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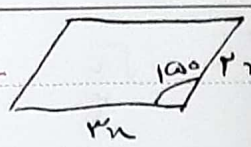
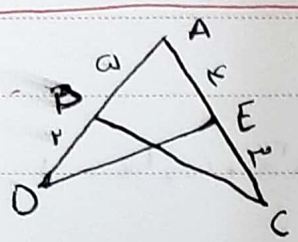
۱۹,۲۵

۱- 

$\frac{1}{2} \times 2x \times 3x \times \sin 150 = 24$

$\Rightarrow x^2 = 18 \Rightarrow x = 3\sqrt{2}$

$\Rightarrow 10x = 30\sqrt{2}$ (۵)

۲- 

$\frac{1}{2} \times 7 \times 5 \times \sin\hat{A} - \frac{1}{2} \times 7 \times 4 \times \sin\hat{A} = 1.75$

$\left(\frac{7}{2} \sin\hat{A}\right)(5-4) = \frac{7}{4}$ (۵)

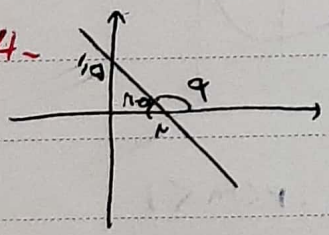
$\Rightarrow \sin\hat{A} = \frac{1}{2} \Rightarrow \cos\hat{A} = \pm\frac{\sqrt{3}}{2} \Rightarrow \tan\hat{A} = \frac{\sqrt{3}}{3}$

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

$\frac{1}{\sqrt{\cos^2\alpha}} - \tan\alpha = \frac{1+\sin\alpha}{|\cos\alpha|} \rightarrow \frac{1}{|\cos\alpha|} - \frac{1+\sin\alpha}{|\cos\alpha|} = \frac{\sin\alpha}{\cos\alpha}$ (۵)

$\Rightarrow \frac{-\sin\alpha}{|\cos\alpha|} = \frac{\sin\alpha}{\cos\alpha} \Rightarrow$ α ربعی

$\Rightarrow |\cos\alpha| = -\cos\alpha \Rightarrow \cos\alpha < 0$

۴- 

$\tan\alpha = -\tan(\pi - \alpha)$

$\Rightarrow -\tan(\pi - \alpha) = -\frac{1.5}{3} = -\frac{3}{4} = \tan\alpha$ (۵)

$\Rightarrow \tan\left(\frac{\pi}{2} - \alpha\right) = \cot\alpha = -\frac{4}{3}$

۵- $\frac{2\cos(248) - 2\sin(158)}{\sin(202) - \cos(292)} = \frac{2\cos(270-22) - 2\sin(180-22)}{\sin(180+22) - \cos(360-22)} = \frac{-2\sin 22 - 2\sin 22}{-\sin 22 - \sin 22}$ (۵)

$\Rightarrow \frac{-4\sin 22}{-2\sin 22} = 2.4$

TANDIS

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6- $\sin\alpha < 0 \quad \cos\alpha > 0 \quad \cos\alpha = \frac{2}{3} \longrightarrow \sin\alpha = \sqrt{1-\frac{4}{9}} = -\frac{\sqrt{5}}{3}$ (1,0)

$$\frac{\sin\left(\frac{\pi}{2}+\alpha\right) - \sin(\alpha-\pi)}{|\tan^2\alpha - 1|} = \frac{\cos\alpha + \sin\alpha}{\left|\frac{\sin^2\alpha}{\cos^2\alpha} - 1\right|} = \frac{-\frac{\sqrt{5}+2}{3}}{\left|\frac{5}{4}-1\right|} = \frac{\frac{\sqrt{5}+4}{3}}{\frac{1}{4}} = \frac{4\sqrt{5}+16}{3}$$

7- $\sin\alpha = 2\cos\alpha \qquad \sin\alpha, \cos\alpha < 0$ (1,0)

$\sin^2\alpha + \cos^2\alpha = 1 \Rightarrow 4\cos^2\alpha + \cos^2\alpha = 1$

$\Rightarrow \cos^2\alpha = \frac{1}{5} \Rightarrow \cos\alpha = -\frac{\sqrt{5}}{5}$ (2)

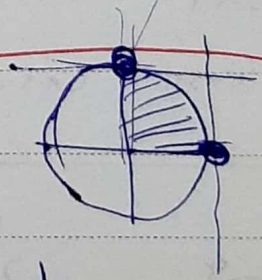
8- $2mx + (m^2-1)y = 2^2 \qquad -\frac{2m}{m^2-1} = \tan 45^\circ = \sqrt{3}$ (2)

$\Rightarrow -2m = \sqrt{3}m^2 - \sqrt{3} \Rightarrow \sqrt{3}m^2 + 2m - \sqrt{3} = 0 \xrightarrow{\div\sqrt{3}} m^2 + \frac{2}{\sqrt{3}}m - 1 = 0$

$\Leftarrow (m-1)\left(m+\frac{\sqrt{3}}{3}\right) = 0 \Rightarrow m_1 = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}, \quad m_2 = -\sqrt{3}$

$m_1 - m_2 = \frac{\sqrt{3}}{3} + \sqrt{3} = \frac{4\sqrt{3}}{3}$

9- $\tan\left(\frac{\pi}{4} - x\right) = \frac{1-m}{2+m} \qquad -\frac{\pi}{4} < x < \frac{\pi}{4}$



$0 < \frac{\pi}{4} - x < \frac{\pi}{2} \Rightarrow \tan\left(\frac{\pi}{4}-x\right) \in (0, +\infty)$ (2)

$\Rightarrow \frac{1-m}{2+m} > 0 \longrightarrow \frac{-2 \quad 1}{- \; + \; -}$ (2) $\Rightarrow -2 < m < 1$

10- $\tan 200^\circ \times \cos 110^\circ + \tan 470^\circ \times \sin 860^\circ$

$200^\circ = 180^\circ + 20^\circ \qquad 110^\circ = 90^\circ + 20^\circ \qquad 470^\circ = 360^\circ + 110^\circ \qquad 860^\circ = 720^\circ + 140^\circ$

$\tan 20^\circ \times -\sin 20^\circ + \tan 110^\circ \times \sin 140^\circ = 0$ (3)