

$$27^\circ \times \frac{\pi}{180} = \frac{27\pi}{180} = \frac{3\pi}{20} \rightarrow x = \frac{3\pi}{20} \quad (\text{الف})$$

$$125^\circ \times \frac{\pi}{180} = \frac{125\pi}{180} = \frac{25\pi}{36} \rightarrow x = \frac{25\pi}{36} \quad (\text{ب})$$

$$\frac{5\pi}{12} \times \frac{180}{\pi} = \frac{180 \times 5}{12} = 75^\circ \rightarrow x = 75^\circ \quad (\text{ج})$$

$$\frac{5\pi}{9} \times \frac{180}{\pi} = 100^\circ \rightarrow x = 100^\circ \quad (\text{د})$$

$$\frac{\alpha\pi}{180} = \frac{D}{180} \rightarrow D = 22,5\alpha$$

$$10\alpha + 22,5\alpha + 12,5\alpha = 60\alpha$$

$$60\alpha = 180$$

$$\alpha = 3$$

$$\frac{12,5\alpha}{9} = \frac{D}{180} \rightarrow D = 12,5\alpha$$

$$\underbrace{\cos 40^\circ}_{1} \underbrace{\cos 30^\circ}_{\sin 40^\circ} - \underbrace{\sin 40^\circ}_{1} \underbrace{\sin 30^\circ}_{\cos 40^\circ} - \underbrace{\tan 40^\circ}_1 + 2 \underbrace{(\cot 40^\circ)}_2 = 1 - 1 - 1 + 2 = 1 \quad (\text{الف})$$

$$\cos 30^\circ = \sin 40^\circ \quad \sin 30^\circ = \cos 40^\circ$$

$$\frac{\tan^2 30^\circ + \tan^2 40^\circ + \tan^2 50^\circ}{\cot^2 40^\circ - \cot^2 50^\circ} = \frac{\left(\frac{\sqrt{3}}{3}\right)^2 + 1 + \sqrt{3}^2}{\sqrt{3} - \frac{\sqrt{3}}{3}} = \frac{\frac{13}{3}}{\frac{2\sqrt{3}}{3}} = \frac{13}{2\sqrt{3}} \quad (\text{ب})$$

$$\sin^2 \theta = \sin 40^\circ \times \sin 40^\circ - \sin 30^\circ \times \sin 30^\circ \rightarrow \sin^2 40^\circ - \sin^2 30^\circ = \sin^2 \theta$$

$$\sin 30^\circ = \cos 40^\circ$$

$$\cos 30^\circ = \sin 40^\circ$$

$$\left(\frac{\sqrt{3}}{2}\right)^2 - \left(\frac{1}{2}\right)^2 = \sin^2 \theta \rightarrow \sin^2 \theta = \frac{1}{2}$$

$$\tan 40^\circ = 1 \quad \sin \theta = \frac{1}{\sqrt{2}} \rightarrow \frac{1}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{2} \rightarrow \text{زاویه } 45^\circ \text{ است یا } 135^\circ$$

ولی به دلیل خارج بودن فقط 45 قابل قبول است

$$\frac{2 \tan 30^\circ (1 - \tan^2 30^\circ)}{(1 - \tan^2 30^\circ)(1 - \tan^2 30^\circ)} = \frac{2\sqrt{3}}{3} = \sqrt{3} \rightarrow \tan \theta = \sqrt{3} \rightarrow \theta = 60^\circ, 120^\circ$$

