Linear Equations

Solve

$$2x + 3 = 11$$

$$2x = 11 - 3$$

$$2x = 8$$

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

$$x = 4$$

$$3x - 2 = 16$$

$$3x = 16 + 2$$

$$3x = 18$$

$$x = \frac{18}{3}$$

$$x = 6$$

Solve

$$2(3x - 1) = 4x + 5$$

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

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

$$2x = 7$$

$$x = \frac{7}{2}$$

$$x = 3.5$$

$$12(x - 1) = 2(2x + 9)$$

$$12x - 12 = 4x + 18$$

$$12x - 4x = 18 + 12$$

$$8x = 30$$

$$x = \frac{30}{8}$$

$$x = 3.75$$

Solve

$$7x - 5 = 41 - 3x$$

$$7x + 3x = 41 + 5$$

$$10x = 46$$

$$x = \frac{46}{10}$$

$$x = 4.6$$

$$2(3x + 1) - (2x - 5) = 15$$

$$6x + 2 - 2x + 5 = 15$$

$$6x - 2x = 15 - 2 - 5$$

$$4x = 8$$

$$x = \frac{8}{4}$$

$$x = 2$$

Solve

$$5 - 2(x + 1) = 3x - 7$$

$$5 - 2x - 2 = 3x - 7$$

$$-2x - 3x = -7 + 2 - 5$$

$$-5x = -10$$

$$x = \frac{-10}{-5}$$

$$x = 2$$

The three angles of the triangle are shown in terms of x

a   Find the value of x.

$$(5x + 20) + (70 - 3x) + (x + 24) = 180$$

$$5x + 20 + 70 - 3x + x + 24 = 180$$

$$5x - 3x + x = 180 - 24 - 20 - 70$$

$$3x = 66$$

$$x = \frac{66}{3}$$

$$x = 22$$

$70 - 3x$

$5x + 20$ $x + 24$
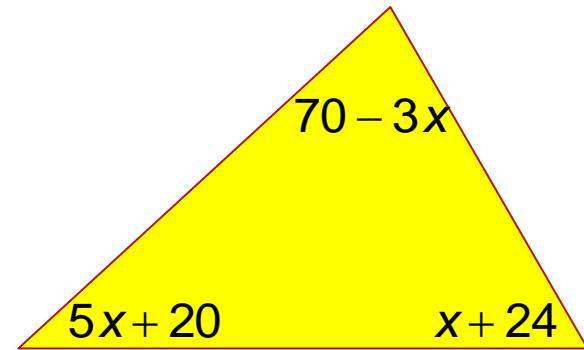
The three angles of the triangle are shown in terms of x

b   Write down the size of each angle in the triangle.

$x = 22$

$one\ angle = 70 - 3x$

$one\ angle = 70 - 3(22)$

$one\ angle = 70 - 66$

$one\ angle = 4°$

$second\ angle = 5x + 20$

$second\ angle = 5(22) + 20$

$second\ angle = 110 + 20$

$second\ angle = 130°$

$third\ angle = x + 24$

$third\ angle = 22 + 24$

$third\ angle = 46°$

$70 - 3x$

$5x + 20$

$x + 24$
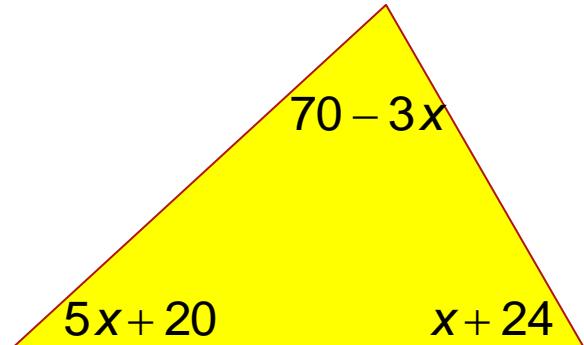
Find the length of a side of this square.
All lengths are in cm.

