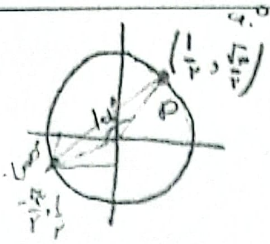
نام و نام خانوادگی ...امیرعلی کیوان فرد...... پاسخنامه تشریحی تکلیف شماره ...۲... کلاس ...دوازدهم سیمرغ... A

۲



۶۰ + ۹۰ = ۱۵۰

$(PP')^2 = R^2 + R^2 - 2R^2\cos 150° = 1+1+2\times1\times\frac{1}{2} = 3 \Rightarrow PP' = \sqrt3 \Rightarrow P_{APP'} = \sqrt3+2$

۱

$$\frac{a\sin\frac{4\pi}{3}+b\cos\frac{7\pi}{6}}{a\sin\frac{11\pi}{6}+b\cos\frac{\pi}{3}} = \frac{-\frac{a\sqrt3}{2}-\frac{b\sqrt3}{2}}{-\frac{a}{2}+\frac{b}{2}} = -\frac{\sqrt3}{3} \quad \frac{b+a}{b-a} = \frac{1}{3}$$

$3b+3a = b-a$

$4a = -2b \quad \frac{b}{a} = -2$

۳

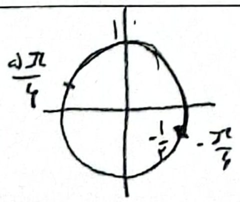
$\frac{\frac{\pi}{9}}{\pi} = \frac{\alpha}{180} \Rightarrow \frac{1}{9} = \frac{\alpha}{180} \Rightarrow \alpha = 20°$ اضافه دقیقه $Min = 40' \Rightarrow 2:40'$

۴

$\alpha = |\frac{11M}{2} - 30H| \Rightarrow 20 = |\frac{11M}{2} - 90|$ → $M = \frac{140}{11}$ ✗ ، $M = 20$ ✓

$90 - \frac{11M}{2} = 20 \Rightarrow \frac{11M}{2} = 70 \Rightarrow M = \frac{140}{11}$

۵



$-\frac{1}{2} < \frac{m-3}{5} < 1 \Rightarrow -\frac{5}{2} < m-3 \le 5 \Rightarrow \frac{1}{2} < m \le 8$

$\alpha = 45^\circ$

$$\frac{\sin\left(\frac{\pi}{2}+\alpha\right) + k\cos\left(\frac{3\pi}{2}-\alpha\right)}{\cos(\pi-\alpha) + 2\sin(\alpha+\pi)} = \frac{\cos\alpha - k\sin\alpha}{-\cos\alpha + 2\sin\alpha} \xrightarrow{\div\cos\alpha} \frac{1-k\tan\alpha}{-1-2\tan\alpha} = 3$$

۶

$$1-k\tan\alpha = -6\tan\alpha - 3 \Rightarrow 1-\frac{k}{2} = -\frac{3}{2} - \frac{9}{2} \Rightarrow \frac{k}{2} = \frac{11}{2} \Rightarrow k = 22$$

$$\frac{\tan\left(\frac{\pi}{2}-x\right) - \cot(\pi-x)}{\cot\left(\frac{3\pi}{2}-x\right)} = \frac{2\cot(x)}{-\tan x} = \frac{2\frac{\cos x}{\sin x}}{-\frac{\sin x}{\cos x}} = -2\cot(x) = 4\frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = 4\sqrt{3}$$

۷

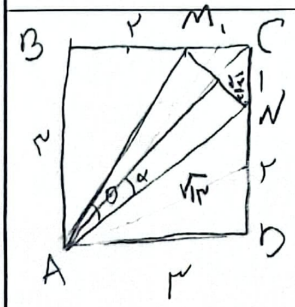
$$\frac{1-\cos x}{1+\cos x} = 3 \Rightarrow 3+3\cos x = 1-\cos x \Rightarrow \cos 2x = -\frac{1}{2},\ \sin x = \frac{\sqrt{3}}{2}$$

$$\frac{\ln A}{\ln 10} = \frac{\alpha}{2\pi} \Rightarrow \alpha = \frac{3\pi}{4}$$

$$\frac{3\pi}{4} R_1 = \frac{q}{\ln 10} \pi R_2$$

$$\frac{R_1}{R_2} = \frac{q^2}{\frac{\ln^2 10}{4}} \times \frac{\pi}{\frac{9\pi^2}{16}} = \frac{4}{3} \Rightarrow \frac{R_1^2}{R_2^2} = \frac{q}{\varepsilon} \Rightarrow \boxed{\frac{\pi R_1^2}{\pi R_2^2} = \frac{q}{\varepsilon}}$$

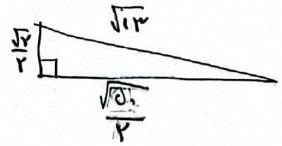
۸



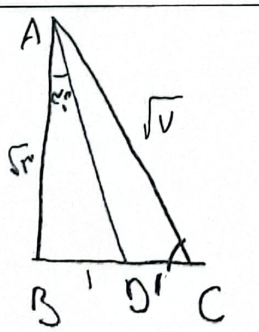
$$AN^2 = 9+\varepsilon \Rightarrow \sqrt{12} = AN = AM$$

$$MN = \sqrt{2} \qquad \sin\alpha = \frac{\sqrt{2}}{2\sqrt{12}} \qquad \cos\alpha = \frac{\sqrt{20}}{2\sqrt{12}}$$

$$\sin\theta = 2\sin\alpha\cos\alpha = \frac{\sqrt{2}\times\sqrt{20}}{2\sqrt{12}\times 2\sqrt{12}} = \frac{10}{24} = \frac{5}{12}$$



۱۰



$$\frac{AB}{BD} = \sqrt{3} \Rightarrow AB = \sqrt{3} \qquad BC \times AB \times \frac{1}{2} = \sqrt{3} \Rightarrow BC = 2$$

$$\sin C = 2\underbrace{\sin\hat{C}}_{\frac{\sqrt{3}}{\sqrt{5}}}\underbrace{\cos\hat{C}}_{\frac{1}{\sqrt{5}}} \Rightarrow \frac{\sqrt{3}\times 2\times 2}{5} = \frac{\varepsilon\sqrt{\varepsilon}}{5}$$

۹