

الف) $\frac{rV^\circ}{180} = \frac{\text{Rad}}{\pi} \Rightarrow \text{Rad} = \frac{rV \times \pi}{\frac{180}{r_0}} = \frac{r\pi}{r_0} \text{ rad}$ $\frac{r}{r_0} = \frac{\text{Rad}}{\pi} = \frac{D}{180}$

ب) $\frac{40}{r_0} \times \frac{\pi}{\frac{180}{r_4}} = \boxed{\frac{r_0 \pi}{r_4}}$

ج) $\frac{\Delta \pi}{\frac{18}{\pi}} \text{ rad} = \frac{D}{180} \Rightarrow D = \frac{180 \times \Delta \pi}{18} = \boxed{10^\circ}$

د) $\frac{r\pi}{18} \times \frac{180}{\pi} = \boxed{10^\circ}$

$\frac{10a^\circ}{\alpha_1}$ و $\frac{120a}{9} \times \frac{180}{r_0} = \frac{120a^\circ}{\alpha_r}$ و $\frac{a\pi}{1} \times \frac{180}{\pi} = \frac{120a^\circ}{\alpha_r}$

$\alpha_1 + \alpha_r + \alpha_r = 180^\circ \Rightarrow 10a^\circ + 120a^\circ + 120a^\circ = 180a^\circ \Rightarrow 180a^\circ = 180^\circ \Rightarrow$

$a = \frac{180^\circ}{180} = \boxed{1}$

الف) $\cos 90^\circ \cos 30^\circ - \sin 30^\circ \sin 90^\circ - \tan 45^\circ + 2 \cot 45^\circ =$
 $(\frac{1}{r} \times \frac{\sqrt{r}}{r}) - (\frac{1}{r} \times \frac{\sqrt{r}}{r}) - (1) + 2(1) = 2 - 1 = \boxed{1}$

ب) $(\frac{1}{\sqrt{r}})^r + 1^r + (\sqrt{r})^r = \frac{1}{r} + 1 + r = \frac{1+r}{r} = \frac{1+r \times \sqrt{r}}{r \times r} = \boxed{\frac{1+r\sqrt{r}}{r}}$
 $\frac{1}{\sqrt{r}} - \frac{1}{\sqrt{r}} = \frac{r-1}{\sqrt{r}} = \frac{r}{\sqrt{r}}$

$-(\frac{1}{r} \times \frac{1}{r}) + (\frac{\sqrt{r}}{r} \times \frac{\sqrt{r}}{r}) = \sin^2 \theta \Rightarrow \frac{r}{r} - \frac{1}{r} = \frac{r-1}{r} = \frac{r}{r} = \frac{1}{r} = \sin^2 \theta \Rightarrow$
 $\sin^2 \theta = \frac{1}{r} \Rightarrow \sin \theta = \frac{1}{\sqrt{r}} = \frac{\sqrt{r}}{r} \Rightarrow \tan \theta = \frac{\sin \theta}{\cos \theta} \Rightarrow$

$\cos^2 \theta = 1 - \sin^2 \theta \Rightarrow \cos \theta = \sqrt{1 - \frac{1}{r}} = \sqrt{\frac{r-1}{r}} = \frac{\sqrt{r-1}}{\sqrt{r}} \Rightarrow$
 $\tan \theta = \frac{\frac{\sqrt{r}}{r}}{\frac{\sqrt{r-1}}{\sqrt{r}}} = \boxed{1} \Rightarrow \theta = 45^\circ$

$(r \times (\frac{1}{\sqrt{r}})(1 - (\frac{1}{\sqrt{r}})^r)) \Rightarrow \frac{r}{\sqrt{r}} \times \frac{r}{r} = \frac{r}{1 \times \sqrt{r}}$

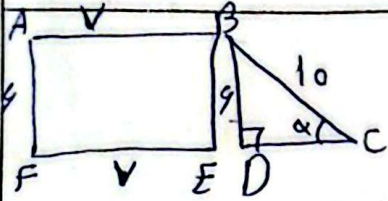
$(1 - (\frac{1}{\sqrt{r}})^r)^r = (1 - \frac{1}{r})^r = \frac{r}{r}$ $\frac{r}{\sqrt{r}} = \sqrt{r} \Rightarrow$

