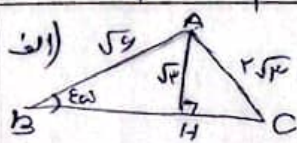


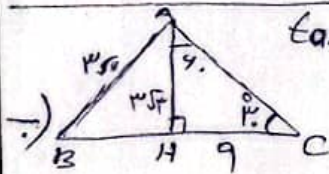
الف)
$$\frac{(\sin 135^\circ + \sin 135^\circ)(\cos 135^\circ + \cos 135^\circ)}{(\frac{\sqrt{2}}{2} + \frac{-\sqrt{2}}{2})(\frac{\sqrt{2}}{2} + (\frac{-\sqrt{2}}{2}))} = \frac{\sqrt{2}-\sqrt{2}}{2} \times \frac{\sqrt{2}+\sqrt{2}}{2} = \frac{-1}{2}$$

$$\Rightarrow \frac{1 + 3 \tan 45^\circ}{\frac{\cos 135^\circ}{3} + \frac{\cos 135^\circ}{1}} = \frac{1+1}{3+1} = \frac{2}{4} = \frac{1}{2}$$



$\sin 45^\circ = \frac{\sqrt{2}}{2} = \frac{AH}{\sqrt{2}} \rightarrow AH = \frac{\sqrt{2}}{2} \times \sqrt{2} = 1 \rightarrow HC = \sqrt{2^2 - 1^2} = \sqrt{3}$

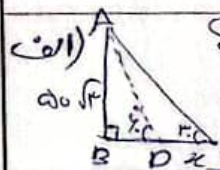
$HC = 3 \leftarrow \text{چون ضلع همیشه مثبت است}$



$\tan 45^\circ = \frac{\sqrt{2}}{3}$

$\frac{AH}{9} = \frac{\sqrt{2}}{3} \rightarrow HA = 3\sqrt{2}$

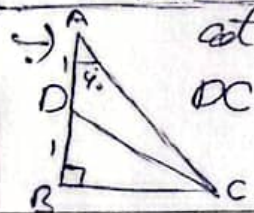
$\sin B = \frac{3\sqrt{2}}{6\sqrt{2}} = \frac{\sqrt{2}}{2} = \frac{\sqrt{2}}{2} = 45^\circ$



$\sin 45^\circ = \frac{\sqrt{2}}{2} = \frac{AD}{100} \rightarrow AD = 50$

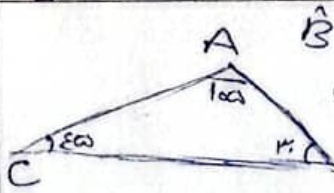
$BD + (50\sqrt{2}) = 100 \rightarrow BD = 50 \rightarrow BC = 50 + 50 = 100$

$\tan C = \frac{50\sqrt{2}}{50+50} = \frac{\sqrt{2}}{2} \rightarrow C = 45^\circ$



$\tan 45^\circ = \frac{\sqrt{2}}{4} = \frac{AD}{BC} \rightarrow 4 = BC\sqrt{2} \rightarrow BC = \frac{4}{\sqrt{2}} = 2\sqrt{2}$

$DC = \sqrt{2} \rightarrow \sin \alpha = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$



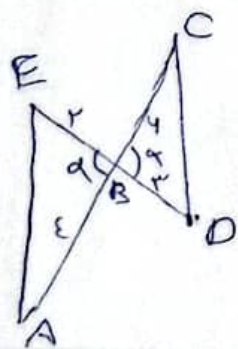
$B = 105^\circ + 45^\circ = 150^\circ \quad 180 - 150 = 30^\circ$

$\frac{AB}{\sin 105^\circ} = \frac{AC}{\sin 30^\circ}$

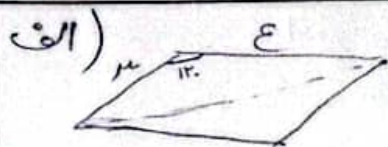
$\sin 105^\circ = \sin(45^\circ + 60^\circ) = \frac{\sqrt{2}}{2} \times \frac{1}{2} + \frac{\sqrt{2}}{2} \times \frac{\sqrt{3}}{2}$

$\frac{\sqrt{2}}{2} + \frac{\sqrt{6}}{2} \rightarrow \sin 105^\circ = \frac{\sqrt{2}+\sqrt{6}}{2}$

