۱- (۲)

$\frac{1}{2}\times a\times a\times \sin 150^\circ = 54 \Rightarrow \frac{1}{2}\times a^2\times\frac{1}{2}=54 \Rightarrow a^2=108 \Rightarrow a=6\sqrt{3}$

محیط $= 2(4a+5a) = 90\sqrt{3}$ ✓

۲- (۲)

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

$\frac{35}{2}\sin A - \frac{28}{2}\sin A = \frac{7}{4}$

$\frac{7}{2}\sin A = \frac{7}{4}$

$\sin A = \frac{1}{2}$

$\hat{A} = 30^\circ$

$\tan\hat{A} = \frac{\sqrt{3}}{3}$ ✓

۳- (۲)

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

$\frac{|\sin\alpha|}{\cos\alpha} = -\frac{\sin\alpha}{\cos\alpha}$

$|\sin\alpha| = -\sin\alpha$

$\sin\alpha<0 \ , \ \cos\alpha<0 \Rightarrow$ زاویه α در ناحیه سوم ✓

$\frac{1}{|\cos\alpha|} - \frac{\sin\alpha}{|\cos\alpha|} = \frac{1+\sin\alpha}{|\cos\alpha|}$

$\frac{\sin\alpha}{\cos\alpha} = \frac{-\sin\alpha}{|\cos\alpha|}$

$|\cos\alpha| = -\cos\alpha$

$\cos\alpha<0$

۴- (۲)

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

$\cot(\pi-\alpha) = -\cot\alpha = \frac{2}{1.5} = \frac{4}{3} \Rightarrow \cot\alpha = -\frac{4}{3}$ ✓

۵- (۲)

$\frac{3\cos(144^\circ)-2\sin(150^\circ)}{\sin(102^\circ)-\cos(192^\circ)} = \frac{-3\sin(22^\circ)-2\sin(22^\circ)}{-\sin(22^\circ)-\sin(22^\circ)} = \frac{-5\sin(22^\circ)}{-2\sin(22^\circ)} = \frac{5}{2}$

۶-

$\frac{\cos\alpha+\sin\alpha}{|\tan^2\alpha-1|} = \frac{\frac{2}{3}-\frac{\sqrt{5}}{3}}{\frac{1}{4}} = \frac{8-4\sqrt{5}}{3}$ ✓

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

$\sin^2\alpha = \frac{5}{9}$

$\sin\alpha = -\frac{\sqrt{5}}{3}$

$\tan^2\alpha = \frac{1}{\cos^2\alpha} - 1 = \frac{5}{4}$

۷- (۲)

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

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

$\cos^2\alpha = \frac{1}{5}$

$\cos\alpha = \frac{-1}{\sqrt{5}} = \frac{-\sqrt{5}}{5}$ ✓

$$\tan 60^\circ = \frac{-2m}{m^2-1}$$

$$\frac{-2m}{m^2-1} = \sqrt{3} \qquad \sqrt{3}m^2 + 2m - \sqrt{3} = 0$$

$$\frac{\sqrt{\Delta}}{|a|} = \frac{\sqrt{4+12}}{\sqrt{3}} = \frac{4}{\sqrt{3}} = \frac{4\sqrt{3}}{3}$$ ✓

-۸ (۲)

-۹ (۲)

$$-\frac{\pi}{4} < x < \frac{\pi}{4}$$

$$\frac{\pi}{4} > -x > -\frac{\pi}{4}$$

$$\frac{\pi}{2} > \frac{\pi}{4} - x > 0$$

$$\tan\left(\frac{\pi}{4} - x\right) = \frac{1-m}{2+m} > 0$$

	-2		1	
$-\frac{1}{4}+9-$	−	∄	+	−

$$-2 < m < 1$$ ✓

-۱۰ (۲)

$$(-\sqrt{3})\left(-\frac{\sqrt{3}}{2}\right) + (-\sqrt{3})\left(\frac{\sqrt{3}}{2}\right) = \frac{3}{2} - \frac{3}{2} = 0$$ ✓