نام و نام خانوادگی ...آترین جابلی... پاسخنامه تشریحی تکلیف شماره ...۱۲... کلاس ...دوازدهم سیر A...

۱

$\tan\frac{5\pi}{6} = -\frac{\sqrt{3}}{3} = \frac{a(-\frac{\sqrt{3}}{2}) + b(\frac{-\sqrt{3}}{2})}{a(-\frac{1}{2}) + b(\frac{1}{2})} = \frac{-\frac{\sqrt{3}}{2}(a+b)}{-\frac{1}{2}(a-b)} = -\frac{\sqrt{3}}{3}$

$\frac{\sqrt{3}}{2}(a-b) = -3\frac{\sqrt{3}}{2}(a+b) \to a-b = -3a-3b \to 2b = -4a$

$\to b = -2a$

$\to \frac{b}{a} = \frac{-2a}{a} = \boxed{-2}$

۲

$\arccos\frac{1}{2} = 60°$

$P\hat{O}P' = 150°$

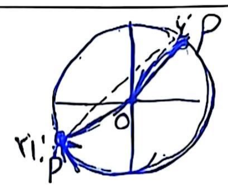
$PO = P'O = 1$

$(PP')^2 = (PO)^2 + (P'O)^2 - 2(PO)(P'O)\cos 150°$

$(PP')^2 = 1 + 1 - 2(-\frac{\sqrt{3}}{2}) = 2+\sqrt{3}$

$\to PP' = \sqrt{2+\sqrt{3}}$

$P_{OPP'} = 2 + \sqrt{2+\sqrt{3}}$

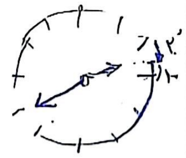


۳

$\frac{\pi}{9} = \frac{180}{9} = 20°$

میزان جابجایی عقربه ساعت شمار همواره نصف مقدار دقیقه است

$\to \frac{Min}{2} = 20 \to M = 40 \to \boxed{2:40}$



۴

$a = \left|\frac{11M}{2} - 30H\right| \to 20 = \left|\frac{11M}{2} - 90\right|$

$\to \begin{cases} \frac{11M}{2} - 90 = 20 \to M = 20 & \text{بار دوم} \\ \frac{11M}{2} - 90 = -20 \to M = \frac{140}{11} = 13 & \text{بار اول} \end{cases}$

بعد از ۲۰ دقیقه زاویه بین دو عقربه برای بار دوم ۲۰ درجه می‌شود

۵

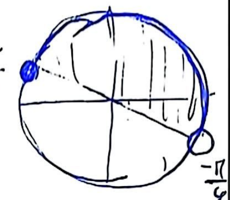
$-\frac{\pi}{6} < x < \frac{5\pi}{6} \to -\frac{1}{2} < \sin x \leq 1 \to -\frac{1}{2} < \frac{m-3}{5} \leq 1$

$\frac{m-3}{5} \leq 1 \to m \leq 8$

$-\frac{1}{2} < \frac{m-3}{5} \to 1 > \frac{-2m+6}{5} \to m > \frac{1}{2}$

$\to \frac{1}{2} < m \leq 8 \to m = 1, 2, \dots, 8$

شامل ۸ عدد صحیح می‌شود.



$-\frac{\pi}{6} < x < \frac{5\pi}{6}$

۶

$$\frac{\sin(\frac{\pi}{2}+10^\circ)+k\cos(\frac{3\pi}{2}-10^\circ)}{\cos(\pi-10^\circ)+2\sin(\pi+10^\circ)}=\frac{\cos 10^\circ+k(-\sin 10^\circ)}{-\cos 10^\circ-2\sin 10^\circ}=2$$

$$\xrightarrow{\div\cos 10^\circ}\frac{-2-4\tan 10^\circ}{1-k\tan 10^\circ}=1\rightarrow -2-4\tan 10^\circ=1-k\tan 10^\circ$$

$$\boxed{k=12}$$

$$\rightarrow 2=-4\tan 10^\circ+k\tan 10^\circ\rightarrow -4(\tfrac{1}{4})+k(\tfrac{1}{4})=2\rightarrow \tfrac{1}{4}(k-4)=2\rightarrow k-4=14$$

