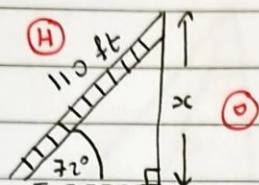


Revision Sheet 5 Worked Solutions

Q1.

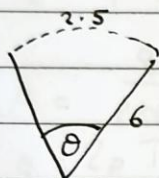


$$\sin 72 = \frac{x}{110}$$

$$\Rightarrow x = 110(\sin 72)$$

$$= \boxed{104.6 \text{ ft}}$$

Q2.

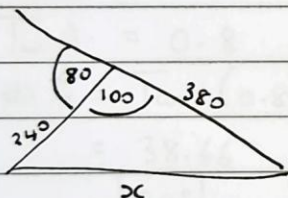


$$l = r\theta$$

$$2.5 = 6(\theta)$$

$$\Rightarrow \theta = \frac{2.5}{6} = \boxed{\frac{5}{12} \text{ rads}}$$

Q3.



Cosine Rule

$$x^2 = (240)^2 + (380)^2 - 2(240)(380)\cos 100$$

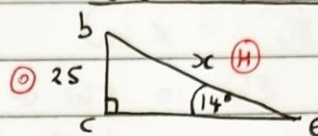
$$x^2 = 202000 + 31673.43$$

$$x^2 = 233673.43$$

$$\Rightarrow x = \sqrt{233673.43}$$

$$= \boxed{483.4 \text{ m}}$$

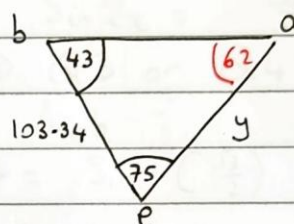
Q4. Consider $\triangle bce$



$$\sin 14 = \frac{25}{x}$$

$$\Rightarrow x = \frac{25}{\sin 14} = 103.34$$

Consider $\triangle bae$



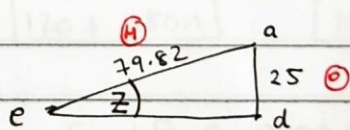
$$\frac{y}{\sin 43} = \frac{103.34}{\sin 62}$$

$$\Rightarrow y(\sin 62) = 103.34(\sin 43)$$

$$\Rightarrow y = \frac{103.34(\sin 43)}{\sin 62}$$

$$= 79.82$$

Consider $\triangle ade$



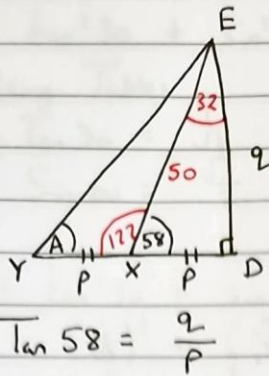
$$\sin z = \frac{25}{79.82}$$

$$\Rightarrow z = \sin^{-1}\left(\frac{25}{79.82}\right)$$

$$= 18.25$$

$$= \boxed{18^\circ}$$

Q5.
i)



$$\tan 58 = \frac{q}{p}$$

$$\Rightarrow q = p \tan 58$$

$$\tan A = \frac{q}{p+p} = \frac{q}{2p}$$

$$\Rightarrow q = 2p \tan A$$

$$\text{As } q = q$$

$$\Rightarrow p \tan 58 = 2p \tan A$$

$$\Rightarrow \tan A = \frac{1}{2} \tan 58$$

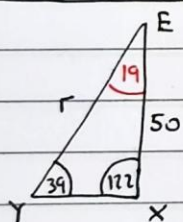
ii) $\tan A = 0.8$

$$\Rightarrow A = \tan^{-1}(0.8)$$

$$= 38.66$$

$$= \boxed{39^\circ}$$

iii) Consider $\triangle YXE$



$$\frac{r}{\sin 122} = \frac{50}{\sin 39}$$

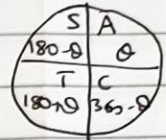
$$\Rightarrow r (\sin 39) = 50 (\sin 122)$$

$$\Rightarrow r = \frac{50 (\sin 122)}{\sin 39}$$

$$= \boxed{67.4 \text{ cm}}$$

Q6.

