

$$\begin{aligned}
 1a) \quad y - y_1 &= m(x - x_1) \\
 y - 4 &= 5(x - 1) \\
 y - 4 &= 5x - 5 \\
 \underline{y} &= \underline{5x - 1}
 \end{aligned}$$

$$\begin{aligned}
 1c) \quad y - y_1 &= m(x - x_1) \\
 y + 3 &= -2(x - 5) \\
 y + 3 &= -2x + 10 \\
 \underline{y} &= \underline{-2x + 7}
 \end{aligned}$$

$$\begin{aligned}
 1b) \quad y - y_1 &= m(x - x_1) \\
 y - 6 &= 3(x + 1) \\
 y - 6 &= 3x + 3 \\
 \underline{y} &= \underline{3x + 9}
 \end{aligned}$$

$$\begin{aligned}
 1d) \quad y - y_1 &= m(x - x_1) \\
 y + 5 &= -3(x + 2) \\
 y &= -3x - 6 - 5 \\
 \underline{\underline{y}} &= \underline{\underline{-3x - 11}}
 \end{aligned}$$

$$\begin{aligned}
 2a) \quad 4a - 12 &< 2a - 3 \\
 \quad \quad +12 \quad \quad &\quad \quad +12 \\
 4a &< 2a + 9 \\
 \quad \quad -2a \quad \quad &\quad \quad -2a \\
 2a &< 9 \\
 \underline{a} &< \underline{\frac{9}{2}}
 \end{aligned}$$

$$\begin{aligned}
 2c) \quad 5x - 3 &> 2x + 7 \\
 5x &> 2x + 10 \\
 3x &> 10 \\
 \underline{x} &> \underline{\frac{10}{3}}
 \end{aligned}$$

$$\begin{aligned}
 2b) \quad 7e + 5 &< 3e + 6 \\
 7e &< 3e + 1 \\
 4e &< 1 \\
 \underline{e} &< \underline{\frac{1}{4}}
 \end{aligned}$$

$$\begin{aligned}
 2d) \quad 4y - 5 &> 2y - 6 \\
 4y &> 2y - 1 \\
 2y &> -1 \\
 \underline{y} &> \underline{-\frac{1}{2}}
 \end{aligned}$$

$$3) a) \begin{aligned} 4x + 2y &= 26 \\ x - y &= 2 \quad (\times 2) \end{aligned}$$

$$\begin{aligned} 4x + 2y &= 26 \quad + \\ 2x - 2y &= 4 \end{aligned}$$

$$6x = 30$$

$$x = 5$$

$$x - y = 2$$

$$5 - y = 2$$

$$y = 3$$

$$3b) \begin{aligned} 4a - y &= 16 \quad (\times 3) \\ 5a + 3y &= 3 \end{aligned}$$

$$\begin{aligned} 12a - 3y &= 48 \quad + \\ 5a + 3y &= 3 \end{aligned}$$

$$17a = 51$$

$$a = 3$$

$$4a - y = 16$$

$$12 - y = 16$$

$$y = -4$$

$$3c) \begin{aligned} 2p - 5w &= 1 \\ 5p + w &= 16 \quad (\times 5) \end{aligned}$$

$$\begin{aligned} 2p - 5w &= 1 \\ 25p + 5w &= 80 \quad + \end{aligned}$$

$$27p = 81$$

$$p = 3$$

$$2p - 5w = 1$$

$$6 - 5w = 1$$

$$w = 1$$

$$3d) \begin{aligned} 2m + d &= 3 \quad (\times 3) \\ 4m - 3d &= 31 \end{aligned}$$

$$\begin{aligned} 6m + 3d &= 9 \quad + \\ 4m - 3d &= 31 \end{aligned}$$

$$10m = 40$$

$$m = 4$$

$$2m + d = 3$$

$$8 + d = 3$$

$$d = -5$$

$$4) a) G = \frac{5d}{6} + 16$$

$$6G = 5d + 96$$

$$6G - 96 = 5d$$

$$\frac{6G - 96}{5} = d$$

$$4c) H = \frac{8f}{11} + 30$$

$$11H = 8f + 330$$

$$11H - 330 = 8f$$

$$\frac{11H - 330}{8} = f$$

$$4b) V = \frac{6x}{7} + 21$$

$$7V = 6x + 147$$

$$7V - 147 = 6x$$

$$\frac{7V - 147}{6} = x$$

$$4d) G = \frac{3w}{5} + 16$$

$$5G = 3w + 80$$

$$5G - 80 = 3w$$

$$\frac{5G - 80}{3} = w$$

Relationships Resit Practice 1.2

6a) $y = kx^2$ pick the point (1, 3) then...

