frac{2x+5}{3-x} \times \frac{14}{15}$$

$$15(2x+5) = 14(3-x)$$

$$30x + 75 = 42 - 14x$$

$$44x + 75 = 42$$

$$44x = -33$$

$$x = \frac{-33}{44}$$

$$x = -\frac{3}{4}$$

$$x = -\frac{3}{4} \quad [3]$$

4 (a) Solve.

(i) $6(7-2x) = 3x-8$

$$42 - 12x = 3x - 8$$

$$+12x \quad +12x$$

$$42 = 15x - 8$$

$$+8 \quad +8$$

$$50 = 15x$$

$$50 = 15x$$

$$\div 15 \quad \div 15$$

$$\frac{50}{15} = x$$

$$\frac{10}{3} = x$$

$$x = \frac{10}{3} \quad [3]$$

(ii) $\frac{2x}{x-5} = \frac{2}{3}$

$$3 \times 2x = 2(x-5)$$

$$6x = 2x - 10$$

$$-2x \quad -2x$$

$$4x = -10$$

$$\div 4 \quad \div 4$$

$$x = \frac{-10}{4}$$

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

$$x = \frac{-5}{2} \quad [3]$$

14 Solve $\frac{x+1}{x-1} - \frac{1}{3} = 0$.

$$+\frac{1}{3} \quad +\frac{1}{3}$$

$$\frac{x+1}{x-1} - \frac{1}{3}$$

$$3(x+1) = 1(x-1)$$

$$3x + 3 = x - 1$$

$$-x \quad -x$$

$$2x + 3 = -1$$

$$-3 \quad -3$$

$$2x = -4$$

$$2x = -4$$

$$\div 2 \quad \div 2$$

$$x = -2$$

$$x = -2 \quad [3]$$

(c) Solve the equations.

$$(i) \quad \frac{3(3-x)}{\times 5} - \frac{2(x+2)}{5} = 1$$

$$15(3-x) - 2(x+2) = 5$$

$$45 - 15x - 2x - 4 = 5$$

$$-17x + 41 = 5$$

$$\quad \quad \quad -41 \quad -41$$

$$-17x = -36$$

$$\quad \quad \quad \div -17 \quad \div -17$$

$$x = \frac{36}{17}$$

$$x = \frac{36}{17} \quad [4]$$

$$(ii) \quad \frac{5}{x+3} - \frac{3}{x+5}$$

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

$$5x + 25 = 3x + 9$$

$$\quad \quad \quad -3x \quad \quad \quad -3x$$

$$2x + 25 = 9$$

$$\quad \quad \quad -25 \quad \quad \quad -25$$

$$2x = -16$$

$$\quad \quad \quad \div 2 \quad \quad \quad \div 2$$

$$x = -8$$

$$x = -8 \quad [3]$$

(b) Solve the equation.

$$\frac{x}{4} + \frac{2x}{3} = 1 \quad \text{multiply all terms by LCM of 3 and 4 (12)}$$

$$\frac{12x}{4} + \frac{24x}{3} = 12$$

$$3x + 8x = 12$$

$$11x = 12$$

$\div 11$

$\div 11$

$$x = \frac{12}{11}$$

$$x = \frac{12}{11} \quad [2]$$

- 3 (a) Geeta buys x apples, $(x+7)$ oranges and $(2x-1)$ bananas. The total number of pieces of fruit Geeta buys is 30.

(i) Find the number of apples Geeta buys.

$$x + x + 7 + 2x - 1 = 30$$

$$4x + 6 = 30$$

$$-6 \quad -6$$

$$4x = 24$$

$$\div 4 \quad \div 4$$

$$x = 8$$

8 apples [3]

- 10 A group of 12 adults and 9 children travel on a bus.

The cost of an adult ticket is \$ n .

The cost of a child ticket is \$ $(n - 10)$.

The total cost of the tickets is \$277.50.

Find the cost of one adult ticket.

$$12n + 9(n - 10) = 277.5$$

$$12n + 9n - 90 = 277.5$$

$$21n - 90 = 277.5$$

$$21n = 367.5$$

$\div 21$

$\div 21$

$$n = 17.5$$

\$ 17.50 [3]

- 8 (a) A shop sells shirts for \$ x and jackets for \$ $(x + 27)$.

The shop sells 4 shirts and 3 jackets for a total of \$194.75.

Write down and solve an equation to find the cost of one shirt.

$$4x + 3(x + 27) = 194.75$$

$$4x + 3x + 81 = 194.75$$

$$7x + 81 = 194.75$$

$- 81$

$- 81$

$$7x = 113.75$$

$\div 7$

$\div 7$

$$x = 16.25$$

\$ 16.25 [3]

- 18 Mrs Kohli buys a jacket, 2 shirts and a hat.

The jacket costs \$ x .

The shirts each cost \$24 less than the jacket and the hat costs \$16 less than the jacket.

Mrs Kohli spends exactly \$100.

Write down an equation in terms of x .

Solve this equation to find the cost of the jacket.

Jacket: x

Shirt: $x - 24$

Hat: $x - 16$

$$x + 2(x - 24) + x - 16 = 100$$

$$x + 2x - 48 + x - 16 = 100$$

$$4x - 64 = 100$$

$$+ 64 \quad + 64$$

$$4x = 164$$

$$\div 4 \quad \div 4$$

$$x = 41$$

\$ 41 [3]