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

$$6x - 4 = 4x + 4$$

$$6x - 4x = 4 + 4$$

$$2x = 8$$

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

$$x = 4$$

length of a side

$$4(x + 1)$$

$$4(4 + 1)$$

$$4(5)$$

$$20 \; cm$$

$$4(x + 1)$$

$$2(3x - 2)$$
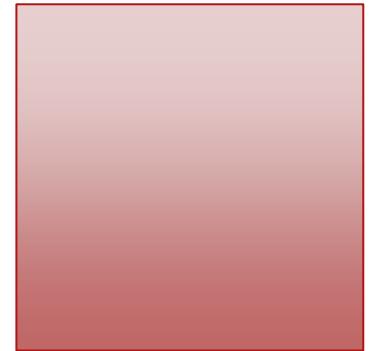
Find the length of a side of this rectangle.
All lengths are in cm.

$$7x - 9 = 5(7 - 3x)$$

$$7x - 9 = 35 - 15x$$

$$7x + 15x = 35 + 9$$

$$22x = 44$$

$$x = \frac{44}{22}$$

$$x = 2$$

$7x - 9$

$5(7 - 3x)$

length of a side

$$7x - 9$$

$$7(2) - 9$$

$$14 - 9$$

$$5\ cm$$

Solve

$$\frac{x}{3} - 5 = 10$$

$$\frac{x}{3} = 10 + 5$$

$$\frac{x}{3} = 15$$

$$x = 15 \times 3$$

$$x = 45$$

$$\frac{x+4}{7} = 3$$

$$x + 4 = 3 \times 7$$

$$x + 4 = 21$$

$$x = 21 - 4$$

$$x = 17$$

Solve

$$\frac{2x - 3}{5} = 6$$

$$2x - 3 = 6 \times 5$$

$$2x - 3 = 30$$

$$2x = 30 + 3$$

$$2x = 33$$

$$x = \frac{33}{2}$$

$$x = 16.5$$

$$\frac{5}{x} + 3 = 7$$

$$\frac{5}{x} = 7 - 3$$

$$\frac{5}{x} = 4$$

$$5 = 4 \times x$$

$$4x = 5$$

$$x = \frac{5}{4}$$

$$x = 1.25$$

Solve

$$6 = \frac{5}{x+2}$$

$$6(x+2) = 5$$

$$6x + 12 = 5$$

$$6x = 5 - 12$$

$$6x = -7$$

$$x = \frac{-7}{6}$$

$$x = -1.17$$

Past Papers

6   (c)   Solve $\dfrac{4x+5}{1-3x} = 2$.

$$\frac{4x+5}{1-3x} = 2$$

$$4x + 5 = 2(1 - 3x)$$

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

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

$$10x = -3$$

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

4   Solve the equation $6 + 8x = 7 - 2x$.

$$6 + 8x = 7 - 2x$$

$$8x + 2x = 7 - 6$$

$$10x = 1$$

$$x = \frac{1}{10}$$

$$x = 0.1$$

(b) Solve $3x = 1 - 5(x+4)$.

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

$$3x = 1 - 5x - 20$$

$$3x + 5x = 1 - 20$$

$$8x = -19$$

$$x = -\frac{19}{8}$$

$$x = -2.375$$

Solve $\dfrac{4}{x-11} = \dfrac{1}{3x}$.

$$4(3x) = 1(x-11)$$

$$12x = x - 11$$

$$12x - x = -11$$

$$11x = -11$$

$$x = -\dfrac{11}{11}$$

$$x = -1$$

(a) Solve $3(x + 10) = 12 - 7x$.

$$3(x + 10) = 12 - 7x$$

$$3x + 30 = 12 - 7x$$

$$3x + 7x = 12 - 30$$

$$10x = -18$$

$$x = -\frac{18}{10}$$

$$x = -1.8$$

Solve the equation $\dfrac{2x-1}{4} + \dfrac{x-2}{3} = 2$.

