

$$\frac{\text{Rad}}{\pi} = \frac{D}{1\lambda.}$$

(1)

$$\text{ا) } \frac{\text{Rad}}{\pi} = \frac{2V}{1\lambda.} = \frac{9 \cancel{\lambda} \times \pi}{1. \cancel{\lambda}.} = \frac{9}{1.} \pi$$

✓

$$\text{ب) } \frac{120}{1\lambda.} \approx \frac{\text{Rad}}{\pi} = \frac{10 \cancel{\lambda} \pi}{1. \cancel{\lambda}.} = \frac{10}{1.} \pi$$

$$\text{ج) } \frac{\frac{d\pi}{12}}{\pi} = \frac{D}{1\lambda.} \Rightarrow \frac{d}{1} \times \frac{1}{12} = \frac{D}{1\lambda.}$$

$$\text{د) } \frac{\frac{\varepsilon \pi}{9}}{\pi} = \frac{D}{1\lambda.} \Rightarrow \frac{\varepsilon}{9} \times \frac{1}{1} = \frac{D}{1\lambda.}$$

$$\frac{G}{1.} = \frac{D}{1\lambda.} = \frac{\text{Rad}}{\pi}$$

(2)

$$\frac{120a}{9} = \frac{D}{1\lambda.} \quad \frac{1\lambda. \times 120a}{1 \times 1} = \frac{120}{1} = 120a$$

✓

$$\frac{\frac{a \times}{1}}{1} = \frac{D}{1\lambda.} \Rightarrow D = \frac{1\lambda. \times a}{1 \times 1} = 1\lambda. a$$

$$a (1 + \cancel{r \cos \epsilon_d} + \cancel{r \sin \epsilon_d}) = 1 \lambda$$

$$a = \frac{1 \lambda}{\epsilon_d} = \epsilon^\circ$$

$$\text{و) } \cos \tau \cdot \cancel{\cos r} \cdot \cancel{\sin r} \cdot \cancel{\cos \epsilon_d} + \cancel{\sin \tau} \cdot \cancel{\sin r} \cdot \tan \epsilon_d + r \cot \epsilon_d \quad (3)$$

$$-1 + r = 1 \quad (1)$$

$$\text{ب) } \frac{\frac{1}{r} \cancel{\tan r} + \cancel{\tan \epsilon_d} + \cancel{\tan r}}{\cancel{\cot r} - \cancel{\cot \epsilon_d}} = \frac{\frac{1}{r}}{\frac{r \sqrt{r}}{r}} = \frac{1}{\sqrt{r}} \quad (4)$$

$\theta < \alpha$

$$-\sin r \cdot \cos \alpha + \cos r \cdot \sin \alpha = \sin \theta \quad (5)$$

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

$$\tan \theta = 1 \quad (2) \quad \checkmark$$

$$\epsilon_d = \theta$$

$$\frac{\frac{1}{r} \cancel{\tan r} (1 - \cancel{\tan r})}{(1 - \cancel{\cot \alpha})} = \frac{\frac{r \sqrt{r}}{r}}{\frac{r}{r}} = \sqrt{r} = \tan \theta \quad (6)$$

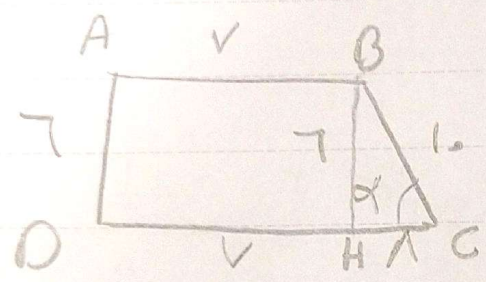
$\theta < \alpha$

$$\theta = \alpha = \frac{\pi}{4} \quad (3) \quad \checkmark$$

4

$$\frac{r \sin \theta - \cos \theta}{\sin \theta - \epsilon \cos \theta} \rightarrow \frac{\frac{r \sin \theta}{\cos \theta} - \frac{\cos \theta}{\cos \theta}}{\frac{\sin \theta}{\cos \theta} - \frac{\epsilon \cos \theta}{\cos \theta}}$$

$$\frac{r \times \Delta - 1}{\Delta - \epsilon} = \boxed{1 \epsilon} \quad \textcircled{r} \checkmark$$



$$\sin \alpha = \frac{r}{l} =$$

$$\sin \alpha = \frac{BH}{BC}$$

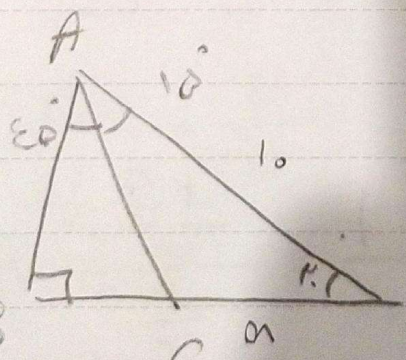
$$\frac{r}{l} = \frac{r}{BC} \Rightarrow BC = l.$$

$\textcircled{r} \checkmark$

$$CH = \sqrt{l^2 - r^2} = \Delta$$

$$P = \cancel{7 + r \times \frac{1}{r}} + \Delta + l = \boxed{r \Delta}$$

✓



$$\sin \epsilon = \frac{\sqrt{r}}{r}$$

$$\sin \epsilon = \frac{BD}{AD}$$

$$\frac{AB}{AD} = \cos \epsilon \Rightarrow \frac{AB}{l} = \frac{1}{r} \Rightarrow AB = \Delta$$

$$\frac{\sqrt{r}}{r} = \frac{BD}{l} \Rightarrow BD = \Delta \sqrt{r}$$

$$\tan \epsilon = \frac{BC}{AB} = 1$$

$$BC = \Delta$$

$$CD = \Delta (\sqrt{r} - 1) \quad \textcircled{r} \checkmark$$



9

الف (نصفی دوم)

ب (نصفی دوم)

✓ ۲

10

$$\tan \alpha = \frac{1}{3} \Rightarrow \cot \alpha = 3$$

$$1 + \cot^2 \alpha = \frac{1}{\sin^2 \alpha} \Rightarrow 1 + 9 = \frac{1}{\sin^2 \alpha} \Rightarrow \sin^2 \alpha = \frac{1}{10}$$

$$\sin \alpha = -\frac{\sqrt{10}}{10}$$

✓ ۲