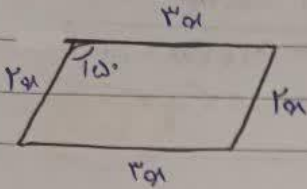


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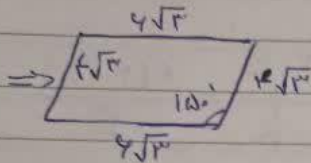


$$S = 2a \times 2a \times \sin 15^\circ = 4a^2 \times \frac{1}{4} = a^2$$

متوازی
المساحت

$$\Rightarrow a^2 = 9 \times 2 \Rightarrow a = \sqrt{18} = 3\sqrt{2}$$

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متوازی
المساحت

$$= 4\sqrt{3} + 4\sqrt{3} + 4\sqrt{3} + 4\sqrt{3} = 16\sqrt{3}$$

۳۰, ۳۲

مساحت هر دو مثلث را بر حسب سینوس زاویه A من نویسیم؛ طبق تریگون

$$S_{\triangle ABC} - S_{\triangle ADE} = 1, \forall \Rightarrow \frac{1}{2} AB \times AC \times \sin \hat{A} - \frac{1}{2} AD \times AE \times \sin \hat{A} = 1 + \frac{2}{3}$$

$$\Rightarrow \frac{1}{2} \times 5 \times 5 \times \sin \hat{A} - \frac{1}{2} \times 4 \times 4 \times \sin \hat{A} = \frac{5}{3} \Rightarrow 5 \sin \hat{A} - 8 \sin \hat{A} = \frac{5}{3}$$

$$\Rightarrow 5 \sin \hat{A} = \frac{5}{3} \Rightarrow \sin \hat{A} = \frac{1}{3} \Rightarrow \hat{A} = \frac{\pi}{6} = 30^\circ$$

$$\tan \hat{A} = \tan \frac{\pi}{6} = \frac{\sqrt{3}}{3} \quad \checkmark$$

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

$$\Rightarrow \frac{-\sin \alpha}{\cos \alpha} = \frac{\sin \alpha}{|\cos \alpha|} \Rightarrow |\cos \alpha| = -\cos \alpha \Rightarrow \cos \alpha < 0$$

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\Rightarrow در ناموسم α قرار دارد \checkmark

$$\frac{|\sin \alpha|}{\cos \alpha} = \frac{-\sin \alpha}{\cos \alpha} \Rightarrow |\sin \alpha| = -\sin \alpha \Rightarrow \sin \alpha < 0$$

$$\left\{ \begin{array}{l} (2, 0) \\ (0, 1) \end{array} \right. \Rightarrow m = \frac{1 \cdot 0 - 0}{0 - 2} = \frac{-2}{-2} = 1 \Rightarrow \tan \alpha = \frac{-2}{-2} = 1$$

$$\tan\left(\frac{\pi}{4} - \alpha\right) = \cot \alpha = \frac{-2}{-2} = 1 \quad \checkmark$$

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$$\frac{r \cos(\pi - \alpha) - r \sin(\alpha - \pi)}{\sin(r, r') - \cos(r, r')} = \frac{r \cos(\pi - \alpha) - r \sin(\alpha - \pi)}{\sin(\alpha + \pi) - \cos(\pi - \alpha)}$$

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

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

(۴) (۵)

$$\frac{\sin(\frac{\pi}{2} + \alpha) - \sin(\alpha - \pi)}{|\tan \alpha - 1|} = \frac{\cos \alpha + \sin \alpha}{|\tan \alpha - 1|} = \frac{\frac{r}{\sqrt{a}} - \frac{\sqrt{a}}{r}}{\frac{a}{r} - 1} = \frac{r - \sqrt{a}}{\sqrt{a} - r} = \frac{r - \sqrt{a}}{\sqrt{a} - r}$$

$$\sin(\alpha - \pi) = -\sin \alpha \qquad \sin^2 \alpha = 1 - \cos^2 \alpha = 1 - \frac{a}{r^2} = \frac{r^2 - a}{r^2}$$

چون انتهای کمان α در ربع سوم قرار دارد پس $\sin \alpha < 0$ یعنی $\sin \alpha = -\frac{\sqrt{a}}{r}$

$$\tan \alpha = \frac{\sin \alpha}{\cos \alpha} = \frac{-\frac{\sqrt{a}}{r}}{\frac{r}{\sqrt{a}}} = -\frac{\sqrt{a}}{r}$$

(۴) (۶)

$$\sin \alpha = r \cos \alpha \Rightarrow \sin^2 \alpha = r^2 \cos^2 \alpha$$

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

زیرا انتهای کمان α در ربع سوم قرار دارد $\Rightarrow \cos \alpha = -\frac{1}{\sqrt{a}}$ ✓
 $\Rightarrow \begin{cases} \cos \alpha = -\frac{1}{\sqrt{a}} \checkmark \\ \cos \alpha = \frac{1}{\sqrt{a}} \times \end{cases} \Rightarrow \cos \alpha = -\frac{1}{\sqrt{a}} \checkmark$

(۴) (۷)

$$r_m x + (m-1)y = r^2$$

شیب خط $\tan \alpha$ برابر است؛

$$\frac{-r_m}{m-1} = \tan \alpha = \sqrt{r} \Rightarrow \sqrt{r} m^2 - \sqrt{r} = -r_m$$

اختلاف مقدار m

$$\Rightarrow \sqrt{r} m^2 + r_m - \sqrt{r} = 0 \Rightarrow |m_1 - m_2| = \frac{\sqrt{\Delta}}{|a|} = \frac{\sqrt{r^2 + r_m^2}}{\sqrt{r}} = \frac{r}{\sqrt{r}} = \frac{r\sqrt{r}}{r}$$

(۴) (۸)

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$$-\frac{\pi}{r} < \alpha < \frac{\pi}{r} \Rightarrow -\frac{\pi}{r} < -\alpha < -\frac{\pi}{r} \Rightarrow 0 < \frac{\pi}{r} - \alpha < \frac{\pi}{r} \Rightarrow \textcircled{r} \textcircled{9}$$

$$\tan\left(\frac{\pi}{r} - \alpha\right) > 0 \Rightarrow \frac{1-m}{r+m} > 0 \quad \frac{-r}{-\phi} + \frac{1}{\phi} \Rightarrow -r < m < 1 \quad \checkmark$$

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$$\tan(70^\circ) = \tan(34^\circ + 36^\circ) = -\tan(36^\circ) = -\sqrt{r}$$

$$\cos(71^\circ) = \cos(18^\circ + 53^\circ) = -\cos 53^\circ = -\frac{\sqrt{r}}{r}$$

$$10 \quad \tan(48^\circ) = \tan(12^\circ + 36^\circ) = \tan(36^\circ) = -\sqrt{r}$$

$$\sin(48^\circ) = \sin(12^\circ + 36^\circ) = \sin(36^\circ) = \frac{\sqrt{r}}{r}$$

$$\Rightarrow \tan(70^\circ) \cdot \cos(71^\circ) + \tan(48^\circ) \cdot \sin(48^\circ) \quad \textcircled{r} \textcircled{10}$$

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$$= (-\sqrt{r})\left(-\frac{\sqrt{r}}{r}\right) + (-\sqrt{r})\left(\frac{\sqrt{r}}{r}\right) = \frac{r}{r} - \frac{r}{r} = 0 \quad \checkmark$$