

۲۷ مسئله

اصغر مساحت

$$S = \sqrt{r} \times 4 \times \frac{1}{r} \times \sin \alpha = \varepsilon, d \quad .1$$

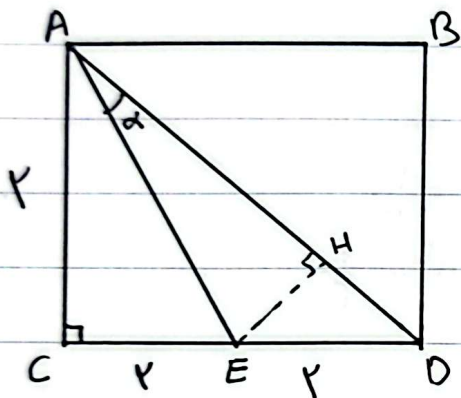
$$\hookrightarrow \sin \alpha = \frac{\varepsilon, d}{\frac{4}{\sqrt{r}}} = \frac{1, d}{\sqrt{r}} = \frac{\sqrt{r}}{r}$$

$$0 < \alpha < 180 \rightarrow \alpha_{\min} = 4. \quad \alpha_{\max} = 12.$$

$$\hookrightarrow \frac{r}{r}$$

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$$\Rightarrow \frac{\frac{r}{r}}{\frac{r}{r}} = \frac{12}{4} = 2 \quad \text{برابر}$$



$$AC^2 = DC^2 + AD^2 = 16 + 16 = 32 \quad .2$$

$$AC = \sqrt{32}$$

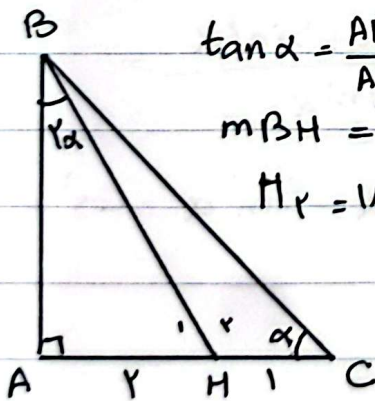
$$S_{ADE} = S_{ACD} - S_{ACE}$$

$$\hookrightarrow r - r = r$$

$$S_{ADE} = \frac{HE \times AD}{r} = r \rightarrow HE \times AC = \varepsilon \rightarrow HE = \frac{\varepsilon}{\sqrt{32}}$$

$$HE = \frac{r}{\sqrt{2}} = 0,5\sqrt{2} \quad AH^2 + HE^2 = AE^2 \rightarrow AH^2 + 0,5 = 1 \rightarrow AH = 0,5\sqrt{2}$$

$$\cot \alpha = \frac{AH}{HE} = \frac{0,5\sqrt{2}}{0,5\sqrt{2}} = \sqrt{\frac{1}{1}} = \sqrt{1} = 1$$



$$\tan \alpha = \frac{AB}{AC} = \frac{AB}{r} \rightarrow AB = r \tan \alpha \quad .3$$

$$\tan \alpha_r = \tan \alpha \Rightarrow \frac{AB}{AG} = \frac{r \tan \alpha}{r}$$

$$H_r = 11 - H_1 \rightarrow H_r = 11 - 11 + 9 + 2\alpha = 9 - 2\alpha$$

$$\tan H_r = \tan(9 - 2\alpha) = \cot 2\alpha$$

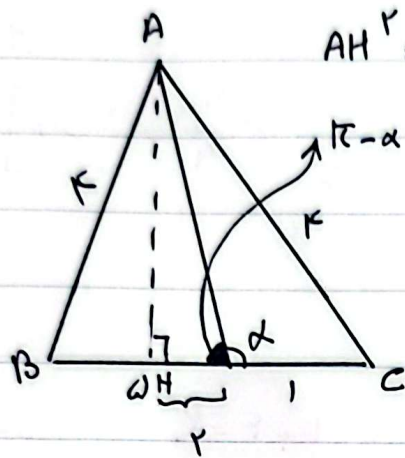
$$\hookrightarrow \cot 2\alpha = \frac{\cot^2 \alpha - 1}{2 \cot \alpha} \rightarrow \frac{r \tan \alpha}{r} = \frac{\cot^2 \alpha - 1}{2 \cot \alpha}$$

$$\hookrightarrow \cot \alpha = 1$$

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الطیر ماری



$$AH^2 = 14 - 9 = 5 \rightarrow AH = \sqrt{5}$$

.4

$$\tan(\pi - \alpha) = \frac{\sqrt{5}}{r} \rightarrow \tan(\alpha) = -\frac{\sqrt{5}}{r}$$

$$\sin^2 \alpha + \sin^2 \alpha + \cos^2 \alpha = \frac{r}{r} \rightarrow \sin^2 \alpha = \frac{1}{r}$$