$$3 = k(1)^2$$

$$\underline{k = 3}$$

6b) $y = kx^2$ pick the point (1, 4) then

$$4 = k(1)^2$$

$$\underline{k = 4}$$

6c) $y = kx^2$ pick the point (2, 2) then

$$2 = k(2)^2$$

$$2 = 4k$$

$$\underline{k = \frac{1}{2}}$$

6d) $y = kx^2$ pick the point (1, 5) then

$$5 = k(1)^2$$

$$\underline{k = 5}$$

7a) $a = 3$ $b = 3$

b) $a = -2$ $b = 1$

8) Check using desmos online.

$$9a) x = 6$$

$$TP = (6, -4) \text{ minimum}$$

$$b) x = 3$$

$$TP = (3, -2) \text{ minimum}$$

$$c) x = 1$$

$$TP = (1, -5) \text{ minimum}$$

$$d) x = 2$$

$$TP = (2, -1) \text{ minimum}$$

Relationships Resit Practice 1.3

10 a) $x = 4$ $x = -5$

b) $x = 2$ $x = -7$

c) $x = -6$ $x = 8$

d) $x = -1$ $x = 9$

11 a) $x^2 + 2x - 1 = 0$

$a = 1$ $b = 2$ $c = -1$

$$x = \frac{-2 \pm \sqrt{2^2 - (4 \times 1 \times -1)}}{2 \times 1}$$

$$x = \frac{-2 \pm \sqrt{8}}{2}$$

$x = 0.414$ (3dp)

$x = -2.414$ (3dp)

b) $x^2 + 3x - 6 = 0$

$a = 1$ $b = 3$ $c = -6$

$$x = \frac{-3 \pm \sqrt{3^2 - (4 \times 1 \times -6)}}{2 \times 1}$$

$$x = \frac{-3 \pm \sqrt{33}}{2}$$

$x = 1.372$

$x = -4.372$

c) $x^2 + 4x - 3 = 0$

$a = 1$ $b = 4$ $c = -3$

$$x = \frac{-4 \pm \sqrt{4^2 - (4 \times 1 \times -3)}}{2 \times 1}$$

$x = 0.646$

$x = -4.646$

$$d) \quad x^2 + 3x - 7 = 0$$

$$a = 1 \quad b = 3 \quad c = -7$$

$$x = \frac{-3 \pm \sqrt{9 - (4 \times 1 \times -7)}}{2 \times 1}$$

$$x = 1.541$$

$$x = -4.541$$

$$x = \frac{-3 \pm \sqrt{37}}{2}$$

$$12a) \quad 3x^2 - 7x + 2 = 0$$

$$a = 3 \quad b = -7 \quad c = 2$$

$$b^2 - 4ac = 49 - (4 \times 3 \times 2)$$

$$= 49 - 24$$

$$= 25 > 0$$

2 real and distinct roots.

$$12b) \quad 2x^2 - 3x + 4 = 0$$

$$a = 2 \quad b = -3 \quad c = 4$$

$$b^2 - 4ac = 9 - (4 \times 2 \times 4)$$

$$= 9 - 32$$

$$= -23 < 0$$

0 roots, not real.

$$12c) \quad x^2 - 6x + 9 = 0$$

$$a = 1 \quad b = -6 \quad c = 9$$

$$b^2 - 4ac = 36 - (4 \times 1 \times 9)$$

$$= 36 - 36 = 0$$

1 real repeated

$$12d) \quad 3x^2 - 6x + 3 = 0$$

$$a = 3 \quad b = -6 \quad c = 3$$

$$b^2 - 4ac = 36 - (4 \times 3 \times 3)$$

$$= 36 - 36 = 0$$

1 real repeated
root

Relationships Resit Practice 1.4.

$$13a) \sqrt{2.8^2 + 6.3^2} = 6.89 \text{ cm}$$

As $6.89 \text{ cm} \neq 7.2 \text{ cm}$ this is not a right angled triangle and not pass.

$$b) \sqrt{9.3^2 + 8.1^2} = 12.33 \text{ cm}$$

As $12.33 \text{ cm} \neq 12.5 \text{ cm}$ this is not a right angled triangle and not pass.

$$c) \sqrt{14^2 + 10.5^2} = 17.5 \text{ cm.}$$

As $17.5 \text{ cm} = 17.5 \text{ cm}$ this must be a right angled triangle and this will pass.

