نام و نام خانوادگی علیرضا اثنی عشری پاسخنامه تشریحی تکلیف شماره ۱۸ کلاس دهم B

۱

الف)

$\dfrac{\frac{11\pi}{4}}{\pi} = \dfrac{\hat{D}_1}{180} \Rightarrow D_1 = 495° = 360 + 135 \Rightarrow \tan\hat{D} = \tan 135°$

$\dfrac{\frac{15\pi}{4}}{\pi} = \dfrac{\hat{D}_2}{180} \Rightarrow \hat{D}_2 = 675 = 360 + 315 \Rightarrow \sin\hat{D}_2 = \sin 315°$

$\dfrac{\frac{13\pi}{4}}{\pi} = \dfrac{\hat{D}_3}{180} \Rightarrow \hat{D}_3 = 585 = 360 + 225 \Rightarrow \cos\hat{D}_3 = \cos 225$

$\Rightarrow -1 + \left(\frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{2}\right) = -\frac{1}{2}$

ب)

$\tan\frac{17\pi}{6} = \tan 150°$

$\sin\frac{11\pi}{3} = \sin 330°$

$\cos\frac{10\pi}{3} = \cos 240° \Rightarrow$

$\left(-\frac{\sqrt{3}}{3} \times -\frac{\sqrt{3}}{2}\right) - \frac{1}{2} = \frac{1}{2} - \frac{1}{2} = 0$

۲

$\cot x = 4 \Rightarrow \dfrac{\cos x}{\sin x} = 4 \Rightarrow \cos x = 4\sin x$

$\dfrac{3\cos x - \sin x}{\cos x + \sin x} \xrightarrow{\cos x = 4\sin x} \dfrac{12\sin x - \sin x}{4\sin x + \sin x} = \dfrac{11\cancel{\sin x}}{5\cancel{\sin x}} = \dfrac{11}{5}$

۳

$\sin\alpha \quad 2\cos\alpha$

$\sin^2\alpha + \cos^2\alpha = 1 \Rightarrow \overbrace{(2\cos\alpha)^2}^{4\cos^2\alpha} + \cos^2\alpha = 1 \Rightarrow \cos^2\alpha = \dfrac{1}{5} \xrightarrow{180<\alpha<270} \cos\alpha = -\dfrac{1}{\sqrt{5}}$

۴

الف)

$\cos^2\alpha = 1 - \sin^2\alpha \xrightarrow{90<\alpha<180} \cos\alpha = -\dfrac{7\sqrt{2}}{10} \Rightarrow \cos\left(\dfrac{11\pi}{4} + \alpha\right) = \cos\left(3\pi + \left(-\dfrac{\pi}{4} + \alpha\right)\right) =$

$-\cos\left(\alpha - \dfrac{\pi}{4}\right) = -\left(\cos\alpha\cos\dfrac{\pi}{4} + \sin\alpha\sin\dfrac{\pi}{4}\right) = \dfrac{3}{5}$

ب)

$1 + \tan^2\alpha = \dfrac{1}{\cos^2\alpha} \xrightarrow[0<\alpha<90]{\tan\alpha = \frac{1}{7}} \cos\alpha = \dfrac{7}{5\sqrt{2}},\ \sin\alpha = \dfrac{1}{5\sqrt{2}} \Rightarrow$

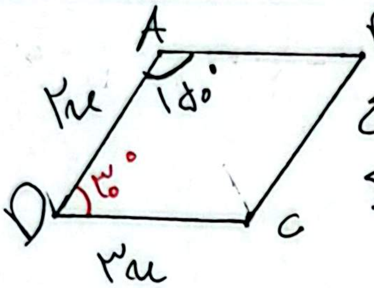
$\sin\left(\dfrac{13\pi}{4} + \alpha\right) = \sin\left(\dfrac{5\pi}{4} + \alpha\right) = \left(-\dfrac{\sqrt{2}}{2}\right)\cos\alpha + \left(-\dfrac{\sqrt{2}}{2}\right)\sin\alpha = -\dfrac{\sqrt{2}}{2}(\sin\alpha + \cos\alpha) = -\dfrac{4}{5}$

