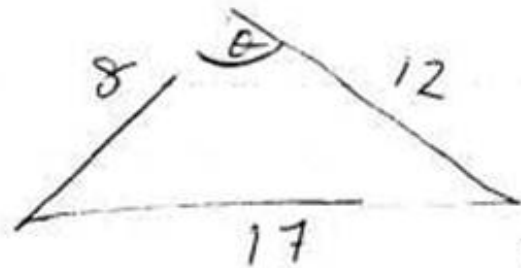


Q1 B Questions



$$(i) \quad 17^2 = 8^2 + 12^2 - 2(8)(12) \cos C$$

$$284 = 208 - 192 \cos C$$

$$284 - 208 = -192 \cos C$$

$$81 = -192 \cos C$$

$$-\frac{81}{192} = \cos C$$

$$\cos^{-1}\left(\frac{-81}{192}\right) = C$$

$$115^\circ = C$$

$$\cos C = \frac{8^2 + 12^2 - 17^2}{2(8)(12)}$$

$$\cos C = \frac{-81}{192}$$

$$C = \cos^{-1}\left(\frac{-81}{192}\right)$$

$$C = 115^\circ$$

$$(ii) \quad \text{Area} = \frac{1}{2} ab \sin C$$

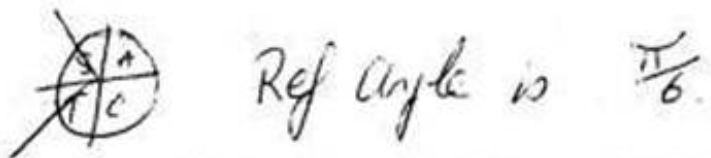
$$\text{Area} = \frac{1}{2} (8)(12) \sin(115^\circ)$$

$$\text{Area} = 43.50277$$

$$= 43.5 \text{ cm}^2$$

$$\begin{aligned} \text{Area} &= 43.50 \times \pi \\ &= 43.5 \text{ cm}^2 \end{aligned}$$

Q2 (i) $\cos 2\theta = -\frac{\sqrt{3}}{2}$ (radians)



Sols: (1) $\pi - \frac{\pi}{6} = \frac{5\pi}{6}$

(2) $\pi + \frac{\pi}{6} = \frac{7\pi}{6}$

General Sols: $2\theta = \frac{5\pi}{6} + 2n\pi$ (2) $2\theta = \frac{7\pi}{6} + 2n\pi$

$\Rightarrow \theta = \frac{5\pi}{12} + n\pi$

$\Rightarrow \theta = \frac{7\pi}{12} + n\pi$

(ii)

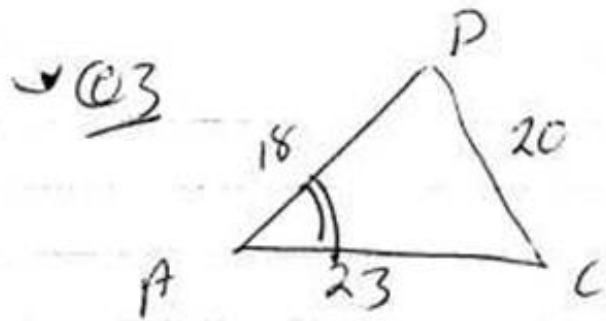
$$\text{Area} = \frac{1}{2} r^2 \theta$$

