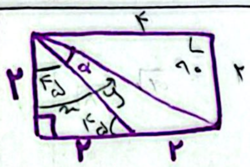
نام و نام خانوادگی ......ترنم احیایی...... پاسخنامه تشریحی تکلیف شماره ...۲۷... کلاس ......A......

۱

$\frac{1}{2} \times 6 \times \sqrt{3} \times \sin\alpha = 4/5 \Rightarrow \sin\alpha = \frac{9}{6\sqrt{3}} \Rightarrow \frac{\sqrt{3}}{2}$

$\sin\alpha = \frac{\sqrt{3}}{2}$ → $\alpha = \frac{\pi}{3}$, $\alpha = \frac{2\pi}{3}$ $\Rightarrow \frac{\alpha_{max}}{\alpha_{min}} = \frac{\frac{2\pi}{3}}{\frac{\pi}{3}} = (2)$

۲



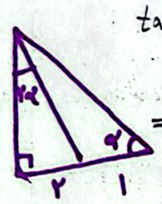
$\Rightarrow \cot\alpha = 3$

$\tan\alpha = \tan(y-x)$

$\tan x = 2/2 = 1 \Rightarrow \tan y = \frac{4}{2} = 2$

$\Rightarrow \tan(y-x) = \frac{\tan y - \tan x}{1+\tan x \tan y} = \frac{2-1}{1+2} = \frac{1}{3}$

۳



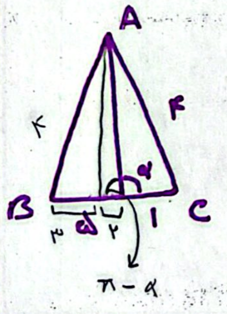
$\tan 2\alpha = \tan(\alpha+\alpha) = \frac{\tan\alpha + \tan\alpha}{1-\tan^2\alpha} = \frac{2\tan x}{1-\tan^2 x}$

$\Rightarrow \tan\alpha = \frac{x}{3}$, $\tan 2\alpha = \frac{3}{x}$

$\Rightarrow \frac{\frac{2x}{3}}{1-\frac{x^2}{9}} = \frac{\frac{2x}{3}}{\frac{9-x^2}{9}} = \frac{6x}{9-x^2} = \frac{3}{x} \Rightarrow 6x^2 = 18 - 2x^2 \to x^2 = \frac{9}{4}$ → $+\frac{3}{2}$ (ق ق ✓) , $-\frac{3}{2}$ (غ ق ق)

$\Rightarrow \tan\alpha = \frac{3/2}{3} = 1/2 \Rightarrow \cot\alpha = \boxed{2}$

۴



$AB^2 = AH^2 + BH^2 \Rightarrow 16 = AH^2 + 9$

$\Rightarrow AH^2 = 7 \Rightarrow AH = \sqrt{7}$

$\tan(\pi-\alpha) = \frac{\sqrt{7}}{2} \Rightarrow -\tan\alpha = \frac{\sqrt{7}}{2} \Rightarrow \tan\alpha = -\frac{\sqrt{7}}{2}$

۵

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

$\tan^2 x = ?$ → $\frac{\sin^2 x}{\cos^2 x} = \frac{\sin^2 x}{1-\sin^2 x} = \frac{\frac{1}{3}}{\frac{2}{3}} = \left(\frac{1}{2}\right)$

۶

$$\frac{\sin^4\alpha+4\overset{1-\sin^2\alpha}{\cos^2\alpha}}{1+\underbrace{\cos^2\alpha}_{1-\sin^2\alpha}}-\frac{\cos^4\alpha+4\overset{1-\cos^2\alpha}{\sin^2\alpha}}{1+\underbrace{\sin^2\alpha}_{1-\cos^2\alpha}}$$

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

$$\Rightarrow(2-\sin^2\alpha)-(2-\cos^2\alpha)=\cos^2\alpha-\sin^2\alpha=\boxed{\cos(2\alpha)}$$

۷

$$\sin(\frac{9\pi}{2}+\alpha)\cos(\frac{7\pi}{2}-\alpha)-\tan(\alpha-\frac{3\pi}{2})$$

$$\sin(\frac{\pi}{2}+\alpha)\cos(\frac{3\pi}{2}-\alpha)+\tan(\frac{3\pi}{2}-\alpha)$$

α ربع ① IF: $\cos(\alpha)(-\sin(\alpha))+\cot(\alpha)$ $\xrightarrow[\alpha \text{ ربع سوم}]{\tan\alpha=\frac43}$ $\cos\alpha=-\frac35$ ، $\sin\alpha=-\frac45$ ، $\cot\alpha=\frac34$

$$\Rightarrow(-\frac35)(-(-\frac45))+\frac34=-\frac{12}{25}+\frac34=\frac{27}{100}=0/27$$

۸

$$(3\cos\underbrace{4x}_{\frac{\pi}{3}}+\sqrt2\sin\underbrace{x}_{\frac{\pi}{12}}-\sqrt2\cos\underbrace{x}_{\frac{\pi}{12}})\Rightarrow\frac32+\sqrt2\underbrace{(\sin\frac{\pi}{12}-\cos\frac{\pi}{12})}_{A}$$

$x=\frac{\pi}{12}$

$\sin\frac{\pi}{12}<\cos\frac{\pi}{12}$ → $A<0$

$$\Rightarrow A^2=(\sin\frac{\pi}{12}-\cos\frac{\pi}{12})^2=\sin^2\frac{\pi}{12}+\cos^2\frac{\pi}{12}-2\sin\frac{\pi}{12}\cos\frac{\pi}{12}$$

$$A^2=1-\sin\frac{\pi}{6}=1-\frac12=\frac12\xrightarrow[A<0]{\sqrt{\ }}A=-\frac{1}{\sqrt2}\Rightarrow\frac32+\sqrt2(-\frac{1}{\sqrt2})=\frac32-1=\boxed{\frac12}$$

۹

$$\tan(\frac{\alpha}{2})=\frac14\to\tan\alpha=\frac{2\tan\frac{\alpha}{2}}{1-\tan^2\frac{\alpha}{2}}=\frac{2(\frac14)}{1-\frac1{16}}=\frac{\frac12}{\frac{15}{16}}=\frac{8}{15}$$

$$\frac{\tan\alpha-\sin\alpha}{\sin\alpha-\cos\alpha}$$

$\sin\alpha=\frac{8}{17}$ ، $\cos\alpha=\frac{15}{17}$

$$\frac{\frac{8}{15}-\frac{8}{17}}{\frac{8}{17}-\frac{15}{17}}=\frac{\frac{8(17-15)}{17\times15}}{-\frac{7}{17}}=-\frac{16}{105}$$

۱۰

$$2\sin\alpha<\sin2\alpha\Rightarrow2\sin\alpha<2\sin\alpha\cos\alpha$$

$$2\sin\alpha-2\sin\alpha\cos\alpha<0\Rightarrow2\sin\alpha\underbrace{(1-\cos\alpha)}_{\text{همواره مثبت } \oplus}<0$$

$\frac{\cot\alpha}{\sin\alpha}>0$ → هر دو ⊖

$\Rightarrow\sin\alpha<0$ → نتیجه $\Rightarrow$ ربع ④