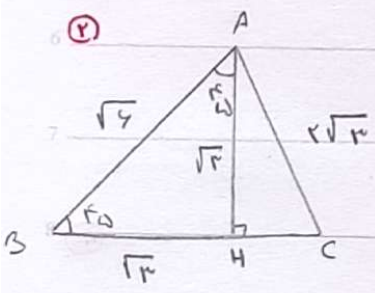


الف -

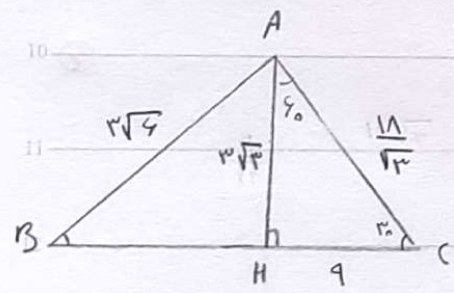
$$① \left(\frac{\sqrt{2}}{2} - \frac{\sqrt{3}}{2} \right) \left(\frac{\sqrt{2}}{2} + \frac{\sqrt{3}}{2} \right) \xrightarrow{\text{مزدج}} \left(\frac{\sqrt{2}}{2} \right)^2 - \left(\frac{\sqrt{3}}{2} \right)^2 = \frac{2-3}{4} = -\frac{1}{4}$$

$$\text{ب - } \frac{1 + 3 \times \left(\frac{1}{\sqrt{3}} \right)^2}{2 \times \left(\frac{\sqrt{2}}{2} \right)^2 + 2 \times \left(\frac{\sqrt{3}}{2} \right)^2} \rightarrow \frac{1 + \frac{3}{3}}{\frac{2 \times 2}{4} + \frac{2 \times 3}{4}} = \frac{2}{2+3} = \frac{2}{5}$$



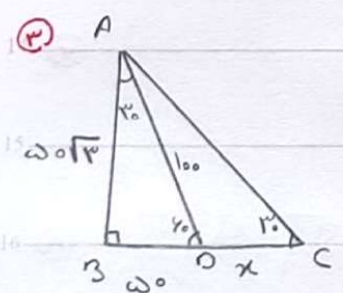
$$4 = 2AH^2 \rightarrow AH = \sqrt{2}$$

$$\left(2\sqrt{3} \right)^2 = \left(\sqrt{2} \right)^2 + HC^2 \rightarrow 12 = 2 + HC^2 \rightarrow HC = \sqrt{10} = 3$$



$$\frac{\sqrt{3}}{2} AC = 9 \rightarrow AC = \frac{12}{\sqrt{3}} = 4\sqrt{3}$$

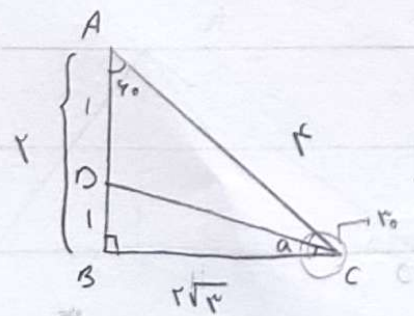
$$\sin B \rightarrow \frac{4\sqrt{3}}{8\sqrt{4}} \times \frac{\sqrt{3}}{4\sqrt{4}} = \frac{\sqrt{12}}{6} = \frac{2\sqrt{3}}{6} = \frac{\sqrt{3}}{3} \rightarrow 45^\circ$$



$$\frac{\sqrt{3}}{2} AD = 50\sqrt{3} \rightarrow AD = 100$$

$$\tan 30^\circ = \frac{50\sqrt{3}}{50+x} = \frac{\sqrt{3}}{3} \rightarrow 150\sqrt{3} = 50\sqrt{3} + \sqrt{3}x$$