$$12 = \frac{1}{2} (4)^2 \theta$$

$$12 = 8\theta$$

$$\frac{12}{8} = \theta$$

$$\frac{3}{2} \text{ radians} = \theta$$

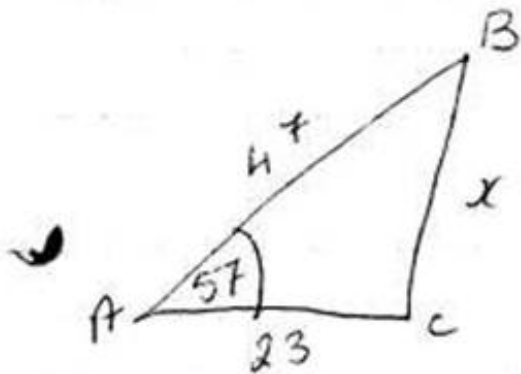


$$\cos B = \frac{(18)^2 + (23)^2 - (20)^2}{2(18)(23)}$$

$$\cos B = \frac{453}{828}$$

$$B = \cos^{-1}\left(\frac{453}{828}\right)$$

$$B = 57^\circ$$



$$x^2 = (47)^2 + (23)^2 - 2(47)(23)\cos(57)$$

$$x^2 = 2738 - 1177.51$$

$$x^2 = 1560.49$$

$$x = 39.5$$

$$x = 40 \text{ cm}$$

Q4

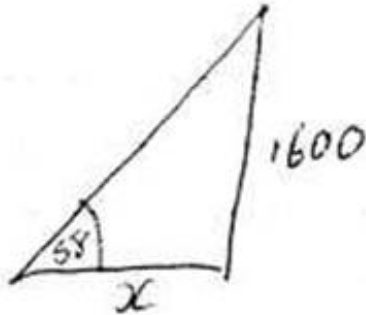
D.S

$$x = 10 \text{ cm}$$

Q4

$$\text{Speed} = \frac{\text{Dis}}{\text{Tim}}$$

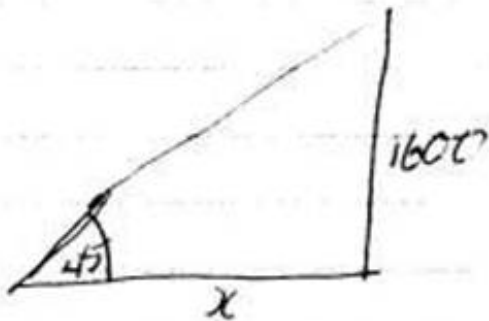
$$1 \text{ min} = \frac{1}{60} \text{ hr}$$



$$\tan 58 = \frac{1600}{x}$$

$$x = \frac{1600}{\tan 58}$$

$$x = 999.79$$



$$\tan 45 = \frac{1600}{x}$$

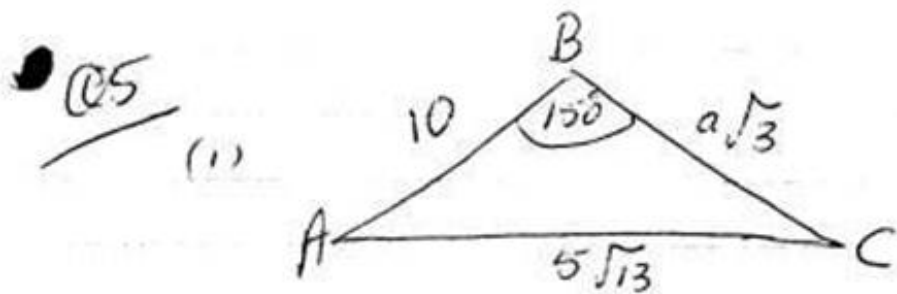
$$x = \frac{1600}{\tan 45}$$

$$x = 1600$$

$$\text{Speed} = \frac{0.6}{\frac{1}{60}}$$

$$= 36 \text{ km/hr}$$

$$1600 - 999.79 = 600.21 = 600 \text{ m} = 0.6 \text{ km}$$



$$(5\sqrt{13})^2 = (10)^2 + (a\sqrt{3})^2 - 2(10)(a\sqrt{3}) \cos 150^\circ$$

$$325 = 100 + 3a^2 - 20(a\sqrt{3}) \left(-\frac{\sqrt{3}}{2} \right)$$

$$325 = 100 + 3a^2 + 30a$$

$$0 = 3a^2 + 30a - 225$$

$$0 = a^2 + 10a - 75$$

$$0 = (a + 15)(a - 5)$$

$$a = -15$$

$$\underline{\underline{a = 5}}$$

Ans.

