

سوال ۱۲

دوازدهم دختر A

۱۹,۵

نام: مبین هاشمی

$$\sin \frac{5\pi}{6} = -\frac{\sqrt{3}}{2} \quad \cos \frac{5\pi}{6} = -\frac{1}{2} \quad \sin \frac{11\pi}{6} = -\frac{1}{2} \quad \cos \frac{\pi}{6} = \frac{1}{2}$$

جواب: سوال ①

$$\frac{a(-\frac{\sqrt{3}}{2}) + b(-\frac{\sqrt{3}}{2})}{a(-\frac{1}{2}) + b(\frac{1}{2})} = \frac{-\frac{\sqrt{3}}{2}(a+b)}{-\frac{1}{2}(a-b)} = \frac{\sqrt{3}(a+b)}{(a-b)} = -\frac{\sqrt{3}}{2}$$

$$\frac{a+b}{a-b} = -\frac{1}{2} \rightarrow b-a = \frac{1}{2}a + \frac{1}{2}b \rightarrow -\frac{1}{2}a = \frac{1}{2}b \rightarrow a = -\frac{1}{2}b$$

$$\frac{b}{a} = \frac{b}{-\frac{1}{2}b} = -2 \quad \checkmark$$

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جواب سوال ۳) به ازای هر ساعت (٪ دقیقه) ۳ در عقربه ساعت شمارش می کند.

$$\frac{\pi}{9} = 2^\circ$$

2°	$K_{0 \min}$
3°	$\%_{\min}$

مابراین ساعت ۲:۴۰ می شود.

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جواب سوال ۵)

$$\frac{\pi}{6} < x \leq \frac{5\pi}{6} \Rightarrow \frac{\omega t}{6} \Rightarrow \frac{\omega}{6} < \sin x \leq 1 \rightarrow -\frac{1}{4} < \frac{m-4}{5} \leq 1$$



$$I) -\frac{1}{4} < \frac{m-4}{5} \rightarrow -1 < \frac{m-4}{5} \rightarrow -5 < m-4 \rightarrow m-4 < 5 \rightarrow m-11 < 0$$

$$m > 1 \rightarrow m > \frac{1}{4}$$

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$$m \in (-\infty, \frac{11}{4})$$

$$II) \frac{m-4}{5} \leq 1 \rightarrow m-4 \leq 5 \rightarrow m-11 \leq 0 \rightarrow m \in (-\infty, 11]$$

$$I \cap II \rightarrow \frac{1}{4} < m \leq 11 \rightarrow \text{عدد صحیح}$$

$$10.8 \times \frac{\pi}{11.0} = \frac{3\pi}{5}$$

جواب سوال ۱)

$$\frac{3\pi}{5} r_A = \frac{9\pi}{10} r_B \rightarrow r_A = \left(\frac{9\pi}{10} \times \frac{5}{3\pi} \right) r_B \rightarrow r_A = \frac{3}{2} r_B$$

$$\frac{S_A}{S_B} = \frac{\frac{9}{4} r_B^2 \pi}{r_B^2 \pi} = \frac{9}{4}$$

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جواب سوال ۴) زاویه بین عقربه های ساعت شمار و دقیقه شمار،

$$\alpha = |\omega_1 t - \omega_2 t|$$

$$\theta_0 = \left| \frac{11}{2} m - 90 \right| \Rightarrow \frac{11}{2} m - 90 = \pm \theta_0$$

$$m = \frac{140}{11} \approx 12.7$$

$$m = 20$$

عباز گذشت ۲۰ دقیقه

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جواب سوال (6) : $\frac{\sin(\frac{\pi}{p} + 1a) + k \cos(\frac{q\pi}{p} - 1a)}{\cos(\pi - 1a) + r \sin(\pi + 1a)} = \frac{\cos 1a - k \sin 1a}{-\cos 1a - r \sin 1a}$ $\xrightarrow{\text{cos و sin صحت}} \cos \div$

$$\frac{1 - k \tan 1a}{-1 - r \tan 1a} \xrightarrow{\tan 1a = \frac{1}{p}} \frac{\frac{p-k}{p}}{-\frac{r}{p}} = \frac{p-k}{r} \times \left(-\frac{r}{p}\right) \Rightarrow \frac{-1 + rk}{1r} = p$$