$$\frac{3(2x-1) + 4(x-2)}{12} = 2$$

$$\frac{6x - 3 + 4x - 8}{12} = 2$$

$$\frac{6x + 4x - 8 - 3}{12} = 2$$

$$\frac{10x - 11}{12} = 2$$

$$10x - 11 = 2 \times 12$$

$$10x - 11 = 24$$

$$10x = 24 + 11$$

$$10x = 35$$

$$x = \frac{35}{10}$$

$$x = 3.5$$

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

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

$$4x - 2x - 10 = 3$$

$$2x - 10 = 3$$

$$2x = 3 + 10$$

$$2x = 13$$

$$x = \frac{13}{2}$$

$$x = 6.5$$

(b) Solve $\dfrac{7}{3-2m} = 4$.

$$\frac{7}{3-2m} = 4$$

$$7 = 4(3 - 2m)$$

$$7 = 12 - 8m$$

$$8m = 12 - 7$$

$$8m = 5$$

$$m = \frac{5}{8}$$

(b) Solve the equation $45 - (p + 3) = 2p$.

$$45 - (p + 3) = 2p$$

$$45 - p - 3 = 2p$$

$$45 - 3 = 2p + p$$

$$42 = 3p$$

$$3p = 42$$

$$p = \frac{42}{3}$$

$$p = 14$$

(c) Solve the equation $\dfrac{2x-3}{4} + \dfrac{5-x}{3} = 0$.

$$\frac{2x-3}{4} + \frac{5-x}{3} = 0$$

$$\frac{2x-3}{4} = -\frac{5-x}{3}$$

$$3(2x-3) = -4(5-x)$$

$$6x - 9 = -20 + 4x$$

$$6x - 4x = -20 + 9$$

$$2x = -11$$

$$x = \frac{-11}{2}$$

$$x = -5.5$$

Solve the equation $\dfrac{3x+1}{2} - \dfrac{x}{3} = 1$.

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

$$\frac{3(3x+1) - 2(x)}{6} = 1$$

$$\frac{9x + 3 - 2x}{6} = 1$$

$$\frac{9x - 2x + 3}{6} = 1$$

$$\frac{7x + 3}{6} = 1$$

$$7x + 3 = 1 \times 6$$

$$7x + 3 = 6$$

$$7x = 6 - 3$$

$$7x = 3$$

$$x = \frac{3}{7}$$

(a) Solve $\dfrac{3x}{4} + \dfrac{2x-1}{2} = 3$.

$$\frac{3x}{4} + \frac{2x-1}{2} = 3$$

$$\frac{1(3x) + 2(2x-1)}{4} = 3$$

$$\frac{3x + 4x - 2}{4} = 3$$

$$\frac{7x - 2}{4} = 3$$

$$7x - 2 = 3 \times 4$$

$$7x - 2 = 12$$

$$7x = 12 + 2$$

$$7x = 14$$

$$x = \frac{14}{7}$$

$$x = 2$$

(a) Solve the equation $\dfrac{7x+1}{4} - \dfrac{x}{2} = 1.$

$$\frac{7x+1}{4} - \frac{x}{2} = 1$$

$$\frac{1(7x+1) - 2(x)}{4} = 1$$

$$\frac{7x+1-2x}{4} = 1$$

$$\frac{5x+1}{4} = 1$$

$$5x + 1 = 1 \times 4$$

$$5x + 1 = 4$$

$$5x = 4 - 1$$

$$5x = 3$$

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

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

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

$$10 - 6x + 3 = 3x + 1$$

$$-6x - 3x = 1 - 3 - 10$$

$$-9x = -12$$

$$9x = 12$$

$$x = \frac{12}{9}$$

$$x = 1.33$$

(a) Solve $\dfrac{3}{x-1} = 2$.

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

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

$$3 = 2x - 2$$

$$3 + 2 = 2x$$

$$5 = 2x$$

$$2x = 5$$

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

$$x = 2.5$$