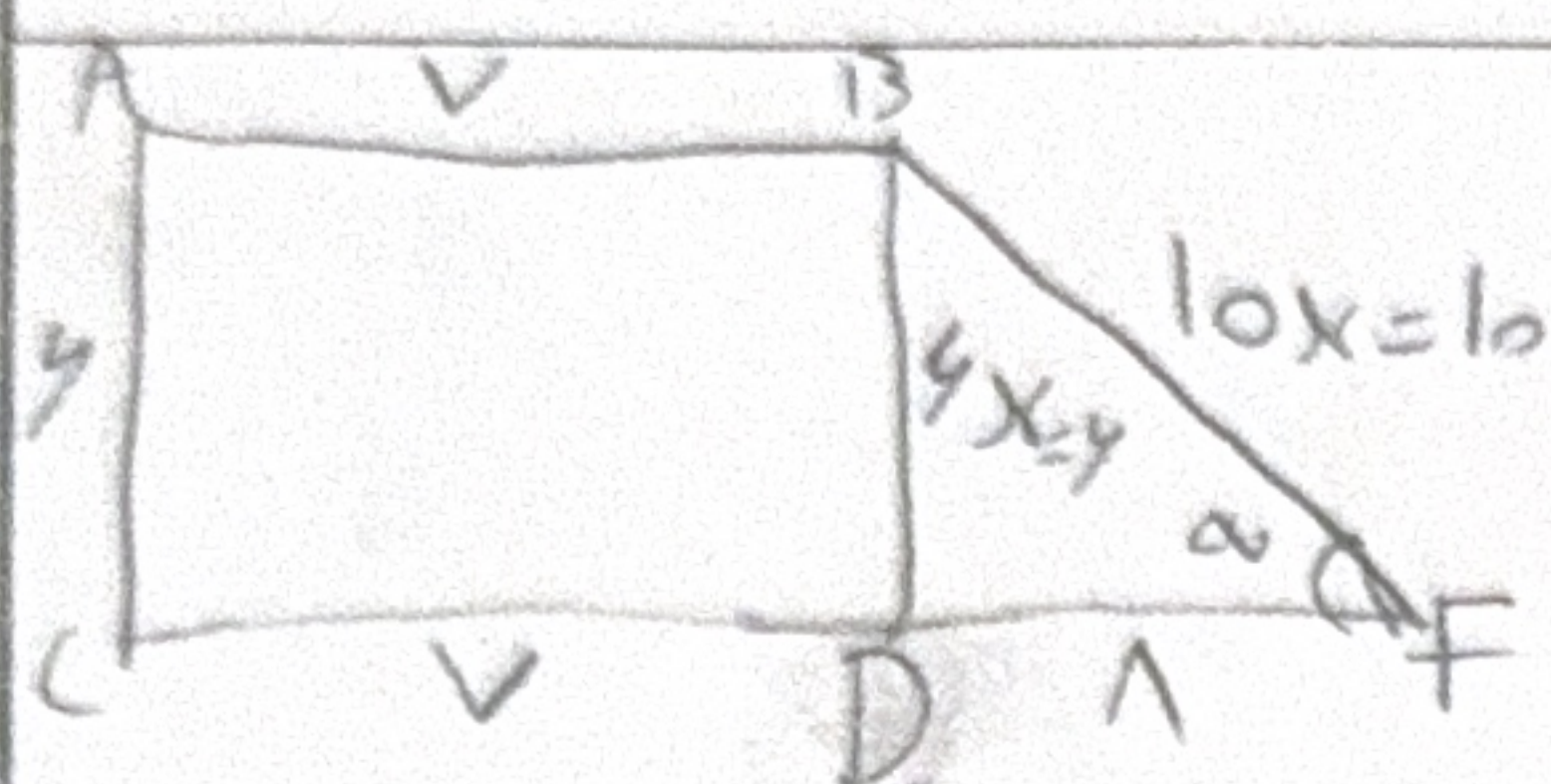
اما 120 قابل قبول نیست چون زاویه خارج است

$$(1 - \cot^2 40^\circ) = (1 - \tan^2 30^\circ)$$

$$40^\circ \times \frac{\pi}{180} = \frac{\pi}{3}$$

$$\tan \theta = 5 \rightarrow \frac{\sin \theta}{\cos \theta} = 5 \rightarrow 5 \cos \theta = \sin \theta$$

$$\frac{3 \times 5 \cos \theta - \cos \theta}{5 \cos \theta - 1 \cos \theta} = \frac{14 \cos \theta}{\cos \theta} = 14$$



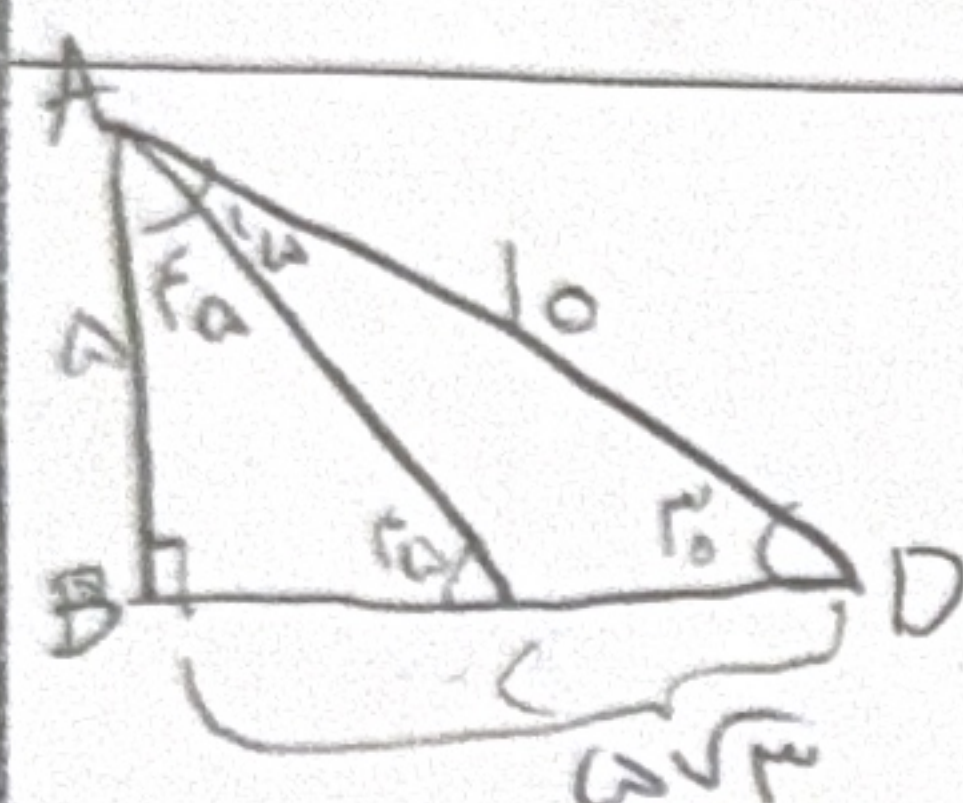
$$\sin \alpha = \frac{\text{مقابل}}{\text{وتر}} = \frac{4}{10}$$