.5

$$\cot^2 \alpha + 1 = \frac{1}{\sin^2 \alpha} - 1 \rightarrow \cot^2 \alpha = r \rightarrow \tan^2 \alpha = \frac{1}{r}$$

$$\frac{\sin^2 \alpha + \epsilon \cos^2 \alpha}{1 + \cos^2 \alpha} = \frac{\cos^2 \alpha + \epsilon \sin^2 \alpha}{1 + \sin^2 \alpha}$$

.6

$$(\cos^2 \alpha)^r = (1 - \sin^2 \alpha)^r \quad (\sin^2 \alpha)^r = (1 - \cos^2 \alpha)^r = 1 + \cos^2 \alpha - r \cos^2 \alpha$$

$$1 + \sin^2 \alpha - r \sin^2 \alpha$$

$$\frac{1 + \cos^2 \alpha - r \cos^2 \alpha + r \cos^2 \alpha}{1 + \cos^2 \alpha} = \frac{1 + r \sin^2 \alpha + \sin^2 \alpha}{1 + \sin^2 \alpha} =$$

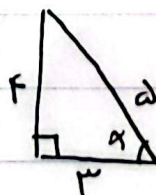
$$\rightarrow 1 + \cos^2 \alpha - (1 + \sin^2 \alpha) = \cos^2 \alpha - \sin^2 \alpha = \cos^2 \alpha$$

$$\cos\left(\frac{\sqrt{r}}{r} \alpha\right) = -\sin \alpha$$

.7

$$-\tan\left(\alpha - \frac{\sqrt{r}}{r} \alpha\right) = \cot \alpha \Rightarrow \left(-\frac{\sqrt{r}}{r}\right) \alpha \left(\frac{\epsilon}{\alpha}\right) + \frac{\sqrt{r}}{r} = 0 \text{ or } \sqrt{r}$$

$$\sin\left(\frac{\sqrt{r}}{r} \alpha + \alpha\right) = \cos \alpha$$



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$$\left( \sqrt{r} \cos \frac{\pi}{4} + \sqrt{r} \sin \pi - \sqrt{r} \cos \pi \right) \quad .8$$

$$\downarrow \quad \downarrow$$

$$\frac{1}{\sqrt{r}} \quad \sqrt{r} (\sin \pi - \cos \pi)$$

$$\left. \begin{array}{l} \sqrt{r} \sin \left( \pi - \frac{\pi}{4} \right) \Rightarrow -\frac{\pi}{4} \end{array} \right\} \frac{r}{r} - 1 = \left[ \frac{1}{r} \right]$$

$$\tan\left(\frac{\alpha}{r}\right) = \frac{1}{\varepsilon} \quad .9$$

$$\rightarrow \tan \alpha = \frac{r \tan\left(\frac{\alpha}{r}\right)}{1 - \tan^2\left(\frac{\alpha}{r}\right)} = \frac{r \times \frac{1}{\varepsilon}}{1 - \left(\frac{1}{\varepsilon}\right)^2} = \frac{14}{r} = \frac{1}{12}$$

$$1 + \tan^2 r = \frac{1}{\cos^2 r} \rightarrow 1 + \frac{4\varepsilon}{r^2} = \frac{r^2 + 4\varepsilon}{r^2} \rightarrow \cos = \frac{12}{14}$$

$$1 + \cot^2 r = \frac{1}{\sin^2 r} \rightarrow 1 + \frac{r^2}{4\varepsilon} = \frac{r^2 + 4\varepsilon}{4\varepsilon} \rightarrow \sin = \frac{1}{14}$$

$$\frac{\tan \alpha - \sin \alpha}{\sin \alpha - \cos \alpha} = \frac{\frac{1}{12} - \frac{1}{14}}{\frac{1}{14} - \frac{12}{14}} = -\frac{r^2}{14 \wedge 12} \xrightarrow{\text{تقریباً}} -0,12$$

$$\frac{\cot \alpha}{\sin \alpha} \rightarrow \frac{\cos / \sin}{\sin} \Rightarrow \frac{\cos}{\sin^2} \rightarrow \cos \rightarrow .10$$

$$r \sin \langle \sin \alpha \rightarrow r \sin \varepsilon \langle \sin \alpha \rightarrow \sqrt{r} \langle 1 \rangle \left. \vphantom{\frac{\cot \alpha}{\sin \alpha}} \right\} \text{بمعنى}$$

الطريق الثاني  $\frac{1}{14}$  كالتالي