(ii) Area = $\frac{1}{2} ab \sin C$

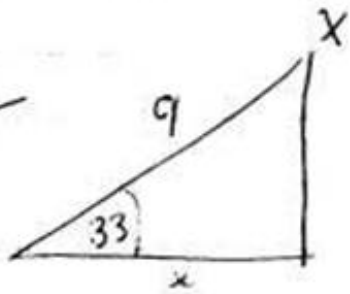
$$\text{Area} = \frac{1}{2} (10)(5\sqrt{3}) \sin (150)$$

$$\text{Area} = \frac{25\sqrt{3}}{2} \text{ cm}^2$$

$$\text{Area} = \frac{1}{2} (10)(5\sqrt{3}) \sin(150)$$

$$\text{Area} = \frac{25\sqrt{3}}{2} \text{ cm}^2$$

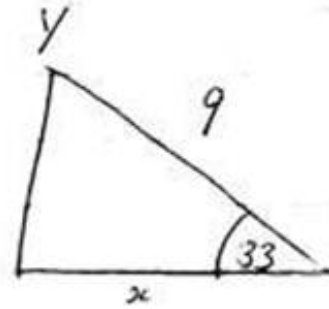
• Q6



$$\cos 33 = \frac{x}{9}$$

$$\cos(33) \times 9 = x$$

$$7.548 = x$$



$$x = 7.548$$

$$18 - 2(7.548) = 2.9 \text{ m}$$

Q7

(i) $[-4, 4]$

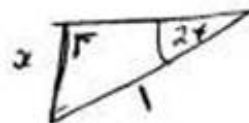
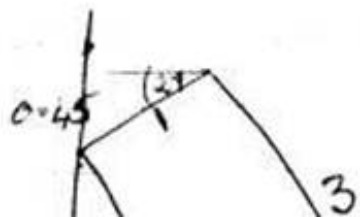
(ii) Period = π

(iii) $g(\pi) = -4$

(iv) $f(x) = 2 \sin 2x$
 $g(x) = 4 \cos x$

(v) $(\frac{5\pi}{4}, 2)$

Q8

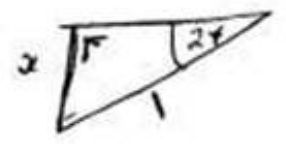
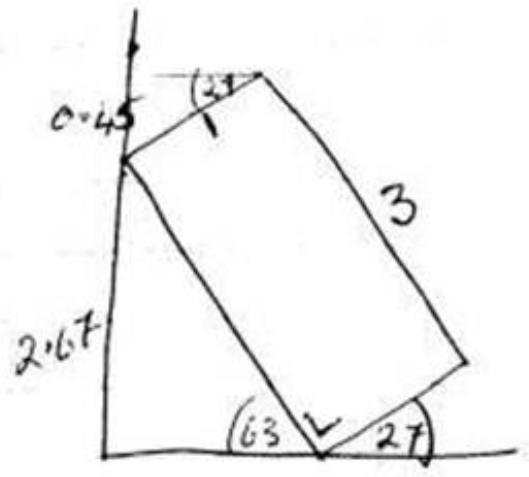


$$\sin 2\alpha = \frac{x}{1}$$

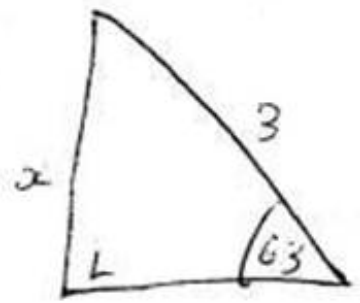
$$\sin 2\alpha = x$$

$$0.454 = x$$

Q8



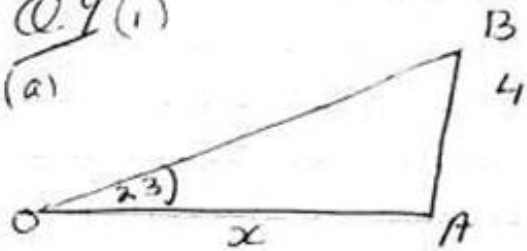
$$\begin{aligned}\sin 27 &= \frac{x}{1} \\ \sin 27 &= x \\ 0.454 &= x\end{aligned}$$



$$\begin{aligned}\sin 63 &= \frac{x}{3} \\ \sin(63) \times 3 &= x \\ 2.673 &= x\end{aligned}$$

$$\begin{aligned}2.673 + 0.454 \\ = 3.127\text{m} \quad = 3.13\text{m}.\end{aligned}$$

