ارشیا ایزدی کلاس دهم B

۱-

الف) $\tan\frac{11\pi}{4} + \sin\frac{15}{4}\cos\frac{13}{4} = \tan 135^\circ + \sin 315^\circ \times \cos 225^\circ$

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

ب) $\tan\frac{17\pi}{6}\sin\frac{11\pi}{3} + \cos\frac{10\pi}{3} = \tan 150^\circ \times \sin 300^\circ + \cos 240^\circ$

$= -\frac{1}{\sqrt{3}} \times \frac{-\sqrt{3}}{2} + \frac{-1}{2} = \boxed{0}$

۲-

$\cot x = 4 \qquad 1+\cot^2 x = \frac{1}{\sin^2 x} \Rightarrow 1+16 = \frac{1}{\sin^2 x} \Rightarrow \sin^2 x = \frac{1}{17}$

$\cos^2 x + \sin^2 x = 1 \Rightarrow \cos^2 x = \frac{16}{17} \Rightarrow \sin x = \frac{1}{\sqrt{17}}$ و $\cos x = \frac{4}{\sqrt{17}}$

$\frac{3\cos x - \sin x}{\cos x + \sin x} = \frac{\frac{12}{\sqrt{17}} - \frac{1}{\sqrt{17}}}{\frac{4}{\sqrt{17}} + \frac{1}{\sqrt{17}}} = \frac{\frac{11}{\cancel{\sqrt{17}}}}{\frac{5}{\cancel{\sqrt{17}}}} = \boxed{\frac{11}{5}}$

۳-

$\sin\alpha = 2\cos\alpha \qquad \sin^2\alpha + \cos^2\alpha = 1 \Rightarrow (2\cos\alpha)^2 + \cos^2\alpha = 1$

$\Rightarrow 5\cos^2\alpha = 1 \Rightarrow \cos^2\alpha = \frac{1}{5}$ و $\cos\alpha = \boxed{-\frac{1}{\sqrt{5}}}$

۴-

الف)

$\frac{11\pi}{4} = 360^\circ + 135^\circ \Rightarrow \sin\frac{11\pi}{4} = \sin 135^\circ$ و $\cos\frac{11\pi}{4} = \cos 135^\circ$

$\sin^2\alpha + \cos^2\alpha = 1 \Rightarrow \frac{2}{100} + \cos^2\alpha = 1 \Rightarrow \cos\alpha = -\frac{\sqrt{98}}{10}$

$\cos\left(\frac{11\pi}{4} + \alpha\right) = \cos 135^\circ \times \cos\alpha - \sin 135^\circ \times \sin\alpha = -\frac{\sqrt{2}}{2} \times -\frac{\sqrt{98}}{10}$

$- \frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{10} = \frac{14}{20} - \frac{2}{20} = \frac{12}{20} = \boxed{\frac{3}{5}}$ الف

ب)

$1+\tan^2\alpha = \frac{1}{\cos^2\alpha} \Rightarrow \frac{50}{49} = \frac{1}{\cos^2\alpha} \Rightarrow \cos^2\alpha = \frac{49}{50} \Rightarrow \cos = \frac{7}{\sqrt{50}}$

$\sin\alpha = \frac{1}{\sqrt{50}}$

$\sin\left(\frac{13\pi}{4} + \alpha\right) = \sin 225^\circ \times \cos\alpha + \sin\alpha \times \cos 225^\circ = -\frac{\sqrt{2}}{2} \times \frac{7}{5\cancel{\sqrt{2}}} + \frac{-\sqrt{2}}{2} \times \frac{1}{5\cancel{\sqrt{2}}}$

$= -\frac{7}{10} + \left(-\frac{1}{10}\right) = -\frac{8}{10} = \boxed{-\frac{4}{5}}$ ب

-۵

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

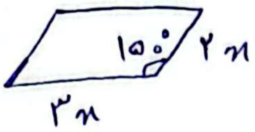
$$\tan^2 x=\frac{\sin^2 x}{\cos^2 x}=\frac{\frac{1}{\cancel{3}}}{\frac{2}{\cancel{3}}}=\boxed{\frac{1}{2}}$$

-۶

$$S_{A\overset{\Delta}{B}C}=\frac{1}{2}\times 6\times\sqrt{3}\times\sin\alpha=4/5=\frac{9}{2}=3\sqrt{3}\times\sin\alpha$$

$$\Rightarrow \sin\alpha=\frac{\sqrt{3}}{2}\qquad \alpha=120\ \text{یا}\ 60\qquad \boxed{\frac{120}{60}=2}$$

-۷



$$\frac{1}{\cancel{2}}\ 2x\times 3x\times\sin 150\times\cancel{2}=54=\cancel{6}x^2\times\frac{1}{\cancel{2}}$$

$$\Rightarrow x^2=18\Rightarrow x=\sqrt{18}$$

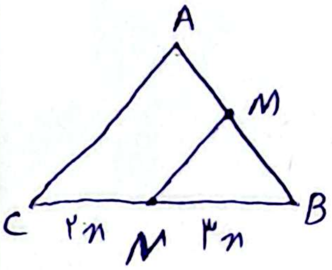
$$\text{محیط}=10\times\sqrt{18}=\boxed{10\sqrt{18}}$$

-۸

$$\left.\begin{aligned}S_{A\overset{\Delta}{D}E}&=\frac{1}{2}\ 7\times 4\times\sin\hat{A}\\ S_{A\overset{\Delta}{B}C}&=\frac{1}{2}\ 7\times 5\times\sin\hat{A}\end{aligned}\right\}\ \frac{35}{2}\sin\hat{A}-\frac{28}{2}\sin\hat{A}=1/75=\frac{7}{2}\sin\hat{A}$$

$$\Rightarrow 3/5=7\sin\hat{A}\Rightarrow\hat{A}=30^\circ\qquad \tan 30^\circ=\boxed{\frac{1}{\sqrt{3}}}$$

-۹



$$\frac{S_{A\overset{\Delta}{B}C}}{S_{B\overset{\Delta}{M}N}}=\frac{\cancel{\frac{1}{2}}\ AB\times 5\cancel{x}\times\cancel{\sin\hat{B}}}{\cancel{\frac{1}{2}}\ BM\times 3\cancel{x}\times\cancel{\sin\hat{B}}}=\frac{5AB}{3BM}=3$$

$$\Rightarrow\frac{AB}{BM}=\frac{9}{5}\Rightarrow\frac{BM}{AB}=\frac{5}{9}$$

۱۰- در ناحیه سوم

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

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

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