۵

$\begin{cases} 2\sin^2 x + \cos^2 x = \dfrac{4}{3} \\ \sin^2 x + \cos^2 x = 1 \end{cases} \xrightarrow[\text{کم می‌کنیم}]{\text{از هم}} \sin^2 x = \dfrac{1}{3},\ \cos^2 x = \dfrac{2}{3} \Rightarrow \tan^2 x = \dfrac{\sin^2 x}{\cos^2 x} = \dfrac{1}{2}$

$S_{AB\hat{C}} = \frac{1}{\cancel{۲}}\times\sqrt{۳}\times\cancel{۶}^{۳}\times\sin\alpha = ۴٫۵ \Rightarrow ۳\sqrt{۳}\,\sin\alpha = ۴٫۵ \Rightarrow$

$\sin\alpha = \frac{۳}{۲\sqrt{۳}} = \frac{\sqrt{۳}}{۲}$ $\begin{cases} \max = ۱۲۰^\circ \\ \min = ۶۰^\circ \end{cases} \Rightarrow \frac{۱۲۰}{۶۰} = ۲$ ۶



بنا بر فرض سوال در متوازی الاضلاع: $\hat{A}+\hat{D} = ۱۸۰^\circ \Rightarrow \hat{D} = ۳۰^\circ$

$S_{ABCD} = ۲x\times۳x\times\sin۳۰^\circ = ۶x^۲\times\frac{1}{۲} = ۵۴ \Rightarrow$ ۷

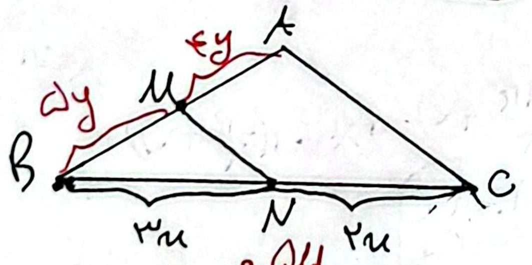
$x^۲ = ۱۸ \Rightarrow x = \pm۳\sqrt{۲} \Rightarrow P_{ABCD} = (۲x\times۲)+(۳x\times۲) = ۱۰x \xrightarrow{x=۳\sqrt{۲}} P = ۳۰\sqrt{۲}$

ضلع منفی نمی‌شود!!

$S_{AB\hat{C}} - S_{AD\hat{E}} = ۱٫۷۵ \Rightarrow \frac{1}{۲}\sin\alpha\times۵\times۷ - \frac{1}{۲}\times\sin\alpha\times۷\times۴ = ۱٫۷۵ \Rightarrow$

$\frac{1}{۲}\sin\alpha(۳۵-\cancel{۲۸}^{۷}) = ۱٫۷۵ = ۷\sin\alpha = ۳٫۵ \Rightarrow \sin\alpha = \frac{1}{۲} \Rightarrow$ ۸

$\arcsin\frac{1}{۲} = ۳۰^\circ \Rightarrow \tan۳۰^\circ = \frac{\sqrt{۳}}{۳}$



$\frac{S_{ABC}}{S_{BMN}} = \frac{\cancel{\frac{1}{۲}\times\sin B}\times AB\times۵\cancel{x}}{\cancel{\frac{1}{۲}\times\sin B}\times BM\times۳\cancel{x}} = ۳ \Rightarrow$ ۹

$۵AB = ۹BM \xrightarrow{BM=۵y} AB = ۹y \Rightarrow AM = ۴y \Rightarrow \frac{BM}{AM} = \frac{۵y}{۴y} = \frac{۵}{۴}$ برابر

$-\frac{1}{\cot\alpha} = -\tan\alpha = \frac{|\sin\alpha|}{\cos\alpha} \Rightarrow \sin\alpha < ۰$ ①

$-\tan\alpha = \frac{1+\sin\alpha}{|\cos\alpha|} - \frac{1}{|\cos\alpha|} = \frac{\sin\alpha}{|\cos\alpha|} \Rightarrow \cos\alpha < ۰$ ② ۱۰

$\xrightarrow{①\cap②} \begin{rcases} \sin\alpha < ۰ \\ \cos\alpha < ۰ \end{rcases} \Rightarrow \underbrace{۱۸۰ < \alpha < ۲۷۰}_{\text{در ناحیه سوم}}$