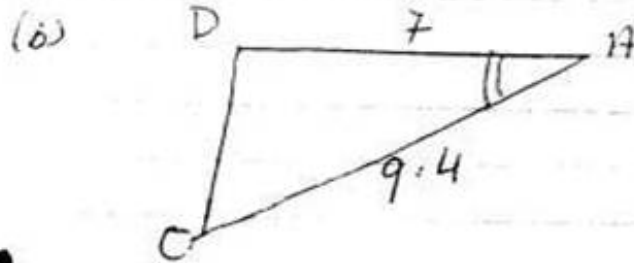
Q.9 (i)



$$\tan 23 = \frac{4}{x}$$

$$x = \frac{4}{\tan 23}$$

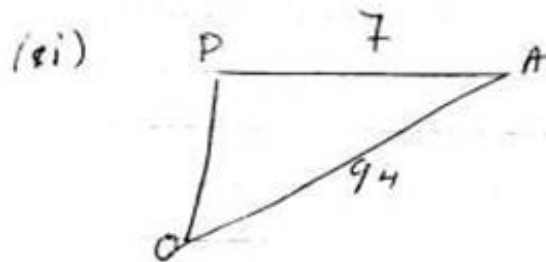
$$x = 9.4 \text{ m}$$



$$\cos \theta = \frac{7}{9.4}$$

$$\theta = \cos^{-1}\left(\frac{7}{9.4}\right)$$

$$\theta = 42^\circ$$



$$(9.4)^2 = (7)^2 + x^2$$

$$(9.4)^2 - (7)^2 = x^2$$

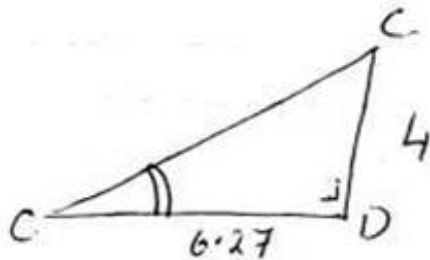
$$39.36 = x^2$$

$$6.27 = x$$

$$\tan \theta = \frac{4}{6.27}$$

$$\theta = \tan^{-1}\left(\frac{4}{6.27}\right)$$

$$\theta = 32.5^\circ$$



\Rightarrow No, does not have "satisfactory viewing"

$$\checkmark \frac{010}{(1)}$$

$$\cos 3\theta = \frac{\sqrt{3}}{2} \quad (\text{radians})$$



ref angle is $\frac{\pi}{6}$

$$\text{Sols: (i) } \frac{\pi}{6}$$

$$(2) \quad 2\pi - \frac{\pi}{6} = \frac{11\pi}{6}$$

$$\text{General Sol: (i) } 3\theta = \frac{\pi}{6} + 2n\pi$$

$$(2) \quad 3\theta = \frac{11\pi}{6} + 2n\pi$$

$$\Rightarrow \theta = \frac{\pi}{18} + \frac{2}{3}n\pi$$

$$\Rightarrow \theta = \frac{11\pi}{18} + \frac{2}{3}n\pi$$

$$(ii) \quad \text{Area} = \frac{1}{2} r^2 \theta$$

$$\begin{aligned} \text{Green Area} &= \frac{1}{2} (4)^2 (2\pi - \theta) \\ &= 8(2\pi - \theta) \end{aligned}$$

$$\Rightarrow \theta = \frac{\pi}{18} + \frac{2}{3}n\pi$$

$$\Rightarrow \theta = \frac{11\pi}{18} + \frac{2}{3}n\pi$$

(ii) Area = $\frac{1}{2}r^2\theta$

$$\begin{aligned}\text{Green Area} &= \frac{1}{2}(4)^2(2\pi - \theta) \\ &= 8(2\pi - \theta) \\ &= 16\pi - 8\theta\end{aligned}$$

$$\begin{aligned}\text{Yellow Area} &= \frac{1}{2}(6)^2\theta - \frac{1}{2}(4)^2\theta \\ &= 18\theta - 8\theta = 10\theta\end{aligned}$$

Areas are equal $\Rightarrow 16\pi - 8\theta = 10\theta$

$$16\pi = 18\theta$$

$$\frac{16\pi}{18} = \theta$$

$$\frac{8\pi}{9} = \theta$$