

Date

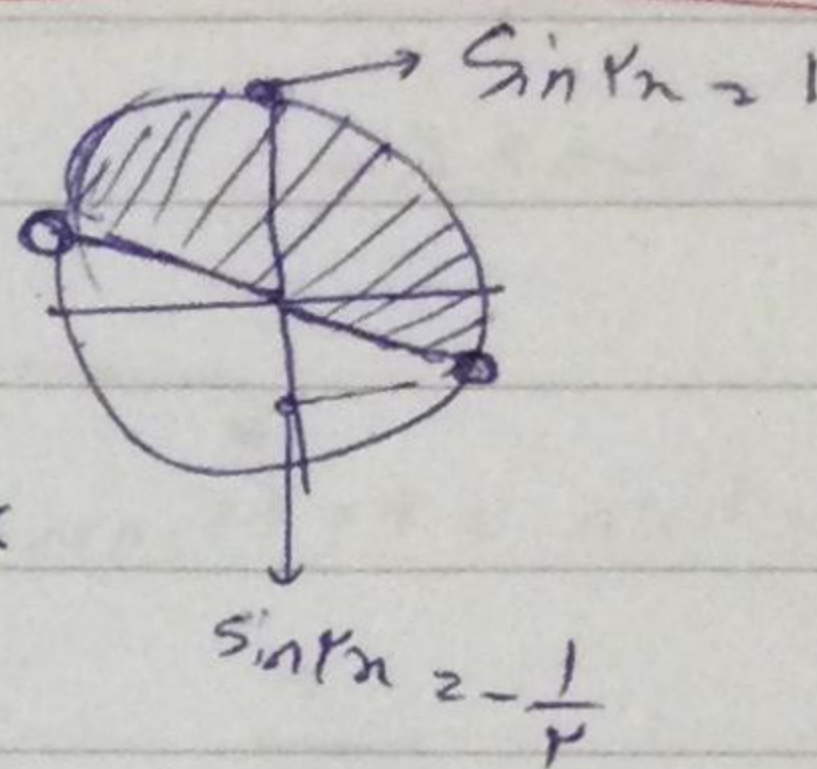
No

$$1 - \cot \alpha = \frac{\cos \alpha}{\sqrt{1 - \cos^2 \alpha}} = \frac{\cos \alpha}{\sqrt{\sin^2 \alpha}} \Rightarrow \frac{\cos \alpha}{\sin \alpha} = \frac{\cos \alpha}{|\sin \alpha|} \Rightarrow \sin \alpha > 0 \quad (1)$$

$$\frac{1}{\sqrt{\cos^2 \alpha}} = \frac{1}{\cos \alpha} = \frac{1 - \sin \alpha}{|\cos \alpha|} \rightarrow \frac{1}{|\cos \alpha|} = \frac{\sin \alpha}{\cos \alpha} = \frac{1 - \sin \alpha}{|\cos \alpha|} \rightarrow \frac{\sin \alpha}{\cos \alpha} = \frac{\sin \alpha}{|\cos \alpha|} \Rightarrow \cos \alpha > 0 \quad (2)$$

(1) & (2) \rightarrow α is in Q1

$$2 - \sin^2 \alpha = \frac{m-1}{r} \quad -\frac{\pi}{r} < \alpha < \frac{\pi}{r} \Rightarrow -\frac{\pi}{r} < r\alpha < \frac{\pi}{r}$$

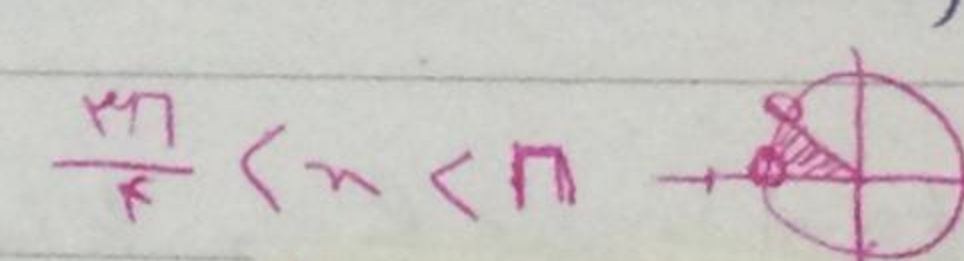


$$\rightarrow -\frac{1}{r} < \sin r\alpha \leq 1 \Rightarrow -\frac{1}{r} < \frac{m-1}{r} \leq 1 \Rightarrow -r < m-1 \leq r$$

$$\Rightarrow -1 < m \leq 1$$

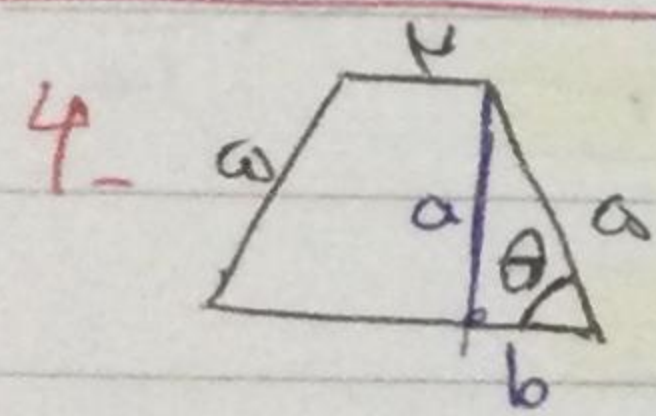
$$3 - \tan \alpha + \cot \alpha = -r$$

$$\frac{\sin \alpha}{\cos \alpha} + \frac{\cos \alpha}{\sin \alpha} = -r \Rightarrow \frac{1}{\sin \alpha \cos \alpha} = -r \Rightarrow \sin \alpha \cos \alpha = -\frac{1}{r}$$