$$ABCD \xrightarrow{\text{مستطیل}} BD = AC \rightarrow 4 = 4x \rightarrow x = 1$$

$$4^2 + DF^2 = 10^2 \rightarrow DF^2 = 4^2 \rightarrow DF = 4$$

$$AB = CD \xrightarrow{\text{مستطیل}} V = CD$$

$$\text{محیط} = V + 1 + 10 + V + 4 = 31$$

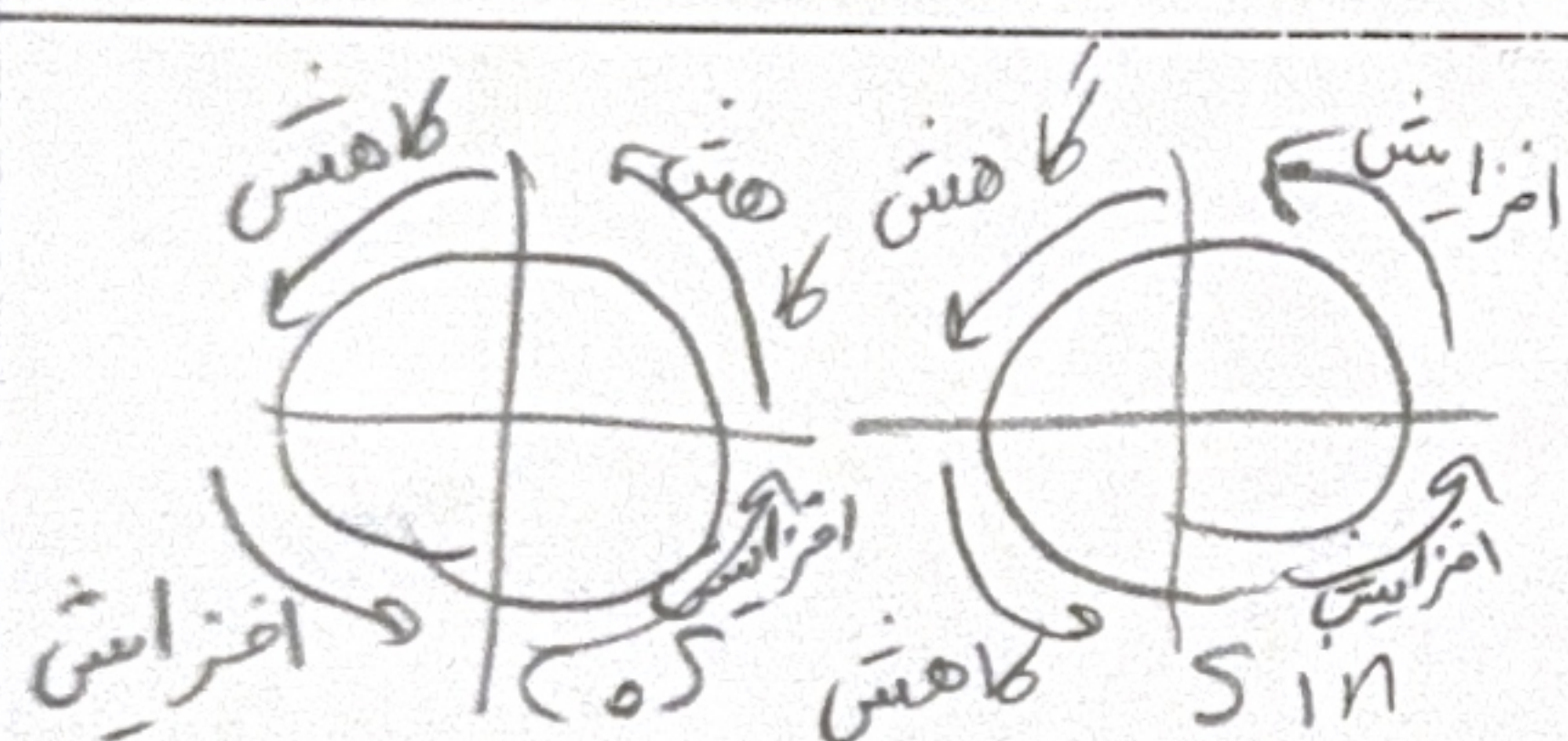


$$A = 60 \rightarrow D = 30 \rightarrow \text{ضلع مقابل زاویه 30 درجه نصف وتر است} \rightarrow AB = 5$$

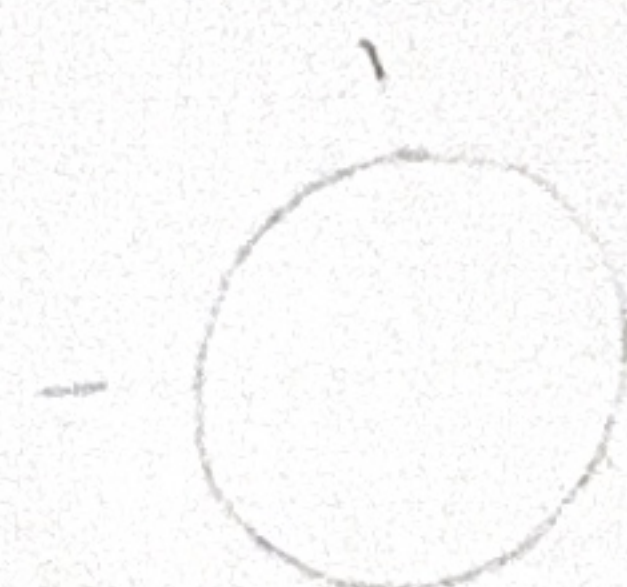
$$AB = BC \rightarrow BC = 5$$

$$DB^2 + 5^2 = 10^2 \rightarrow DB = \sqrt{15} = 5\sqrt{3}$$

