

↓ Exercise 2.2

- Q1 (i) $\sin 48 = 0.7431$
(ii) $\cos 74 = 0.2756$
(iii) $\tan 28.4 = 0.5407$
(iv) $\cos 43^\circ 24' = 0.7266$
(v) $\tan 30^\circ 36' = 0.5914$

- Q2 (i) 48°
(ii) 69°
(iii) 55°
(iv) 78°
(v) 42°
(vi) 12°

- Q3 (i) $\sin \theta = \frac{2}{3}$
 $\theta = \sin^{-1}(\frac{2}{3})$
 $\theta = 42^\circ$
(ii) $\cos \theta = \frac{3}{5}$
 $\theta = \cos^{-1}(\frac{3}{5})$
 $\theta = 53^\circ$
(iii) $\theta = \tan^{-1}(\frac{4}{3}) = 41^\circ$
(iv) $\theta = \sin^{-1}(\frac{3}{5}) = 24^\circ$

- Q4 (i) $\sin^2 45 + \cos^2 45 = 1$
 $(\frac{1}{\sqrt{2}})^2 + (\frac{1}{\sqrt{2}})^2$
 $\frac{1}{2} + \frac{1}{2}$
 $= 1$ True ✓
(ii) $\sin 60 \cos 30 + \cos 60 \sin 30 = 1$
 $(\frac{\sqrt{3}}{2})(\frac{\sqrt{3}}{2}) + (\frac{1}{2})(\frac{1}{2})$
 $\frac{3}{4} + \frac{1}{4}$
 $= 1$ True ✓

- (iii) $\cos^2 60 + \cos 60 \sin 30 = \frac{1}{2}$
 $(\frac{1}{2})^2 + (\frac{1}{2})(\frac{1}{2})$
 $\frac{1}{4} + \frac{1}{4}$
 $= \frac{2}{4} = \frac{1}{2}$ True ✓

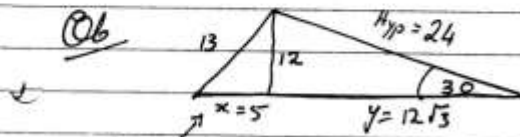
Q5 $\sin^2 \frac{\pi}{6} + \sin^2 \frac{\pi}{4} + \sin^2 \frac{\pi}{3} = \frac{3}{2}$

Use Table on Pg 13 of Tables

$$\left(\frac{1}{2}\right)^2 + \left(\frac{1}{\sqrt{2}}\right)^2 + \left(\frac{\sqrt{3}}{2}\right)^2$$

$$\frac{1}{4} + \frac{1}{2} + \frac{3}{4}$$

$$= \frac{1}{2} + \frac{3}{4} = \frac{3}{2} \quad \text{True } \checkmark$$



$$\sin \theta = \frac{O}{H}$$

$$\sin 30 = \frac{12}{H}$$

$$H = \frac{12}{\sin 30} = \frac{12}{\frac{1}{2}} = 12 \times \frac{2}{1}$$

$$H = 24$$

Pythagoras

$$13^2 = 12^2 + x^2$$

$$13^2 - 12^2 = x^2$$

$$25 = x^2$$

$$5 = x$$

Pythagoras

$$24^2 = 12^2 + y^2$$

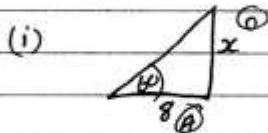
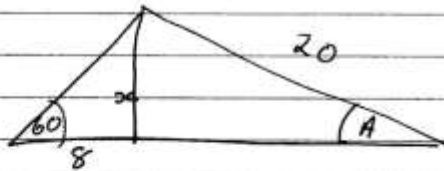
$$24^2 - 12^2 = y^2$$

$$432 = y^2$$

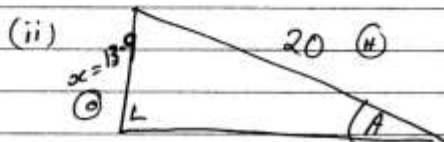
$$12\sqrt{3} = y$$

Perimeter = $13 + 24 + 5 + 12\sqrt{3}$
 $= 42 + 12\sqrt{3}$

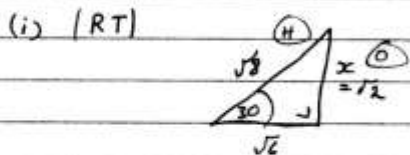
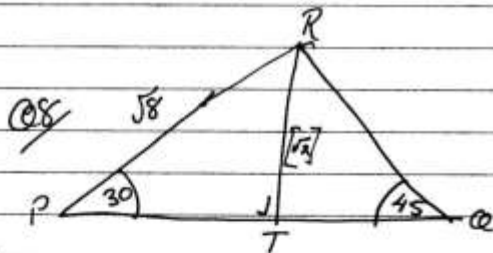
Q7



$$\begin{aligned} \tan \theta &= \frac{o}{A} \\ \tan 60 &= \frac{x}{8} \\ \tan(60) \times 8 &= x \\ 8\sqrt{3} &= x \\ 13.9 &= x \quad \text{To one dec place.} \end{aligned}$$



$$\begin{aligned} \sin \theta &= \frac{o}{H} \\ \sin A &= \frac{13.9}{20} \\ A &= \sin^{-1}\left(\frac{13.9}{20}\right) \\ A &= 44^\circ \end{aligned}$$

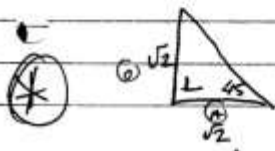


$$\begin{aligned} \sin \theta &= \frac{o}{H} \\ \sin 30 &= \frac{x}{\sqrt{8}} \\ \sin(30) \times \sqrt{8} &= x \\ \sqrt{2} &= x \end{aligned}$$

(ii) |PT| Pythagoras.

$$\begin{aligned} (\sqrt{8})^2 &= (\sqrt{2})^2 + x^2 \\ 8 - 2 &= x^2 \\ \sqrt{6} &= x \end{aligned}$$

Area: require |TQ|



$$\begin{aligned} \tan \theta &= \frac{o}{A} \\ \tan 45 &= \frac{x}{\sqrt{2}} \\ x &= \frac{\sqrt{2}}{\tan 45} \\ x &= \sqrt{2} \end{aligned}$$

$$\begin{aligned} \text{Area} &= \frac{1}{2} \text{ base} \times \text{height} \\ &= \frac{1}{2} (\sqrt{6} + \sqrt{2}) \times \sqrt{2} \\ &= 1 + \sqrt{3} \end{aligned}$$