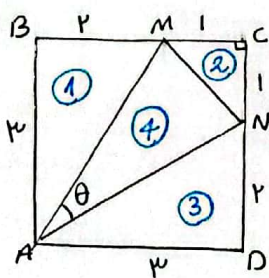
$$-1 + rk = pr \rightarrow rk = pr \rightarrow k = pr \quad \checkmark$$

جواب سوال (7) : $\frac{1 - \cos x}{1 + \cos x} = r \rightarrow 1 - \cos x = r + r \cos x$

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

$$\sin x = \pm \frac{r\sqrt{r^2-1}}{r} \xrightarrow{\text{Positive}} \frac{r\sqrt{r^2-1}}{r} \quad \tan = \frac{r\sqrt{r^2-1}}{r} \times \frac{r}{-1} = -r\sqrt{r^2-1} \quad \cot = \frac{\sqrt{r^2-1}}{r} \quad \checkmark$$

$$\frac{\tan(\frac{\pi}{p} - x) - \cot(\pi - x)}{\cot(\frac{q\pi}{p} - x) + r \tan(r\pi - x)} = \frac{\cot x + \cot x}{\tan x - r \tan x} = \frac{\frac{\sqrt{r^2-1}}{r}}{-r\sqrt{r^2-1}} = \frac{\sqrt{r^2-1}}{r} \times \frac{1}{-r\sqrt{r^2-1}} = -\frac{1}{r} \quad \checkmark$$



مساحت مربع $S = p^2 = 9$

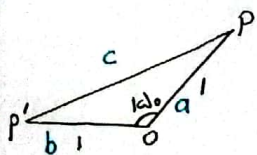
② مساحت $S = \frac{1 \times 1}{2} = \frac{1}{2}$ ③, ① مساحت $S = \frac{r \times r}{2} (r) = 6$

④ مساحت $S = \frac{1 \times 1}{2} - \frac{1 \times r}{2} = \frac{1}{2} - \frac{r}{2}$

$$AN = AM = \sqrt{r^2 + r^2} = \sqrt{1r^2}$$

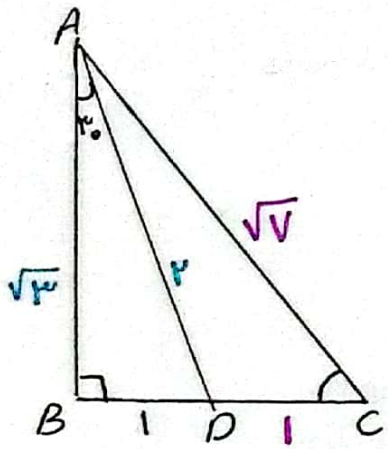
⑤ مساحت $S = \frac{1}{2} (\sqrt{1r^2} \times \sqrt{1r^2}) \sin \theta = \frac{1r^2}{2} \sin \theta = \frac{1}{2} \rightarrow \sin \theta = \frac{1}{1r^2} \quad \checkmark$

$P(\frac{1}{p}, y) \rightarrow y = \frac{\sqrt{p^2-1}}{p}$ (زاویه نبود)



$$c = \sqrt{a^2 + b^2 - 2ab \cos 120^\circ} = \sqrt{1 + 1 - 2(-\frac{\sqrt{p^2-1}}{p})} = \sqrt{2 + \sqrt{p^2-1}}$$

opp' $= 1 + 1 + \sqrt{2 + \sqrt{p^2-1}} = 2 + \sqrt{2 + \sqrt{p^2-1}} \quad \checkmark$



$$S_{\triangle ABC} = \frac{1}{2} (\sqrt{3})(1)(1+DC) = \sqrt{3}$$

$$\boxed{DC=1}$$

$$AC = \sqrt{BC^2 + AB^2} = \sqrt{4 + 3} = \sqrt{7}$$

$$\sin^2 \hat{C} = 2 \sin C \cdot \cos C = 2 \left(\frac{\sqrt{3}}{\sqrt{7}} \right) \left(\frac{2}{\sqrt{7}} \right) = \frac{4\sqrt{3}}{7}$$

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جواب سوال 9 :