آیدین اشرفی - گروه A تکلیف ۱۸

۱-

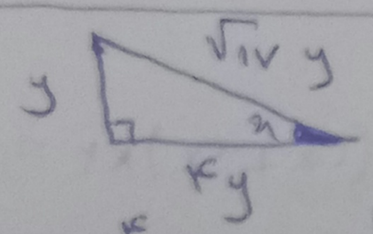
الف) $\tan\frac{11\pi}{4} + \sin\frac{15\pi}{4}\cos\frac{13\pi}{4} = \underbrace{\tan\frac{3}{4}\pi}_{-1} + \underbrace{\sin\frac{7}{4}\pi}_{-\frac{\sqrt{2}}{2}}\ \underbrace{\cos\frac{5}{4}\pi}_{-\frac{\sqrt{2}}{2}}$

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

ب) $\tan\frac{17}{6}\pi \sin\frac{11}{3}\pi + \cos\frac{10}{3}\pi = \tan\frac{5}{6}\pi \sin\frac{5}{3}\pi + \cos\frac{4}{3}\pi$

$= \left(-\frac{\sqrt{3}}{3}\right) \times \left(-\frac{\sqrt{3}}{2}\right) - \frac{1}{2} = -\frac{1}{6}$

۲-

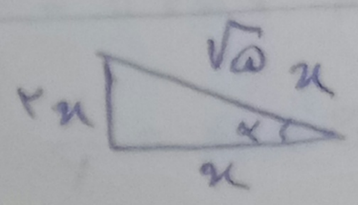


$\sin x = \frac{1y}{\sqrt{17}y}$, $\cos x = \frac{4y}{\sqrt{17}y}$

$\dfrac{3 \times \frac{4}{\sqrt{17}} - \frac{1}{\sqrt{17}}}{\frac{4}{\sqrt{17}} + \frac{1}{\sqrt{17}}} = \frac{11}{5}$

۳-

$\sin\alpha = 2\cos\alpha \Rightarrow \tan\alpha = 2$



$\cos\alpha = \frac{-x}{\sqrt{5}x} = \frac{-\sqrt{5}}{5}$

۴-

بر اساس روابط:

(I) $\cos(\alpha+\beta) = \cos\alpha\cos\beta - \sin\alpha\sin\beta$

(II) $\sin(\alpha+\beta) = \sin\alpha\cos\beta + \sin\beta\cos\alpha$

الف)

$\cos\left(\frac{11}{4}\pi + \alpha\right) = \cos\left(\frac{3}{4}\pi + \alpha\right) = \underbrace{\cos\frac{3}{4}\pi}_{-\frac{\sqrt{2}}{2}}\ \underbrace{\cos\alpha}_{\frac{7}{5\sqrt{2}}} - \underbrace{\sin\frac{3}{4}\pi}_{\frac{\sqrt{2}}{2}}\ \underbrace{\sin\alpha}_{\frac{\sqrt{2}}{10}}$

$\sin^2\alpha + \cos^2\alpha = 1$

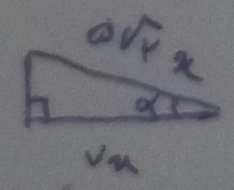
$1 - \frac{2}{100} = \cos^2\alpha \quad \frac{98}{100} = \cos^2\alpha \Rightarrow \boxed{\cos\alpha = \frac{7}{5\sqrt{2}}}$

$\Rightarrow -\frac{\sqrt{2}}{2} \times \frac{7}{5\sqrt{2}} - \frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{10} = \frac{-7}{10} - \frac{1}{10} = \frac{-8}{10}$ ← جواب الف

ب)

$\sin\left(1\frac{3\pi}{4} + \alpha\right) = \sin\left(\frac{7\pi}{4} + \alpha\right) = \sin\frac{7\pi}{4}\cos\alpha + \sin\alpha\cos\frac{7\pi}{4}$

