نام و نام خانوادگی .... پاسخنامه تشریحی تکلیف شماره ...۱... کلاس ....

۱

الف) $\tan\frac{11\pi}{4} + \sin\frac{15\pi}{4} \times \cos\frac{13\pi}{4} \Rightarrow \frac{11\pi}{4} - 2\pi = \frac{3\pi}{4} \xrightarrow{\tan} -1 \;/\; \frac{15\pi}{4} - 4\pi = -\frac{\pi}{4} \xrightarrow{\sin} -\frac{\sqrt{2}}{2} \;/\; \frac{13\pi}{4} - 3\pi = \frac{\pi}{4} \xrightarrow{\cos} \frac{\sqrt{2}}{2}$

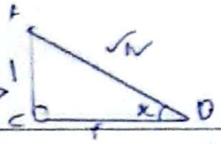
$-1 + \frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{2} = -1 + \frac{1}{2} = -\frac{1}{2}$

ب) $\tan\frac{17\pi}{6} \cdot \sin\frac{11\pi}{3} + \cos\frac{10\pi}{3} \Rightarrow \frac{17\pi}{6} - 2\pi = \frac{5\pi}{6} \xrightarrow{\tan} -\frac{1}{\sqrt{3}} \;/\; \frac{11\pi}{3} - 2\pi = \frac{5\pi}{3} \rightarrow \frac{\sqrt{3}}{2}$

$\frac{10\pi}{3} - 4\pi + \pi = 4\pi \Rightarrow \cos 0 = 1 \;\}\; -\frac{1}{\sqrt{3}} \times \frac{\sqrt{3}}{2} + 1 = -\frac{1}{2} + 1 = \frac{1}{2}$

۲

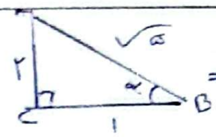
$\frac{3\cos x - \sin x}{\cos x + \sin x} = \frac{3\times\frac{4}{\sqrt{17}} - \frac{1}{\sqrt{17}}}{\frac{4}{\sqrt{17}} + \frac{1}{\sqrt{17}}} = \frac{\frac{11}{\sqrt{17}}}{\frac{5}{\sqrt{17}}} = \frac{11}{5} = 2/2$



$\cot x = 4 \Rightarrow \frac{\text{مجاور}}{\text{مقابل}} \Rightarrow 4^2 + 1^2 = AB^2 \Rightarrow AB = \sqrt{17} \Rightarrow \sin x = \frac{1}{\sqrt{17}},\ \cos x = \frac{4}{\sqrt{17}}$

۳

$\sin\alpha = 2\cos\alpha \Rightarrow \frac{\sin\alpha}{\cos\alpha} = \tan\alpha = 2 = \frac{\text{مقابل}}{\text{مجاور}}$



$\Rightarrow AB^2 = 2^2 + 1^2 = 5,\ AB = \sqrt{5}$

$\cos\alpha = \frac{\text{مجاور}}{\text{وتر}} = \frac{1}{\sqrt{5}} \xrightarrow{\text{ناحیه ۳}} -\frac{1}{\sqrt{5}}$

۴

الف) $\sin\alpha = \frac{\sqrt{2}}{10} \Rightarrow \sin^2\alpha = \frac{1}{50} \Rightarrow 1 - \sin^2\alpha = \frac{49}{50} \Rightarrow \cos\alpha = -\sqrt{\frac{49}{50}} = -\frac{7}{5\sqrt{2}} = -\frac{7\sqrt{2}}{10}$

$\cos\left(\frac{11\pi}{4}\right) = \cos\left(\frac{3\pi}{4}\right) = -\frac{\sqrt{2}}{2} \;|\; \sin\left(\frac{11\pi}{4}\right) = \sin\left(\frac{3\pi}{4}\right) = \frac{\sqrt{2}}{2} \;\}\; \cos(x+y) = \cos x\cos y - \sin x\sin y$

$\Rightarrow \cos\left(\frac{11\pi}{4} + \alpha\right) = \left(-\frac{\sqrt{2}}{2}\right)\times\left(-\frac{7\sqrt{2}}{10}\right) - \left(\frac{\sqrt{2}}{2}\right)\left(\frac{\sqrt{2}}{10}\right) = \frac{7}{10} - \frac{1}{10} = \frac{3}{5}$

ب) $\tan\alpha = \frac{1}{7} \Rightarrow \sqrt{1^2 + 7^2} = \sqrt{50} = 5\sqrt{2} \Rightarrow \sin\alpha = \frac{1}{5\sqrt{2}} = \frac{\sqrt{2}}{10},\ \cos\alpha = \frac{7}{5\sqrt{2}} = \frac{7\sqrt{2}}{10} \;\}\; \frac{13\pi}{4} = 3\pi + \frac{\pi}{4}$

$\Rightarrow \sin\left(\frac{\pi}{4}\right) = \frac{\sqrt{2}}{2},\ \cos\left(\frac{\pi}{4}\right) = \frac{\sqrt{2}}{2} \;\}\; \sin(x+y) = \sin x\cos y + \cos x\sin y \Rightarrow \sin\left(\frac{13\pi}{4} + \alpha\right) = \left(\frac{\sqrt{2}}{2}\right)$

