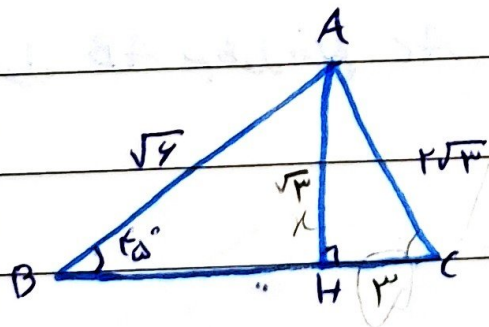


نفسرنا اسامی

$$\text{الف) } (\sin 135^\circ + \sin 225^\circ) (\cos 135^\circ - \cos 225^\circ) = \frac{\sqrt{2}}{2} + \left(-\frac{\sqrt{2}}{2}\right) \times \frac{\sqrt{2}}{2} - \left(-\frac{\sqrt{2}}{2}\right) \quad (1)$$

$$\left(\frac{\sqrt{2}}{2} - \frac{\sqrt{2}}{2}\right) \times \left(\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2}\right) = \left(\frac{\sqrt{2}}{2}\right)^2 - \left(\frac{\sqrt{2}}{2}\right)^2 = \frac{2}{4} - \frac{2}{4} = -\frac{1}{2}$$

$$\text{ب) } \frac{1 + 3 \tan^2 45^\circ}{2 \cos^2 45^\circ + 2 \cos^2 135^\circ} = \frac{1 + 3 \left(\frac{\sqrt{2}}{2}\right)^2}{2 \times \left(\frac{\sqrt{2}}{2}\right)^2 + 2 \left(-\frac{\sqrt{2}}{2}\right)^2} = \frac{1 + 3 \times \frac{2}{4}}{2 \times \frac{2}{4} + 2 \times \frac{2}{4}} = \frac{1 + 1}{2 + 2} = \frac{2}{4} = \frac{1}{2}$$



طرح ضلع و زاویه پیدا کردیم:

$$\sin 45^\circ = \frac{x}{\sqrt{6}} = \frac{\sqrt{2}}{2} \rightarrow \frac{\sqrt{2} \times \sqrt{6}}{2} = \frac{\sqrt{12}}{2} = \frac{2\sqrt{3}}{2} = \sqrt{3}$$

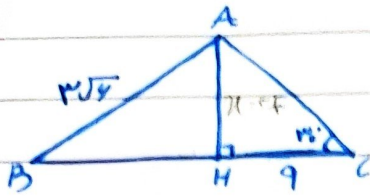
$$(2\sqrt{3})^2 = x^2 + (3)^2$$

$$12 = x^2 + 9$$

$$9 = x^2$$

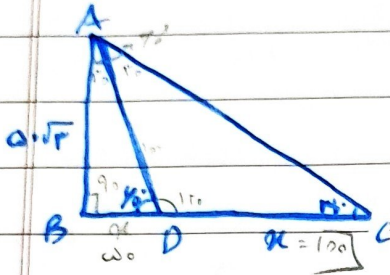
$$x = 3$$

ب) اندازهای B



$$\tan 70^\circ = \frac{\sqrt{5}}{1} = \frac{H}{1} \Rightarrow H = \sqrt{5}$$

$$\sin B = \frac{H}{AB} = \frac{\sqrt{5}}{2\sqrt{5}} = \frac{1}{2} \quad (B = 30^\circ)$$



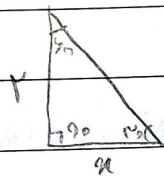
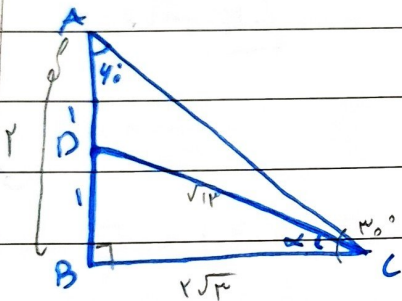
$$\tan 70^\circ = \frac{\sqrt{5}}{1} = \frac{AD}{1} \Rightarrow AD = \sqrt{5}$$