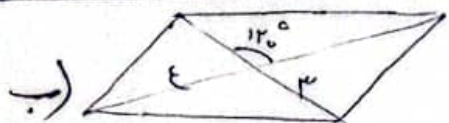
$\frac{AB}{\frac{\sqrt{2}+\sqrt{6}}{2}} = \frac{AC}{\frac{1}{2}} \rightarrow \frac{AB}{AC} = \frac{\sqrt{2}+\sqrt{6}}{1} = \frac{\sqrt{2}+\sqrt{6}}{1}$



$\frac{S_{ABE}}{S_{BCD}} = \frac{\frac{1}{2} \times 4 \times 4 \times \sin 45^\circ}{\frac{1}{2} \times 4 \times 4 \times \sin 45^\circ} = \frac{4}{4}$

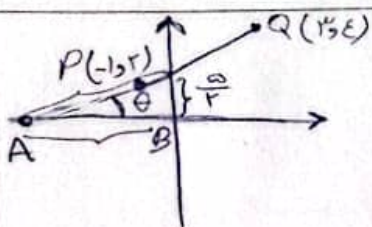


$$S = r \times E \times \sin 110^\circ = r \times E \times \frac{\sqrt{r}}{r} = \sqrt{r} \times E$$



$$S = \frac{1}{r} \times a \times b \times \sin \alpha \rightarrow S = \frac{1}{r} \times a \times b \times \sin 110^\circ$$

$$\frac{1}{r} \times E \times r \times \frac{\sqrt{r}}{r} = \sqrt{r} \times E$$



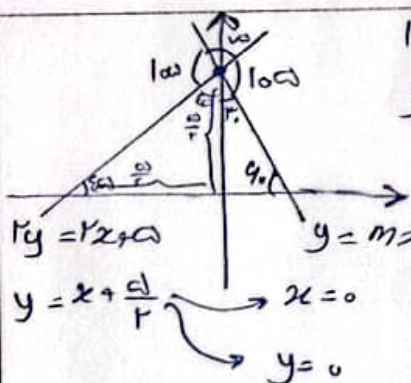
$$\tan(\theta) = \frac{y_2 - y_1}{x_2 - x_1} = \frac{E - \frac{1}{r}}{r + 1} = \frac{1}{r}$$

$$y = mx + b \rightarrow E = \frac{1}{r}r + b \rightarrow m = \frac{1}{r}$$

$$E = \frac{1}{r}r + b \rightarrow b = \frac{a}{r} \rightarrow y = \frac{1}{r}x + \frac{a}{r}$$

$$AB = r \rightarrow y = 0 \rightarrow x = r \rightarrow \cos \theta = \frac{a}{r}$$

$$\omega^r + \left(\frac{a}{r}\right)^r = x^r \rightarrow x = \frac{\omega \sqrt{a}}{r} \rightarrow \cos \theta = \frac{a}{\omega \sqrt{a}} = \frac{\sqrt{a}}{\omega}$$



$$100 \times r = 110 \rightarrow \frac{r \times 110 - 110}{r} = \sqrt{a}$$

$$y = mx + b \Rightarrow b = \frac{a}{r}$$

$$m = \tan 110^\circ = -\sqrt{r}$$

$$110 - 90 = 20^\circ$$

$$m \times b = \frac{a}{r} \times (-\sqrt{r}) = \frac{-a\sqrt{r}}{r}$$

$$F(x) = \cos(\pi + x) + \sin\left(\frac{\pi}{r} - x\right) - \tan\left(\frac{r}{r}x + x\right)$$

$$F\left(\frac{\pi}{r}\right) \Rightarrow \frac{\sqrt{r}}{r} + \left(-\frac{\sqrt{r}}{r}\right) - \sqrt{r} = -\sqrt{r}$$

$$\sin\left(\frac{\sqrt{r}}{r}x + x\right) + \cos\left(\frac{\sqrt{r}}{r}x - x\right)$$

$$\cos(r\pi + x) - \sin(9\pi - x)$$

$$\frac{\cos x - \sin x}{\sin\left(\frac{\pi}{r} + x\right) + \cos\left(\frac{\sqrt{r}}{r}x - x\right)} = \frac{\cos x - \sin x}{\cos(\pi + x) - \sin(9\pi - x)}$$

$$= \frac{\cos x - \sin x}{-\cos x + \sin x}$$

$$= \frac{-(-\cos x + \sin x)}{-\cos x + \sin x} = -1$$