$$d) \sqrt{33.6^2 + 14^2} = 36.4 \text{ cm} \quad \text{As } 36.4 \text{ cm} = 36 \text{ cm} \text{ this must be a right angled triangle and this will pass.}$$

$$14a) \quad \begin{aligned} \text{TSV} &= 90^\circ \\ \text{TUV} &= 90^\circ \end{aligned}$$

$$\begin{aligned} \text{Therefore } \text{SVU} &= 360 - 90 - 90 - 156 \\ &= \underline{24^\circ} \end{aligned}$$

$$\begin{aligned} b) \text{SVU} &= 360 - 90 - 90 - 161 \\ &= \underline{19^\circ} \end{aligned}$$

$$15a) \quad SF = \frac{\text{new}}{\text{old}}$$
$$= \frac{200}{2500} = 0.08$$

$$\text{Vol of small box} =$$
$$36000 \times 0.08^3$$
$$= 18,432 \text{ cm}^3$$

$$b) \quad SF = \frac{\text{new}}{\text{old}}$$
$$= \frac{70}{150} = 0.4\dot{6}$$

$$\text{Vol of small prism} =$$
$$2550 \times 0.4\dot{6}^3$$
$$= 259,1\dot{5} \text{ cm}^3$$

$$c) \quad SF = \frac{\text{new}}{\text{old}}$$
$$= \frac{1,4}{3,6} = 0.3\dot{8}$$

$$\text{Vol of small tank} =$$
$$43200 \times 0.3\dot{8}^3$$

16 a) Angles in a 7 sided polygon =
 $(7-2) \times 180 = 900^\circ$

$$\text{Angle} = \frac{900}{7} = 128.57^\circ$$

b) Angles in a 5 sided polygon =
 $(5-2) \times 180 = 540.$

$$\text{Angle} = \frac{540}{5} = 108^\circ.$$

Relationships Unit Resit 1.5.

17) Check answers in desmos online.