$$\tan 40^\circ = \frac{\sqrt{5}}{1} = \frac{AD}{1} \Rightarrow AD = \sqrt{5}$$

$$\tan 40^\circ = \frac{\sqrt{5}}{1} = \frac{AD}{1} \Rightarrow AD = \sqrt{5}$$

$$\omega + \alpha = 180^\circ$$

$$\alpha = 100^\circ$$



$$\tan 40^\circ = \frac{\sqrt{5}}{1} = \frac{r}{1} \Rightarrow r = \sqrt{5}$$

$$\alpha = 100^\circ$$

سینوس

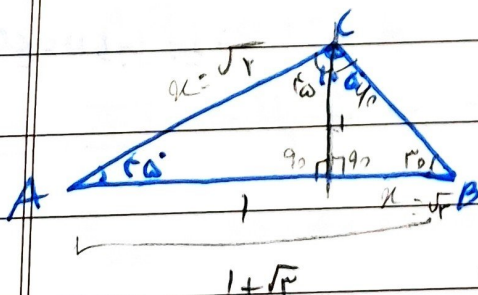
$$(2\sqrt{5})^2 + 1 = \alpha^2$$

$$r^2 + 1 = \alpha^2$$

$$1^2 = \alpha^2$$

$$\sqrt{1} = \alpha$$

$$\sin \alpha = \frac{1}{\sqrt{5}}$$



د) نسبت طول AB به طول AC

$$\tan A = \tan 60^\circ = \frac{1}{1}$$

$$1^2 + 1^2 = \alpha^2$$

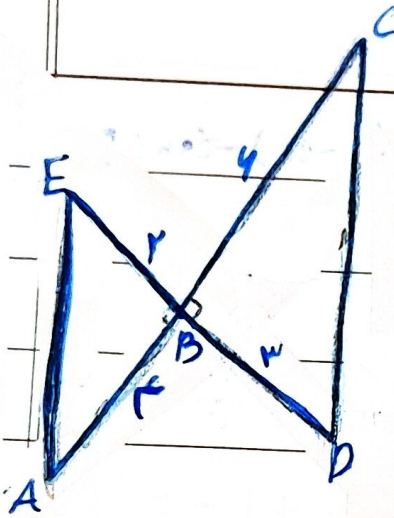
$$r = \alpha$$

$$\alpha = \sqrt{2}$$

$$\tan B = \tan 30^\circ = \frac{\sqrt{5}}{1} = \frac{1}{\alpha} = r = \sqrt{5} \alpha$$

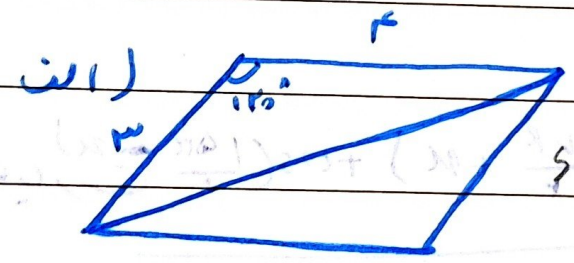
$$\sqrt{5} = \alpha$$

$$\frac{AB}{AC} = \frac{1+\sqrt{5}}{\sqrt{5}}$$



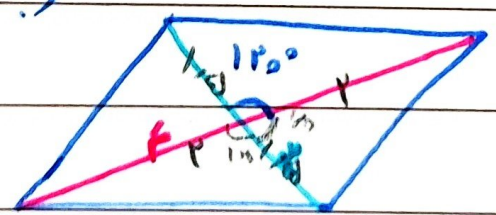
⑤ مساحت ABE و مساحت BCD $\rightarrow$ $AB^2 + (3+4)^2 = 16$

$$\begin{aligned} ABE: \frac{1}{2} \times r \times r \times \sin 90^\circ &= \frac{1}{2} \times r \times r \times 1 = r \\ DCB: \frac{1}{2} \times r \times 4 \times \sin 90^\circ &= \frac{1}{2} \times r \times 4 \times 1 = 2r \end{aligned} \quad \left[\frac{r}{2} \right]$$



⑥ مساحت متوازی الاضلاع زیر:

$$S = 3 \times 4 \times \sin 120^\circ = 3 \times 4 \times \frac{\sqrt{3}}{2} = 6\sqrt{3}$$



$$\frac{1}{2} \times 2 \times 1.5 \times \sin 120^\circ = \frac{1}{2} \times 2 \times 1.5 \times \frac{\sqrt{3}}{2} \times 2 = \frac{3\sqrt{3}}{2}$$

$$\frac{1}{2} \times 2 \times 1 \times \sin 60^\circ = \frac{1}{2} \times 2 \times 1 \times \frac{\sqrt{3}}{2} \times 2 = \frac{3\sqrt{3}}{2}$$

$$\frac{3\sqrt{3}}{2} + \frac{3\sqrt{3}}{2} = \frac{3\sqrt{3} + 3\sqrt{3}}{2} = \frac{2 \times 3\sqrt{3}}{2} = 3\sqrt{3}$$

المطلوب $f\left(\frac{\pi R}{4}\right)$ ، إذاً $f(x) = \cos(R+x) + \sin\left(\frac{R}{r} - x\right) - \tan\left(\frac{\pi R}{r} + x\right)$ (9)

$$-\cos + \sin + \cot = f(x)$$

$$f\left(\frac{\pi R}{4}\right) = 100^\circ \quad \cos = -\frac{\sqrt{r}}{r}$$

$$\sin = \frac{1}{r}$$

$$+\frac{\sqrt{r}}{r} + \frac{1}{r} - \frac{\sqrt{r}}{1} =$$

$$\cot = -\sqrt{r} \quad \frac{\sqrt{r} + 1 - r\sqrt{r}}{r} = \frac{-\sqrt{r} + 1}{r}$$

$\sin\left(\frac{1\sqrt{r}}{r} + x\right) + \cos\left(\frac{1\pi R}{r} - x\right)$ (10)

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

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