$$(\sin \alpha + \cos \alpha)^2 = \sin^2 \alpha + \cos^2 \alpha + 2 \sin \alpha \cos \alpha = 1 - \frac{2}{r} \Rightarrow |\sin \alpha + \cos \alpha| = \sqrt{1 - \frac{2}{r}} \Rightarrow \sin \alpha + \cos \alpha = -\frac{\sqrt{r-2}}{r}$$

$$\Rightarrow A = \frac{1}{-\frac{\sqrt{r-2}}{r} \times \frac{r}{r}} = \frac{r}{r-2}$$



$$\cos \theta = 0.4 = \frac{b}{a} = \frac{4}{10} \Rightarrow b = 4$$

$$\sin \theta = 0.8 = \frac{a}{a} = \frac{8}{10} \Rightarrow a = 10$$

$$S_{\text{triangle}} = \frac{(4+10) \times 4}{2} = \frac{14 \times 4}{2} = 28$$

$$5 - \tan\left(\frac{\pi}{4} + \alpha\right) \tan\left(-\frac{\pi}{4}\right) - \sin\left(\frac{\pi}{4} + \alpha\right) \cos\left(\frac{\pi}{4} - \alpha\right) = -\cot 10 \tan 10 - \sin 10 (-\sin 10)$$

$$\Rightarrow -1 + \sin^2 10 = -1 + 1 - \cos^2 10 = -\cos^2 10 \Rightarrow k = -1$$

$$6 - A = \sqrt{r} \cos(110) \sin(140) - \sqrt{r} \sin(100) \cos(140)$$

$$\Rightarrow \sqrt{r} \times \frac{\sqrt{r}}{r} \times (-\cos 10) - \sqrt{r} \times \frac{\sqrt{r}}{r} \times \cos 10 = -\frac{r}{r} \cos 10 + \cos 10 = -\cos 10$$

$$\Rightarrow \frac{A}{\cos 10} = \frac{1}{r}$$

$$7. f(n) = 14 \cos^2(4n) \cos^2(8n) \cos^2(12n) \cos^2(16n) \quad r \cos \alpha = 1 + \cos 2\alpha$$

$$\rightarrow f(n) = (1 + \cos(4n))(1 + \cos(8n))(1 + \cos(12n))(1 + \cos(16n))$$

$$\Rightarrow f\left(\frac{\pi}{4}\right) = 16 \left(1 + \cos \frac{\pi}{4}\right) \left(\cos^2 \frac{\pi}{4}\right) \left(-\cos^2 \frac{\pi}{4}\right) \left(\cos^2 \frac{\pi}{4}\right) = 16 \left(1 + \frac{\sqrt{2}}{2}\right) \left(\frac{1}{2}\right) \left(-\frac{1}{2}\right) \left(\frac{1}{2}\right) = \frac{16\sqrt{2} + 9}{14}$$

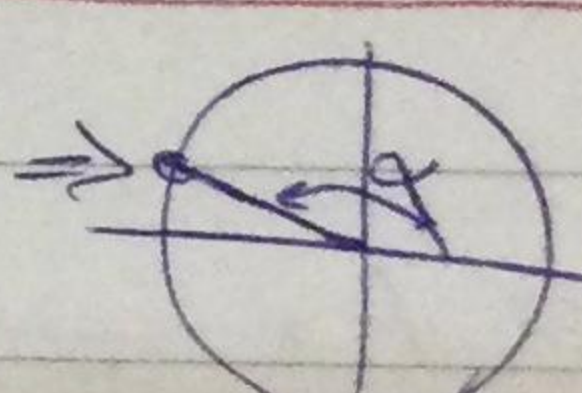
$$8. \sin n < 0, \cos n < 0 \quad \frac{1 - \sin n}{1 + \sin n} = \frac{k}{1} \quad \tan \frac{n}{r}$$

$$1 - \sin n = k + k \sin n \Rightarrow \frac{k}{a} = \sin n \Rightarrow \cos n = \sqrt{1 - \frac{k^2}{a^2}} = -\frac{k}{a}$$

$$\tan \frac{n}{r} = \frac{\sin n}{1 + \cos n} = \frac{-\frac{k}{a}}{1 - \frac{k}{a}} = -k$$

$$9. \frac{\sin \theta}{1 - \cos \theta} + \frac{1 + \cos \theta}{\sin \theta} = k \cot \frac{\theta}{r}$$

$$\cot \frac{\theta}{r} + \cot \frac{\theta}{r} = k \cot \frac{\theta}{r} \Rightarrow k = 2$$

$$10. \sin \alpha = \frac{\sqrt{r}}{10} \quad \sin \alpha > 0 \quad \cos \alpha < 0 \Rightarrow \cos \alpha = \sqrt{1 - \frac{r}{100}} = \frac{\sqrt{9r}}{10}$$


$$\cos\left(\frac{11\pi}{r} + \alpha\right) = \cos\left(\frac{11\pi}{r} + \alpha\right) = \cos \frac{11\pi}{r} \cos \alpha - \sin \frac{11\pi}{r} \sin \alpha = -\frac{\sqrt{r}}{r} \times \frac{\sqrt{9r}}{10} - \frac{\sqrt{r}}{r} \times \frac{\sqrt{r}}{10}$$

$$\rightarrow \frac{1r}{r_0} - \frac{r}{r_0} = \frac{1r}{r_0} = \frac{r}{a}$$