

ALGEBRA and TRIGONOMETRY : ANSWERS

1) a) $4(x+7)$
 $= 4x + 28$

b) $3y(2-5y)$
 $= 6y - 15y^2$

c) $x(x+9)$
 $= x^2 + 9x$

d) $3x(7+5x)$
 $= 21x + 15x^2$

2) a) $2(x+7) + 3(2x+9)$
 $= 2x + 14 + 6x + 27$
 $= 8x + 41$

b) $5(2x-1) - 6(3x-7)$
 $= 10x - 5 - 18x + 42$
 $= -8x + 37$

c) $3(x^2+3x+1) - 2(x^2-2x-7)$
 $= 3x^2 + 9x + 3 - 2x^2 + 4x + 14$
 $= x^2 + 13x + 17$

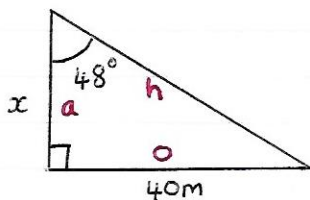
3) a) $(x+6)(x+2)$
 $= x^2 + 2x + 6x + 12$
 $= x^2 + 8x + 12$

b) $(x-7)(x-9)$
 $= x^2 - 9x - 7x + 63$
 $= x^2 - 16x + 63$

c) $(2x+3)(5x-2)$
 $= 10x^2 - 4x + 15x - 6$
 $= 10x^2 + 11x - 6$

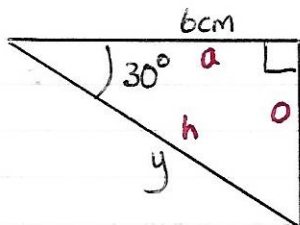
d) $(5-3x)(4x+3)$
 $= 20x + 15 - 12x^2 - 9x$
 $= -12x^2 + 11x + 15$

4) a)



$$\tan x = \frac{o}{a}$$
$$\tan 48^\circ = \frac{40}{x}$$
$$x \tan 48^\circ = 40$$
$$x = \frac{40}{\tan 48^\circ}$$
$$x = 36 \text{ m}$$

b)



$$\cos x = \frac{a}{h}$$
$$\cos 30^\circ = \frac{6}{y}$$
$$y \cos 30^\circ = 6$$
$$y = \frac{6}{\cos 30^\circ}$$
$$y = 7 \text{ cm}$$

$$\begin{aligned}
 5) \quad a) \quad 2(x+7) &= 20 \\
 2x + 14 &= 20 \\
 2x &= 20 - 14 \\
 2x &= 6 \\
 x &= \frac{6}{2} \\
 x &= 3
 \end{aligned}$$

$$\begin{aligned}
 b) \quad 3(2x-1) - 2(x+7) &= 2 \\
 6x - 3 - 2x - 14 &= 2 \\
 4x - 17 &= 2 \\
 4x &= 19 \\
 x &= \frac{19}{4} \\
 \text{or } x &= 4\frac{3}{4}
 \end{aligned}$$

$$\begin{aligned}
 6) \quad a) \quad T &= 3y + 7 \quad (y) \\
 T - 7 &= 3y \\
 \frac{(T-7)}{3} &= y
 \end{aligned}$$

$$\begin{aligned}
 b) \quad H &= \frac{7y}{2\omega} \quad (\omega) \\
 2H\omega &= 7y \quad \times 2\omega \\
 \omega &= \frac{7y}{2H} \quad \div 2H
 \end{aligned}$$

$$\begin{aligned}
 c) \quad g &= 7(t-5) + 2(3t+4) \quad (t) \\
 g &= 7t - 35 + 6t + 8 \\
 g &= 13t - 27 \\
 g + 27 &= 13t \\
 \frac{(g+27)}{13} &= t
 \end{aligned}$$

$$\begin{aligned}
 d) \quad h &= 3(t^2+3) + a(t^2-7) \quad (t) \\
 h &= 3t^2 + 9 + at^2 - 7a \\
 h + 7a - 9 &= 3t^2 + at^2 \\
 h + 7a - 9 &= (3+a)t^2 \\
 \frac{(h+7a-9)}{(3+a)} &= t^2 \\
 \sqrt{\frac{(h+7a-9)}{(3+a)}} &= t
 \end{aligned}$$

7)

$$a) \quad \frac{3x}{4} + \frac{1}{1} = \frac{2}{3}$$

$$\text{LCM} = 12$$

$$\frac{9x}{12} + \frac{12}{12} = \frac{8}{12}$$

$\times 12$

$$9x + 12 = 8$$

$$9x = 8 - 12$$

$$9x = -4$$

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

$$b) \frac{(x+5)}{2} - \frac{(3x-2)}{3} = \frac{5}{1}$$

$$\frac{3(x+5)}{6} - \frac{2(3x-2)}{6} = \frac{30}{6} \quad \text{LCM} = 6$$

$$\times 6 \quad 3(x+5) - 2(3x-2) = 30$$

$$3x + 15 - 6x + 4 = 30$$

$$-3x + 19 = 30$$

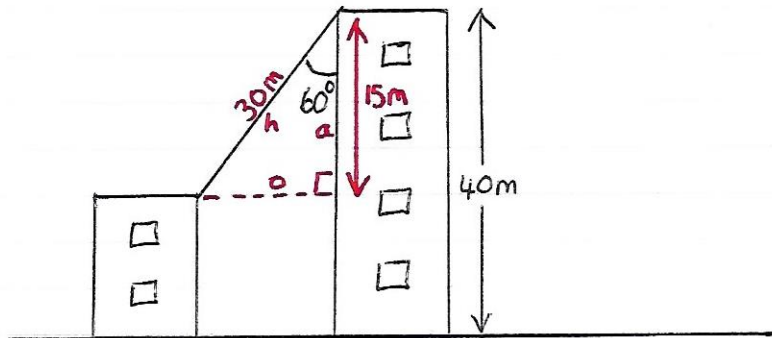
$$19 - 30 = 3x$$

$$-11 = 3x$$

$$-\frac{11}{3} = x$$

$$\text{or } -3\frac{2}{3} = x$$

8)



$$\cos x = \frac{a}{h}$$

$$\cos 60 = \frac{a}{30}$$

$$30 \cos 60 = a$$

$$15 \text{ m} = a$$

∴ Height of small building is $40 - 15 = 25 \text{ m}$