$\times\left(\frac{7\sqrt{2}}{10}\right) + \left(\frac{\sqrt{2}}{2}\right)\left(\frac{\sqrt{2}}{10}\right) = \frac{7}{10} + \frac{1}{10} = \frac{4}{5}$

۵

$2\sin^2 x + \cos^2 x = \frac{4}{3}$

$\cos^2 x + \sin^2 x = 1 \Rightarrow \cos^2 x = 1 - \sin^2 x$

$\Rightarrow 2\sin^2 x + 1 - \sin^2 x = \frac{4}{3} \Rightarrow \sin^2 x = \frac{1}{3}$

$\frac{1}{3} + \cos^2 x = \frac{4}{3} \Rightarrow \cos^2 x = \frac{2}{3}$

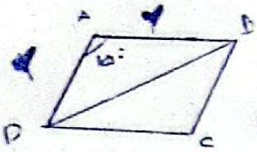
$\tan^2 x = \frac{\sin^2 x}{\cos^2 x} = \frac{\frac{1}{3}}{\frac{2}{3}} = \frac{1}{2}$

6

$$S_{\triangle ABC} = \frac{\sqrt{3} \times 6 \times \sin\alpha}{2} = 4.5 \Rightarrow \sin\alpha = \frac{\sqrt{3}}{2} \Rightarrow \sin 60, 120, 240, 300$$

مثلث ... ۱۸۰ درجه $\Longrightarrow \frac{120}{60} = 2$

7



$$S_{\square ABCD} = AD \times AD \times \sin A \Rightarrow \sin 150 = \frac{1}{2} \Rightarrow$$

چون متوازی الاضلاع ۲ تا مثلث دیگر $\times \frac{1}{2}$

$$AB \times AD = 108$$

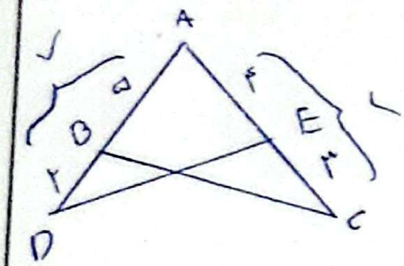
$$\frac{AB}{AD} = \frac{2}{3} \Rightarrow$$

نسبت = ۶ $\Rightarrow 108 \div 6 = 18 \Rightarrow \sqrt{18} = 3\sqrt{2} \Rightarrow$

$$\frac{2}{3} = \frac{2 \times 3\sqrt{2}}{3 \times 3\sqrt{2}} \rightarrow \frac{6\sqrt{2}}{9\sqrt{2}} \rightarrow 108 ✓$$

$$2(6\sqrt{2} + 9\sqrt{2}) = 30\sqrt{2}$$

8



$$S_{\triangle ABC} - S_{\triangle APE} = 1.75$$

$$S_{\triangle ABC} > S_{\triangle APE}$$

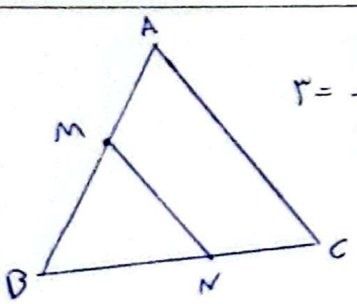
$$S_{\triangle ABC} = \frac{AC \times AB \times \sin A}{2}$$

$$S_{\triangle AED} = \frac{AE \times AD \times \sin A}{2}$$

$$\frac{35 \times \sin A}{2} - \frac{28 \sin A}{2} = 1.75 \Rightarrow \frac{35 \sin A - 28 \sin A}{2} = 1.75 \Rightarrow \sin A = \frac{1}{2}$$

$\Longrightarrow A = 30^\circ \quad \tan 30 = \frac{1}{\sqrt{3}}$

9



$$3 = \frac{S_{\triangle ABC} = \frac{AB \times BC \times \sin B}{2}}{S_{\triangle BMN} = \frac{BM \times BN \times \sin B}{2}} \Rightarrow \frac{AB \times \frac{5}{3} BN}{BM \times BN} = 3 \Rightarrow \frac{AB}{BM} = \frac{9}{5}$$

$$AB = AM + MB$$

$$2BN = 3NC \Rightarrow NC = \frac{2}{3} BN$$

$$\Rightarrow BC = \frac{5}{3} BN$$

$$\Rightarrow 9BM = 5MB + 5AM$$

$$\Rightarrow 4BM = 5AM \Rightarrow$$

$$\frac{BM}{AM} = \frac{5}{4}$$

10

ناحیه ۳

$$\frac{|\sin\alpha|}{\cos\alpha} = -\frac{1}{\frac{\cos\alpha}{\sin\alpha}} \Rightarrow \frac{|\sin\alpha|}{\cos\alpha} = \frac{-\sin\alpha}{\cos\alpha} \Rightarrow \sin\alpha < 0$$

$$\frac{-|\cos\alpha|}{\cos\alpha} \times \sin\alpha = \sin\alpha \Rightarrow \frac{|\cos\alpha|}{\cos\alpha} = -1 \Rightarrow \cos\alpha < 0$$

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