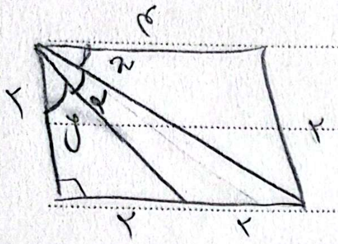
$\tan y = \frac{2}{2} = 1$

$\tan x = \frac{2}{4} = \frac{1}{2}$

حسنا جبری ، ۱/ ص ۲۷ یازدهم دختر A.

۱۲)



$\alpha + x + y = 90 \rightarrow \alpha = 90 - (x+y)$

$\cot\alpha = \cot(\pi/2 - (x+y)) = \tan(x+y) =$

$\frac{\tan x + \tan y}{1 - \tan x \times \tan y} = \frac{1/2 + 1}{1 - 1/2} = \frac{3/2}{1/2} = 3$

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۱۱)

$S = 1/2\, a \times b \times \sin\alpha \Rightarrow 1/2 \times \sqrt{3} \times 6 \times \sin\alpha = 3\sqrt{3} \times \sin\alpha = 4/5$

$\rightarrow \sin\alpha = \frac{1/5}{\sqrt{3}} = \frac{3/2}{\sqrt{3}} = \frac{3}{2\sqrt{3}} = \frac{\sqrt{3}}{2} \rightarrow \alpha = \frac{\pi}{3}$

$\rightarrow \alpha = \frac{2\pi}{3}$ } ۲ بار

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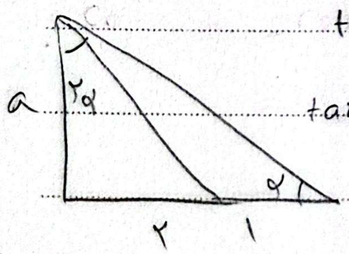
۱۳)



$\tan\alpha = \frac{a}{3} \rightarrow \cot\alpha = \frac{3}{a} = \frac{3}{3/2} = \frac{6}{3} = 2$

$\tan 2\alpha = \frac{2}{a} = \frac{2\tan\alpha}{1-\tan^2\alpha} = \frac{\frac{2a}{3}}{1 - a^2/9} = \frac{\cancel{2}a/3}{\frac{9-a^2}{9}} = \frac{\cancel{2}}{a}$

$3a^2 = \frac{9-a^2}{\cancel{3}} \rightarrow a^2 = 9/4 \rightarrow a = 3/2$

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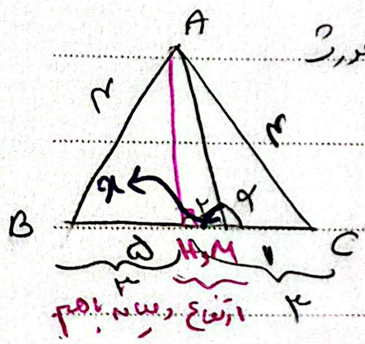
۱۴)



فیثاغورث : $(AH)^2 + (CH)^2 = (AC)^2$ (۹ ، ۱۶) $\rightarrow AH = \sqrt{7}$

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

Subject : ( ) Date :

۱۵) $2\sin^2 + \cos^2 = \sin^2 + 1 = 4/3 \rightarrow \sin^2 = 1/3 \Rightarrow \cos^2 = 2/3$

$\tan^2 = \frac{1/3}{2/3} = \boxed{1/2}$

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۱۶) $\frac{\sin^2 + 4\cos^2}{1+\cos^2}$ ① $-$ $\frac{\cos^2 + 4\sin^2}{1+\sin^2}$ ②

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

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

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

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

$2 - \sin^2 - 2 + \cos^2 = \cos^2 - \sin^2 = \boxed{\cos 2\alpha}$

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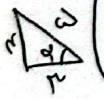
۱۷) $\sin\left(\frac{9\pi}{2} + \alpha\right) \times \cos\left(\frac{7\pi}{2} - \alpha\right) - \tan\left(\alpha - \frac{3\pi}{2}\right)$

$\frac{9\pi}{2} = 4\pi + \frac{\pi}{2}$, $\frac{7\pi}{2} = 3\pi + \frac{\pi}{2}$

$\cos\alpha \times -\sin\alpha + \cot\alpha =$

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

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



$\rightarrow -\frac{3}{3} \times \frac{4}{5} + \frac{3}{4} = \frac{-12}{20} + \frac{3}{4} = \frac{-24+35}{40} = \boxed{\frac{11}{40}}$

---

۱۸)

$* \sin\alpha - \cos\alpha = \sqrt{2}\sin\left(\alpha - \frac{\pi}{4}\right) \Rightarrow \sqrt{2}(\sin\alpha - \cos\alpha) = 2\sin\left(\frac{\pi}{12} - \frac{\pi}{4}\right)$

$= 2\sin\left(-\frac{\pi}{6}\right) = 2 \times \frac{-1}{2} = \boxed{-1}$

$3\cos^2\left(\frac{\pi}{12}\right) = 3\cos\left(\frac{\pi}{6}\right) = 3 \times \frac{1}{2} = \boxed{\frac{3}{2}}$ $\rightarrow \frac{3}{2} - 1 = \boxed{\frac{1}{2}}$

Arman

Subject : (   )   Date : ....

۹) تانژانت تعریف شده است پس: $\frac{\alpha}{2} \neq k\pi + \frac{\pi}{2}$

$$\sin\alpha = \frac{2\tan(\frac{\alpha}{2})}{1+\tan^2(\frac{\alpha}{2})} = \frac{2\times\frac{1}{4}}{1+\frac{1}{16}} = \frac{1}{\cancel{2}} \times \frac{\cancel{16}^{8}}{17} = \boxed{\frac{8}{17}}$$

$$\cos\alpha = \frac{1-\tan^2(\frac{\alpha}{2})}{1+\tan^2(\alpha/2)} = \frac{1-\frac{1}{16}}{1+\frac{1}{16}} = \frac{15}{\cancel{16}} \times \frac{\cancel{16}}{17} = \boxed{\frac{15}{17}}$$

$$\tan\alpha = \frac{8}{17} \times \frac{17}{15} = \boxed{\frac{8}{15}}$$

$$\rightarrow \frac{\tan\alpha - \sin\alpha}{\sin\alpha - \cos\alpha} = \frac{\frac{8}{15} - \frac{8}{17}}{\frac{8}{17} - \frac{15}{17}} = \frac{\frac{16}{255}}{\frac{-7}{17}} = \frac{16}{\cancel{255}_{15}} \times \frac{-\cancel{17}^{1}}{7} = \boxed{\frac{-16}{105}}$$

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۱۰) $2\sin\alpha < \sin 2\alpha \rightarrow \cancel{2}\sin\alpha < \cancel{2}\sin\alpha\cos\alpha \xrightarrow{\sin>0} \cos\alpha > 1$ ✗

ناحیه سوم یا چهارم $\boxed{\sin<0} \rightarrow \cos\alpha < 1$ ✓

$$\frac{\cot\alpha}{\sin\alpha} > 0 \rightarrow \frac{\cos\alpha}{\sin^2\alpha} > 0 \rightarrow \boxed{\cos\alpha > 0} \Longrightarrow$$ ناحیه چهارم