۷

$$\frac{\tan(\frac{\pi}{2}-2)-\cot(\pi-2)}{\cot(\frac{3\pi}{2}-2)+2\tan(2\pi-2)}=\frac{\cot 2+\cot 2}{\tan 2-2\tan 2}=\frac{2\cot 2}{-\tan 2}=\frac{-2}{\tan^2 2}$$

$$1-\cos 2=2+2\cos 2\rightarrow \cos 2=-\tfrac{1}{3}\rightarrow \sin 2=\sqrt{1-\cos 2}^{(2\text{nd})}=\sqrt{\tfrac{8}{9}}=\frac{2\sqrt{2}}{3}$$

$$\tan 2=\frac{\sin 2}{\cos 2}=\frac{\frac{2\sqrt{2}}{3}}{\frac{-1}{3}}=-2\sqrt{2}\rightarrow \tan^2 2=(-2\sqrt{2})^2=8$$

$$\rightarrow \frac{-2}{\tan^2 2}=\frac{-2}{8}=\boxed{\frac{-1}{4}}$$

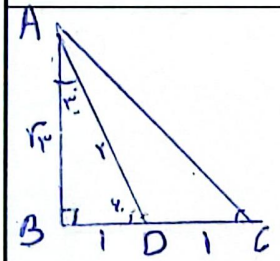
۸

$$l_A=l_B\rightarrow \theta_A r_A=\theta_B r_B\rightarrow \frac{2}{3}\pi(r_A)=(\frac{9\pi}{10})r_B$$

$$\frac{10\Delta}{24^\circ}\times 2\pi=\frac{2}{3}\pi\qquad\rightarrow \frac{r_A}{r_B}=\frac{\frac{9\pi}{10}}{\frac{2\pi}{3}}=\frac{27}{20}$$

$$\frac{S_A}{S_B}=\frac{r_A^2\pi}{r_B^2\pi}=(\frac{r_A}{r_B})^2=(\frac{27}{20})^2=\boxed{\frac{729}{400}}$$

۹



$$S=\frac{1}{2}AB\times BC=2\sqrt{2}\rightarrow AB\times BC=4\sqrt{2}\rightarrow 2\times BC=2\sqrt{2}$$

$$\rightarrow \boxed{BC=2}$$

$$\frac{BD}{\sin 30^\circ}=\frac{AD}{\sin 90^\circ}\rightarrow \underline{AD=2}\qquad \frac{AB}{\sin 45^\circ}=\frac{AD}{\sin 90^\circ}\rightarrow \underline{AB=2\sqrt{2}}$$

$$DC=BC-BD=2-1=1\qquad \tan C=\frac{AB}{BC}=\frac{2\sqrt{2}}{2}$$

$$\sin 2C=\frac{2\tan C}{1+\tan^2 C}=\frac{2\sqrt{2}}{1+2}=\frac{2\sqrt{2}}{3}=\frac{4\sqrt{2}}{6}$$

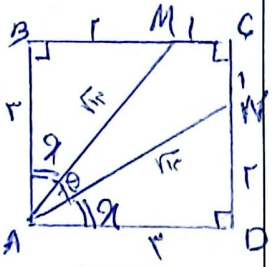
۱۰

$$\sin\theta=\sin(90^\circ-2\alpha)=\cos 2\alpha$$

$$\cos 2\alpha=\cos(\alpha+\alpha)=\cos\alpha\cos\alpha-\sin\alpha\sin\alpha$$

$$=\cos^2\alpha-\sin^2\alpha=(\frac{3}{\sqrt{13}})^2-(\frac{2}{\sqrt{13}})^2=\frac{5}{13}$$

$$\rightarrow \boxed{\sin\theta=\frac{5\sqrt{13}}{13}}$$



$$AM=AN=\sqrt{2^2+3^2}=\sqrt{13}$$