$$DC = DB - BC \rightarrow DC = 5\sqrt{3} - 5 \rightarrow D(= 5(\sqrt{3} - 1))$$



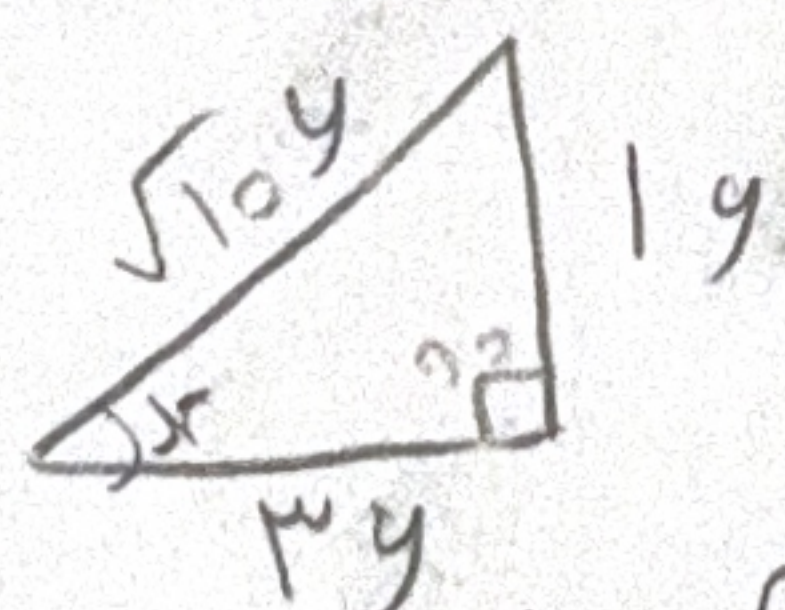
الف) ناحیه سوم



ب) ناحیه دوم

$$\tan x = \frac{\text{مقابل}}{\text{مجاور}} = \frac{1}{3}$$

ناحیه ۳ $\leftarrow \cos < 0$ و $\sin < 0$ و $\tan > 0$



$$\sin x = \frac{\text{مقابل}}{\text{وتر}} = \frac{1}{\sqrt{10}} = \frac{1}{\sqrt{10}}$$

$$\frac{1^2 + 3^2}{\sqrt{10}^2} = \frac{10}{10} = 1 \rightarrow \sin^2 x = \frac{1}{10} \rightarrow \sin x = \frac{1}{\sqrt{10}}$$

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