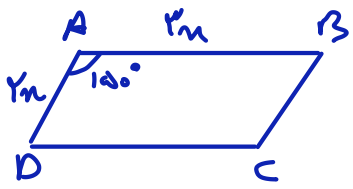
## ۱




$S_{ABCD} = 2n \times 2n \times \sin 150^\circ = 2n^2 = 24 \longrightarrow n^2 = 12 \longrightarrow n = \sqrt{12}$

محیط $= 10n \longrightarrow \boxed{10\sqrt{12}}$

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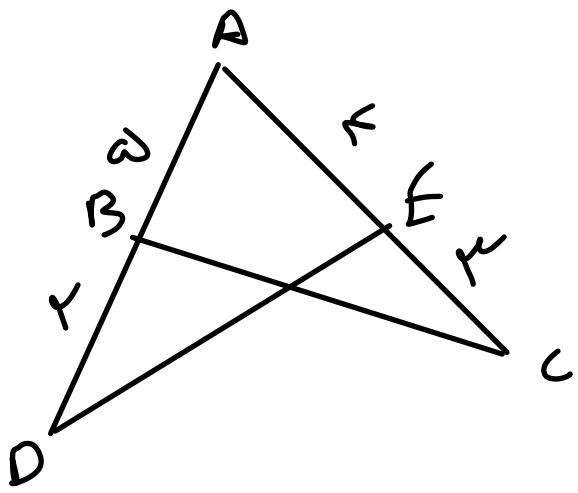
## ۲




$|S_{AB\hat{C}} - S_{AD\hat{E}}| = 1,75$

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

$\frac{1}{2} \times 7 \times \sin\hat{A}(5-4) = 1,75 \longrightarrow \sin\hat{A} = \frac{1,75}{3,5} = 0,5 \longrightarrow \hat{A} = 30^\circ$ قابل قبول

$\hookrightarrow \hat{A} = 150^\circ$ غیرقابل قبول ($\hat{A}$ حاده است)

$\tan\hat{A} = \tan 30^\circ = \boxed{\frac{\sqrt{3}}{3}}$

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## ۳

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

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

$-\frac{\sin\alpha}{\cos\alpha} = \frac{1+\sin\alpha-1}{|\cos\alpha|} \longrightarrow -\frac{\sin\alpha}{\cos\alpha} = \frac{\sin\alpha}{|\cos\alpha|} \Longrightarrow \cos\alpha < 0$ ناحیه دوم و سوم

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

$\frac{|\sin\alpha|}{\cos\alpha} = -\frac{\sin\alpha}{\cos\alpha} \Longrightarrow \sin\alpha < 0$ * ناحیه سوم یا چهارم

$\Longrightarrow$ ناحیه سوم

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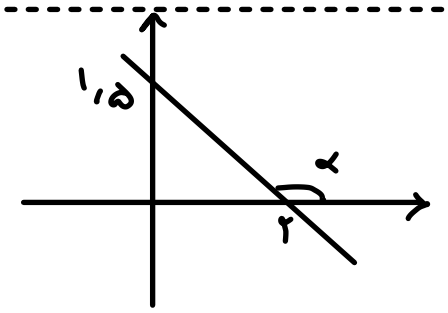
## ۴




$\tan\alpha = -\frac{1,5}{2} = -0,75$

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

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## ۵

$\frac{3\cos 248^\circ - 2\sin 158^\circ}{\sin 270^\circ - \cos 270^\circ} = \frac{3\cos(\frac{3\pi}{2} - \alpha) - 2\sin(\pi - \alpha)}{\sin(\pi + \alpha) - \cos(\frac{3\pi}{2} + \alpha)} = \frac{-3\sin\alpha - 2\sin\alpha}{-\sin\alpha - \sin\alpha} = \frac{-5\sin\alpha}{-2\sin\alpha} = \boxed{2,5}$

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## ۶

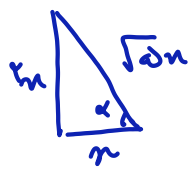
$\frac{\sin(\frac{\pi}{2} + \alpha) - \sin(\alpha - \pi)}{|\tan^2\alpha - 1|} \longrightarrow \cos\alpha$ , $-\sin\alpha$

$\longrightarrow \frac{\frac{2}{3} - \frac{\sqrt{5}}{3}\cos\alpha + \sin\alpha}{\frac{1}{4}} = \boxed{\frac{8 - 4\sqrt{5}}{3}}$


$\longrightarrow \sin\alpha = -\frac{\sqrt{5}}{3} \quad \cos\alpha = \frac{2}{3}$

$\tan\alpha = -\frac{\sqrt{5}}{2}$

$\sin\alpha = 2\cos\alpha$




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

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$2mx+(m^2-1)y=2$ $\longrightarrow$ $y=-\frac{2m}{m^2-1}x-\frac{2}{2m}$ $\longrightarrow$ $-\frac{2m}{m^2-1}=\tan 45^\circ$ $\longrightarrow$ $-2m=\sqrt{2}m^2-\sqrt{2}$ ④

$\sqrt{2}m^2+2m-\sqrt{2}=0$

$|\alpha\cdot\beta|=\frac{\sqrt{\Delta}}{|a|}$ $\longrightarrow$ $\frac{\sqrt{16}}{\sqrt{2}}=\frac{4}{\sqrt{2}}=\frac{4\sqrt{2}}{2}$

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$\tan\left(\frac{\pi}{6}-x\right)=\frac{1-m}{2+m}$ $\quad -\frac{\pi}{4}<x<\frac{\pi}{4}$ ⑨

$\frac{\pi}{4}>-x>-\frac{\pi}{4}$ $\longrightarrow$ $\frac{\pi}{2}>\underbrace{\frac{\pi}{4}-x}_{t}>0$ $\longrightarrow 0<\tan\left(\frac{\pi}{4}-x\right)<\infty$

$0<\frac{1-m}{2+m}$ $\longrightarrow$ 

$\longrightarrow$ $-2<m<1$

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$\tan 20^\circ\cos 210^\circ+\tan 240^\circ\sin 150^\circ=-\sqrt{2}\times-\frac{\sqrt{2}}{2}+-\sqrt{2}\times\frac{\sqrt{2}}{2}=0$ ⑩