$\tan\alpha = \frac{1}{7}$



$\boxed{\sin\alpha = \frac{1}{5\sqrt{2}}}$ $\boxed{\cos\alpha = \frac{7}{5\sqrt{2}}}$

$= -\frac{\sqrt{2}}{2} \times \frac{7}{5\sqrt{2}} + \frac{1}{5\sqrt{2}} \times \frac{\sqrt{2}}{2} = \frac{7}{10} + \frac{1}{10} = \frac{8}{10}$ ← جواب ب

۵-

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

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

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

$$\frac{1}{2}\times 6\times\sqrt{3}\times\sin\alpha = 4{,}5$$

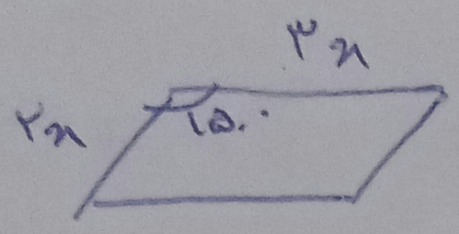
$$\sin\alpha = \frac{4{,}5}{3\sqrt{3}} = \frac{\frac{9}{2}}{3\sqrt{3}} = \frac{3}{2\sqrt{3}}\times\frac{\sqrt{3}}{\sqrt{3}} = \frac{3\sqrt{3}}{2\times 3} = \frac{\sqrt{3}}{2}$$

$\alpha = 60^\circ$ و 120°

کمترین — بیشترین

$$\frac{120^\circ}{60^\circ} = 2$$

دو برابر



مساحت متوازی الاضلاع

$$S = \frac{3x\times 2x\times \sin 150^\circ}{2} = 54$$

$\sin 150^\circ \to \frac{1}{2}$

متوازی الاضلاع

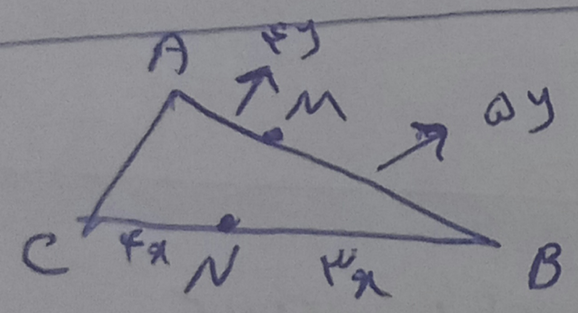
$$3x^2 = 108 \qquad x^2 = \frac{108}{3} = 36 \Rightarrow \boxed{x = 6}$$

محیط $= (2x + 3x)\times 2 = 60$

گزینه ۲

$$\frac{1}{2}\sin A\times 5\times 7 - \frac{1}{2}\sin A\times 7\times 4 = 1{,}75$$

$$\sin A = \frac{1}{2} \xrightarrow{\hat{A} = 30^\circ} \tan A = \frac{\sqrt{3}}{3}$$



$$\frac{S_{BMN}}{S_{ABC}} = \frac{\frac{1}{2}\sin A\times BM\times BN}{\frac{1}{2}\sin A\times AB\times BC} = \frac{1}{3}$$

$$\frac{BM\times 3x}{AB\times 5x} = \frac{1}{3} \qquad \frac{BM}{AB} = \frac{5}{9}$$

$$AB = AM + MB = 4y + 5y \Rightarrow \boxed{\frac{BM}{AM} = \frac{5}{4}}$$

$$-\tan\alpha = \frac{\sin\alpha}{|\cos\alpha|} \qquad \cos\alpha < 0 \quad \text{I}$$

از رابطه I و II $\Rightarrow$

ناحیه ۳

$$\frac{|\sin\alpha|}{\cos\alpha} = \frac{-1}{\cot\alpha} = \frac{-\sin\alpha}{\cos\alpha} \Rightarrow \sin\alpha < 0 \quad \text{II}$$