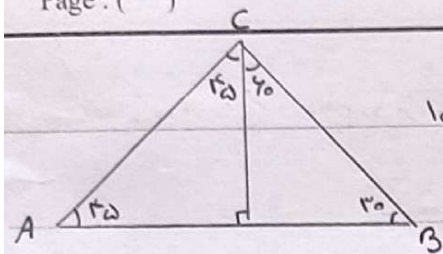
$$100\sqrt{3} = \sqrt{3}x \rightarrow x = 100$$



$$\frac{\sqrt{2}}{2} \times 1 = 1/\sqrt{2} = CB$$

$$CD^2 = 1 + \left(\frac{1}{\sqrt{2}} \right)^2 \rightarrow CD = \sqrt{3/2}$$

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



$$10^\circ - 30^\circ = 40^\circ$$

$$\frac{AB}{\sin C} = \frac{AC}{\sin B} \rightarrow \frac{AB}{AC} = \frac{\sin C}{\sin B} = \frac{\sin 10^\circ}{\sin 30^\circ}$$

تقسیم کنیم

$$\sin 10^\circ = \sin(40^\circ + 30^\circ) \rightarrow \sin 40^\circ \cos 30^\circ + \cos 40^\circ \sin 30^\circ = \frac{\sqrt{3} + \sqrt{r}}{r}$$

$$\frac{\frac{\sqrt{3} + \sqrt{r}}{r}}{\frac{1}{r}} = \frac{\sqrt{3} + \sqrt{r}}{r}$$

$$\frac{S_{ABE}}{S_{BCD}} = \frac{\frac{1}{r} \times r \times r \times \sin B}{\frac{1}{r} \times r \times r \times \sin B} = \frac{1}{1} = \frac{r}{9}$$

$$\text{الف) } r \times r \times \left(\frac{\sin 10^\circ}{\frac{\sqrt{r}}{r}} \right) = 9\sqrt{r}$$

$$\rightarrow \frac{1}{r} \times r \times r \times \left(\frac{\sin 10^\circ}{\frac{\sqrt{r}}{r}} \right) = 3\sqrt{r}$$

$$m = \frac{r - r}{r + 1} = \frac{r}{r} = \frac{1}{r} = \tan \theta \rightarrow \cos = \frac{r}{\sqrt{r}}$$

$$\tan \theta = \frac{m_r - m_1}{1 + m_r m_1} \rightarrow \frac{\tan 40^\circ - \tan 30^\circ}{1 + (\tan 40^\circ \times \tan 30^\circ)} = \frac{\frac{\sqrt{r}-1}{\sqrt{r}+1} \times \frac{\sqrt{r}-1}{\sqrt{r}-1}}{\frac{r+1-r\sqrt{r}}{r-1}} = \frac{r(r-\sqrt{r})}{r-1}$$

چون قسمت‌ها با هم برابرند

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

$$r_y = rx + d \rightarrow y = \frac{rx + d}{r} \rightarrow mb = -\sqrt{r} \times \frac{d}{r} = \frac{-d\sqrt{r}}{r}$$

در این رابطه

$$\textcircled{9} \quad f(x) = \cos(\pi+x) + \sin\left(\frac{\pi}{r}-x\right) - \tan\left(\frac{r\pi}{r}+x\right)$$

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

$$f\left(\frac{2\pi}{r}\right) = \cot\left(\frac{2\pi}{r}\right) = \cot 120^\circ = -\sqrt{3}$$

(120°)

$$\textcircled{10} \quad \frac{\sin\left(\frac{14\pi}{r}+x\right) + \cos\left(\frac{12\pi}{r}-x\right)}{\cos(r\pi+x) - \sin(4\pi-x)}$$

$$\cos(r\pi+x) - \sin(4\pi-x)$$

$$\sin\left(\frac{14\pi}{r}+x\right) \rightarrow \sin\left(\frac{\pi}{r}+x\right) = \cos x$$

$$14\pi + \frac{\pi}{r}$$

$$\cos\left(\frac{12\pi}{r}-x\right) \rightarrow \cos\left(\frac{r\pi}{r}-x\right) = -\sin x$$

$$12\pi + \frac{r\pi}{r}$$

$$\cos(r\pi+x) \rightarrow \cos(\pi+x) = -\cos x$$

$$\sin(4\pi-x) \rightarrow \sin(-x) = -\sin x$$

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