نام و نام خانوادگی ..... پاسخنامه تشریحی تکلیف شماره ۲۷ ..... کلاس یازدهم ریاضی B .....

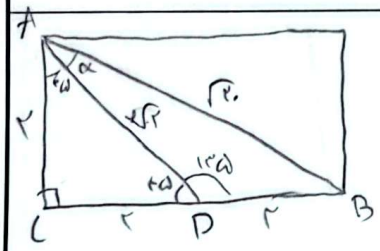
۲۵

۱ (۲)

$S_{\triangle} = \frac{1}{2} AB \sin\alpha \Rightarrow 6\sqrt{3} = \frac{1}{2} \times \sqrt{12} \times 4 \times \sin\alpha \rightarrow \sin\alpha = \frac{9}{\sqrt{12}\times 4} = \frac{\sqrt{3}}{2}$

$\Rightarrow \alpha_1 = 60 \quad , \quad \alpha_2 = 120 \quad \frac{\alpha_2}{\alpha_1} = \frac{120}{60} = 2$ ✓

۲ (۲)

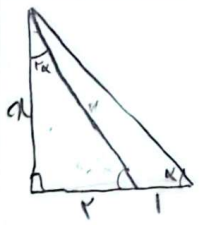


$S_{ABD} = \frac{1}{2} \times 4 \times 2 = 4$

$S_{ABD} = \frac{1}{2} \times \sqrt{12} \times 4\sqrt{5} \times \sin\alpha = 4 \rightarrow \sin\alpha = \frac{\sqrt{10}}{10}$

$\rightarrow \cos\alpha = \frac{\sqrt{90}}{10} \Rightarrow \cot\alpha = \frac{\cos\alpha}{\sin\alpha} = \frac{\frac{\sqrt{90}}{10}}{\frac{\sqrt{10}}{10}} = \sqrt{9} = 3$ ✓

۳ (۲)

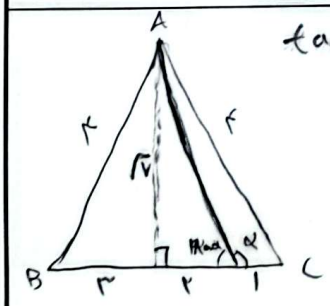


$\tan\alpha = \frac{x}{2}$ $\quad \cot 2\alpha = \frac{x}{4}$ $\quad \cot 2\alpha = \frac{1-\tan^2\alpha}{2\tan\alpha}$

$\frac{x}{4} = \frac{1-\frac{x^2}{9}}{\frac{2x}{3}} \rightarrow \frac{x}{4} = \frac{9-x^2}{6x} \rightarrow 3x^2 = 9 - x^2$

$\rightarrow 4x^2 = 9 \rightarrow x^2 = \frac{9}{4} \rightarrow x = \frac{3}{2}$ $\quad \cot\alpha = \frac{\frac{3}{2}}{2} = \frac{3}{4}$ ✓

۴ (۲)



$\tan(180-\alpha) = -\tan\alpha = \frac{\sqrt{7}}{3}$

$\rightarrow \tan\alpha = -\frac{\sqrt{7}}{3}$ ✓

۵ (۲)

$2\sin^2\alpha + \cos^2\alpha = \frac{5}{4} \rightarrow \sin^2\alpha + 1 = \frac{5}{4} \rightarrow \sin^2\alpha = \frac{1}{4}$

$1 + \cot^2\alpha = \frac{1}{\sin^2\alpha} \rightarrow 1 + \cot^2\alpha = 4 \rightarrow \cot^2\alpha = 3 \rightarrow \tan^2\alpha = \frac{1}{3}$ ✓

۶ (۲)

$\sin^4\alpha = (\sin^2\alpha)^2 = (1-\cos^2\alpha)^2 = 1+\cos^4\alpha - 2\cos^2\alpha$

$\rightarrow \frac{1+\cos^2\alpha+2\cos^2\alpha}{1+\cos^2\alpha} - \frac{1+\sin^4\alpha+2\sin^2\alpha}{1+\sin^2\alpha} = \frac{(1+\cos^2\alpha)^2}{1+\cos^2\alpha} - \frac{(1+\sin^2\alpha)^2}{1+\sin^2\alpha}$

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

۷ (۲)

$1+\tan^2\alpha = \frac{1}{\cos^2\alpha} \rightarrow \frac{25}{9} = \frac{1}{\cos^2\alpha} \rightarrow -\cos\alpha = \frac{3}{5}, -\sin\alpha = \frac{4}{5}, \cot\alpha = \frac{3}{4}$

$\rightarrow \sin\left(\frac{9\pi}{2}+\alpha\right).\cos\left(\frac{7\pi}{2}-\alpha\right) - \tan\left(\alpha-\frac{3\pi}{2}\right) = \cos\alpha.(-\sin\alpha) + \cot\alpha$

$(-\frac{3}{5})\times(+\frac{4}{5}) + \frac{3}{4} = \frac{-12}{25} + \frac{3}{4} = \frac{-48+75}{100} = \frac{27}{100}$ ✓

۸ (۲)

$2\cos\frac{\pi}{3} + \left(\sqrt{2}\sin\frac{\pi}{12} - \sqrt{2}\cos\frac{\pi}{12}\right) = 2\cos\frac{\pi}{3} + 2\sin\left(-\frac{\pi}{6}\right) = 2\times\frac{1}{2} - 2\times\frac{1}{2}$

$= \frac{1}{2}$ ✓

$\sin\alpha - \cos\alpha = \sqrt{2}\sin(\alpha-\frac{\pi}{4})$

$\frac{\pi}{12} - \frac{\pi}{4} = \frac{\pi-3\pi}{12} = -\frac{2\pi}{12} = -\frac{\pi}{6}$

۹ (۲)

$\tan\alpha = \frac{2\tan\frac{\alpha}{2}}{1-\tan^2\frac{\alpha}{2}} \rightarrow \tan\alpha = \frac{\frac{1}{2}}{\frac{15}{16}} = \frac{8}{15} \rightarrow \sin\alpha = \frac{8}{17}, \cos\alpha = \frac{15}{17}$

$\frac{\tan\alpha-\sin\alpha}{\sin\alpha-\cos\alpha} = \frac{\frac{8}{15}-\frac{8}{17}}{\frac{8}{17}-\frac{15}{17}} = \frac{\frac{16}{15\times 17}}{\frac{-7}{17}} = -\frac{16}{105}$ ✓

۱۰ (۲)

$\frac{\cot\alpha}{\sin\alpha} > 0 \rightarrow$ ربع اول یا ربع چهارم

ربع اول: جفت مثبت — ربع چهارم: جفت منفی

$2\sin\alpha < \sin 2\alpha \rightarrow 2\sin\alpha < 2\sin\alpha\cos\alpha$

$-1 < \cos\alpha$

ربع سوم یا ربع چهارم

ربع چهارم