$\tan \theta = \sqrt{r} \Rightarrow \theta = 60^\circ \Rightarrow 60^\circ = \boxed{\frac{\pi}{3} \text{ rad}}$

$$\tan \theta = \omega \Rightarrow \sin \theta = \omega \cos \theta \Rightarrow$$

$$\frac{r \sin \theta - \cos \theta}{\sin \theta - r \cos \theta} = \frac{r(\omega \cos \theta) - \cos \theta}{\omega \cos \theta - r \cos \theta} = \frac{\omega \cos \theta - \cos \theta}{\omega \cos \theta - r \cos \theta} \Rightarrow$$

$$\frac{\omega \cos \theta - \cos \theta}{\omega \cos \theta - r \cos \theta} = \frac{1r \cos \theta}{\cos \theta} = \boxed{1r} \quad (2) \quad \checkmark$$



$$\sin \alpha \times \text{وتر} = 10 \sin \alpha = 4 \Rightarrow \sin \alpha = \frac{4}{10} \Rightarrow$$

$$BD = AF = 4 \Rightarrow BC^2 = BD^2 + DC^2 \Rightarrow$$

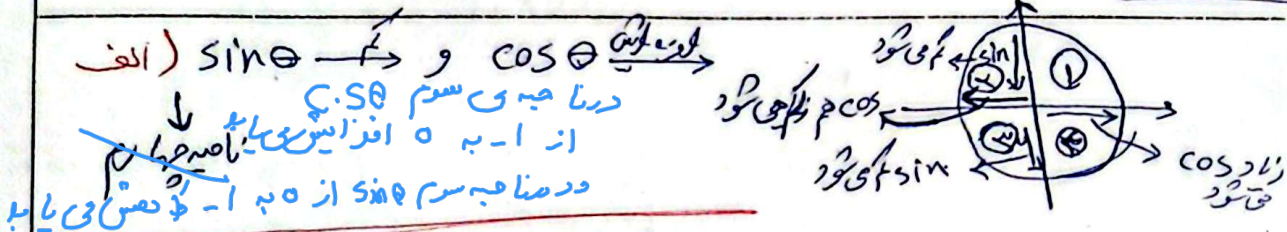
$$DC = \sqrt{10^2 - 4^2} = \sqrt{4^2} = 4 \Rightarrow FC = 10 \Rightarrow$$

$$\text{مجموعه} = 10 + 4 + 4 + 10 = \boxed{38} \quad (2) \quad \checkmark$$

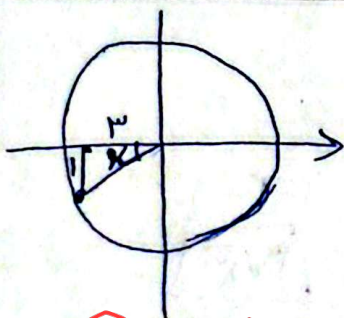
$$\left. \begin{array}{l} \cos 40^\circ \times \text{وتر} = AB \Rightarrow \cos 40^\circ \times AC = AB \\ \hat{A} = 40^\circ \Rightarrow \hat{D} = 30^\circ \Rightarrow \sin 30^\circ \times 10 = AB \end{array} \right\} \Rightarrow \frac{\sqrt{r} AC}{r} = \omega \Rightarrow AC = \frac{10\sqrt{r}}{r} = \omega \sqrt{r}$$

$$\sin 40^\circ \times \text{وتر} = BC \Rightarrow \frac{\sqrt{r}}{r} \times \omega \sqrt{r} = \omega \Rightarrow \boxed{BC = \omega} \Rightarrow BD = \sin 40^\circ \times 10 = \frac{10\sqrt{r}}{r}$$

$$\Rightarrow BD - BC = CD \Rightarrow \omega \sqrt{r} - \omega = DC = \omega(\sqrt{r} - 1) \Rightarrow \boxed{DC = \omega(\sqrt{r} - 1)}$$



ب) $\sin \theta$ و $\cos \theta$ هر دو مثبت یا هر دو منفی
در ربع اول و سوم



$$\tan \alpha = \frac{\sin \alpha}{\cos \alpha} = \frac{1}{3} \Rightarrow \sin \alpha = \frac{1}{\sqrt{10}} \quad \text{و} \quad \cos \alpha = \frac{3}{\sqrt{10}}$$

$$\text{وتر} = \sqrt{3^2 + 1^2} = \sqrt{10} \Rightarrow$$

$$\sin \alpha = -\frac{1}{\sqrt{10}} = -\frac{\sqrt{10}}{10} \quad (\text{منفی چون در ربع سوم})$$

$$(2) \quad \checkmark$$