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



$$\ominus \Rightarrow Q2 \text{ or } Q3$$

Ref Angle :

$$\theta = \cos^{-1}\left(\frac{1}{\sqrt{2}}\right) = 45^\circ$$

$$\Rightarrow Q2: 180 - 45 = \boxed{135^\circ}$$

$$Q3: 180 + 45 = \boxed{225^\circ}$$

Q7. $\sin 2x = -\frac{\sqrt{3}}{2}$

$$\ominus \Rightarrow Q3 \text{ or } Q4$$

Ref Angle :

$$\theta = \sin^{-1}\left(\frac{\sqrt{3}}{2}\right) = 60^\circ$$

$$\Rightarrow Q3: 180 + 60 = 240^\circ$$

$$Q4: 360 - 60 = 300^\circ$$

$$\Rightarrow 2x = 240, 300, 600, 660, 960, \dots$$

$$x = 120^\circ, 150^\circ, 300^\circ, 330^\circ$$

$x \in \mathbb{R} \Rightarrow$ General Solns

$$2x = 240 + 360n \text{ or } 300 + 360n$$

$$x = \boxed{120 + 180n} \quad \boxed{150 + 180n}$$

Q8. $\sin 4\theta = 0.9848$

$$\oplus \Rightarrow Q1 \text{ or } Q2$$

Ref Angle : $\sin^{-1}(0.9848) = 80^\circ$

$$Q1: 80^\circ \quad Q2: 180 - 80 = 100^\circ$$

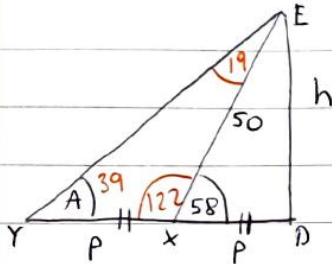
$$4\theta = 80, 100, 440, 460, 800, 820, 1160, 1180$$

$$\theta = \boxed{20, 25, 110, 115, 200, 205, 290, 295}$$

Q9. $\tan A = \frac{1}{4}$ $\tan B = \frac{1}{3}$

$$\begin{aligned}\tan(A+B) &= \frac{\tan A + \tan B}{1 - \tan A \tan B} \\ &= \frac{\frac{1}{4} + \frac{1}{3}}{1 - (\frac{1}{4})(\frac{1}{3})} \\ &= \frac{\frac{7}{12}}{\frac{11}{12}} = \boxed{\frac{7}{11}}\end{aligned}$$

Q10.
i)



$$\tan A = \frac{h}{2p} \quad \tan 58 = \frac{h}{p}$$

$$\frac{1}{2} \left(\frac{h}{p} \right) = \frac{h}{2p} = \tan A$$

$$\Rightarrow \tan A = \frac{1}{2} \tan 58$$

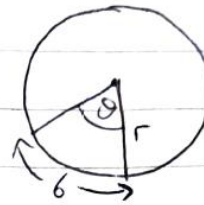
Q.E.D.

ii) $\tan A = \frac{1}{2} \tan 58$
 $= \frac{1}{2} (1.60033)$
 $= 0.800167$
 $A = \tan^{-1}(0.800167) = \boxed{39^\circ}$

iii) To find p :
 $\cos 58 = \frac{p}{50}$
 $\Rightarrow p = 50(\cos 58) = 26.5$
 To find $|YE|$
 $\cos 39 = \frac{2(26.5)}{|YE|}$

$$\begin{aligned}\Rightarrow |YE| &= \frac{53}{\cos 39} = 68.198 \\ &= \boxed{68.2 \text{ cm}}\end{aligned}$$

Q11.



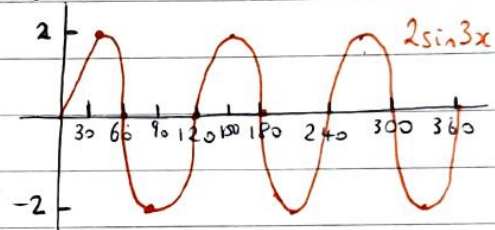
$$L = r\theta$$

$$6 = r(0.75)$$

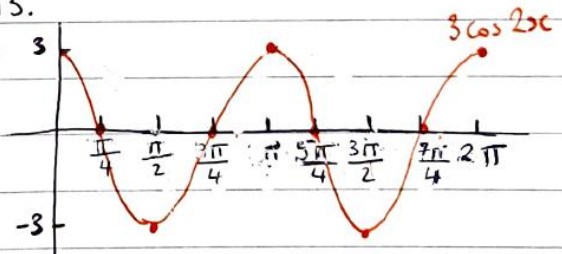
$$r = \frac{6}{0.75} = 8 \text{ cm}$$

$$\begin{aligned}A &= \frac{1}{2} r^2 \theta = \frac{1}{2} (8)^2 (0.75) \\ &= \boxed{24 \text{ cm}^2}\end{aligned}$$

Q12.



Q13.



Q14.