18) a) period = $\frac{360}{3} = 120^\circ$

b) period = $\frac{360}{4} = 90^\circ$

c) period = $\frac{360}{2} = 180^\circ$

d) period = $\frac{360}{5} = 72^\circ$

e) period = $\frac{360}{9} = 40^\circ$

f) period = $\frac{360}{12} = 30^\circ$

19) a) $4 \sin x - 1 = 0$

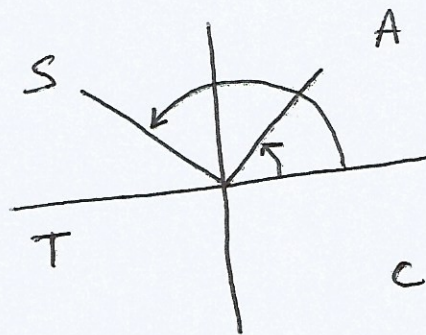
$$4 \sin x = 1$$

$$\sin x = \frac{1}{4}$$

$$\sin^{-1}\left(\frac{1}{4}\right) = 14.48^\circ$$

$$x = 14.48^\circ \text{ or } \dots$$

$$180 - 14.48^\circ$$



$$b) 5 \cos x - 2 = 0$$

$$5 \cos x = 2$$

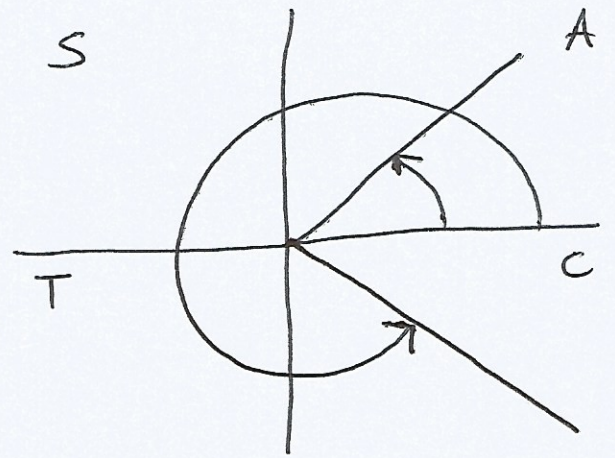
$$\cos x = \frac{2}{5}$$

$$x = \cos^{-1}\left(\frac{2}{5}\right) = 66.42^\circ$$

$$x = 66.42^\circ \text{ or } \dots$$

$$x = 360 - 66.42^\circ$$

$$x = 293.58^\circ$$



$$c) 3 \sin x - 2 = 0$$

$$3 \sin x = 2$$

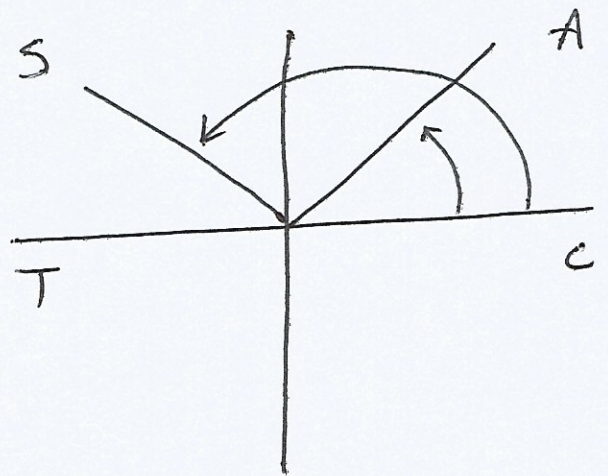
$$\sin x = \frac{2}{3}$$

$$x = \sin^{-1}\left(\frac{2}{3}\right) = 41.81^\circ$$

$$x = 41.81^\circ \text{ or } \dots$$

$$x = 180 - 41.81$$

$$x = 138.19^\circ$$



$$19 d) 3 \cos x - 2 = 0$$

$$3 \cos x = 2$$

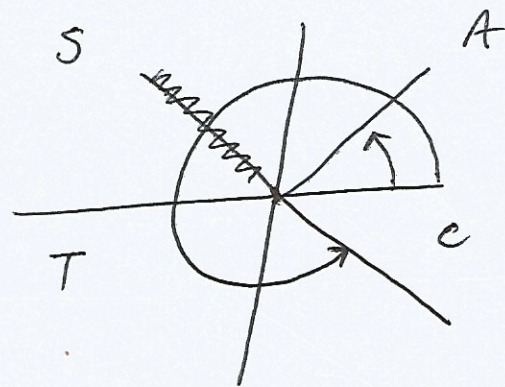
$$\cos x = \frac{2}{3}$$

$$x = \cos^{-1}\left(\frac{2}{3}\right) = 48.19^\circ$$

$$x = \underline{48.19^\circ} \text{ or } \dots$$

$$x = 360 - 48.19$$

$$x = \underline{311.81^\circ}$$



$$e) 2 \cos x - 1 = 0$$

$$2 \cos x = 1$$

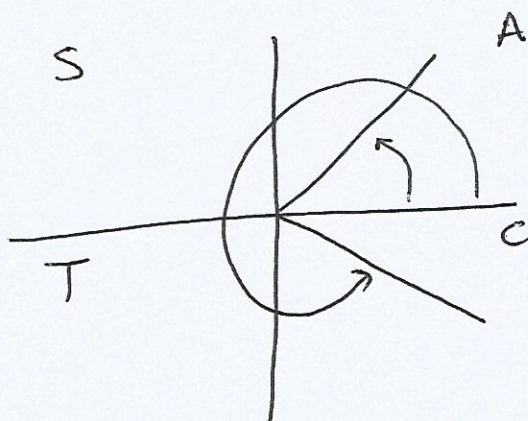
$$\cos x = \frac{1}{2}$$

$$x = \cos^{-1}\left(\frac{1}{2}\right) = 60^\circ$$

$$x = \underline{60^\circ} \text{ or } \dots$$

$$x = 360 - 60$$

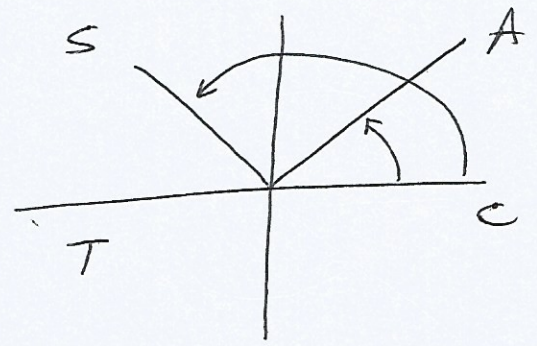
$$x = \underline{300^\circ}$$



$$19 f) \quad 5 \sin x - 2 = 0$$

$$5 \sin x = 2$$

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



$$x = \sin^{-1}\left(\frac{2}{5}\right) = 23.58^\circ$$

$$\underline{x = 23.58^\circ \text{ or } \dots}$$

$$x = 180 - 23.58$$

$$\underline{x = 156.42^\circ}$$