

تکلیف شماره 16

کلاس دهم دفتر B

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$$\frac{D_{ar}}{180} = \frac{R_{ad}}{\pi}$$

$$R_{ad} = \frac{\pi D_{ar}}{180}$$

$$\frac{27\pi}{180} = \frac{3\pi}{\cancel{30}}$$

1- الف)

$$\frac{12\Delta}{180} = \frac{R_{ad}}{\pi}$$

$$R_{ad} = \frac{12\Delta\pi}{180}$$

$$\frac{12\Delta\pi}{180} = \frac{12\Delta\pi}{\cancel{180}}$$

ب)

$$\frac{\frac{\Delta\pi}{180}}{\pi} = \frac{x^\circ}{180}$$

$$x = \frac{180 \times \Delta}{180} = \Delta^\circ$$

ج)

$$\frac{\frac{\Sigma\pi}{\pi}}{\pi} = \frac{x^\circ}{180}$$

$$x = \frac{\Sigma 180}{\pi} = 180^\circ$$

د)

$$\frac{G}{200} = \frac{D}{180} = \frac{R_{ad}}{\pi}$$

$$\frac{12\Delta a}{200} = \frac{x^\circ}{180}$$

$$x = \frac{180 \times 12\Delta a}{200} = 10.8\Delta a$$

2-

$$\frac{ax}{\pi} = \frac{x^\circ}{180}$$

$$x^\circ = \frac{180 \times a}{\pi} = 22.1\Delta a$$

$$10a + 12\Delta a + 22.1\Delta a = 180 \quad \Sigma \Delta a = 180$$

$$a = \frac{180}{\Sigma \Delta} = \frac{180}{2} = 90^\circ$$

$$\frac{\cos 40^\circ \cos 30^\circ - \sin 40^\circ \sin 30^\circ}{\cos 80^\circ} = \frac{\sin 80^\circ}{\sin 80^\circ} = 1$$

3- الف)

$$\frac{1}{\sqrt{2}} \times \frac{\sqrt{3}}{2} - \frac{\sqrt{3}}{2} \times \frac{1}{\sqrt{2}} = \frac{\frac{\sqrt{3}}{2}}{\frac{\sqrt{3}}{2}} + 2 \frac{\frac{\sqrt{3}}{2}}{\frac{\sqrt{3}}{2}} = \frac{\sqrt{3}}{2} \frac{\sqrt{3}}{2} - 1 + 2 = 1$$

1, 1, 1, 1

$$\left(\frac{\sin 30^\circ}{\cos 30^\circ}\right)^2 + \left(\frac{\sin 80^\circ}{\cos 80^\circ}\right)^2 + \left(\frac{\sin 40^\circ}{\cos 40^\circ}\right)^2 \Rightarrow \left(\frac{\sin 30^\circ}{\cos 30^\circ}\right)^2 = \left(\frac{1/2}{\sqrt{3}/2}\right)^2 = \frac{1}{3} \quad \left(\frac{\sin 80^\circ}{\cos 80^\circ}\right)^2 = \left(\frac{\sqrt{3}/2}{1/2}\right)^2 = 3$$

ب)

$$\left(\frac{\sin 40^\circ}{\cos 40^\circ}\right)^2 = \left(\frac{\sqrt{3}/2}{1/2}\right)^2 = 3 \quad \frac{\sin 30^\circ}{\cos 30^\circ} = \frac{1/2}{\sqrt{3}/2} = \frac{1}{\sqrt{3}} \quad \frac{1}{\sqrt{3}} \times \frac{1}{\sqrt{3}} = \frac{1}{3} \Rightarrow \frac{1}{3} + 1 + 3 = \frac{16}{3} = \frac{16\sqrt{3}}{3}$$

$$-\sin 30^\circ \cos 40^\circ + \cos 30^\circ \sin 40^\circ = \sin \theta \Rightarrow -\frac{1}{2} \times \frac{1}{\sqrt{3}} + \frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2} = -\frac{1}{2\sqrt{3}} + \frac{3}{4} = \frac{1}{4} = \sin \theta$$

$$\sin \theta = \frac{\sqrt{3}}{4} \quad (\theta < 90^\circ) \Rightarrow \theta = 80^\circ \quad \tan 80^\circ = \frac{\sin 80^\circ}{\cos 80^\circ} = \frac{\frac{\sqrt{3}}{4}}{\frac{1}{2}} = \frac{\sqrt{3}}{2}$$

$$\tan 40^\circ = \frac{\sin 40^\circ}{\cos 40^\circ} = \frac{1/2}{\sqrt{3}/2} = \frac{1}{\sqrt{3}} \quad \cot 40^\circ = \frac{1}{\tan 40^\circ} = \sqrt{3} \quad \left(\frac{\sin 40^\circ}{\cos 40^\circ}\right)^2 = \left(\frac{1/2}{\sqrt{3}/2}\right)^2 = \frac{1}{3}$$

د)

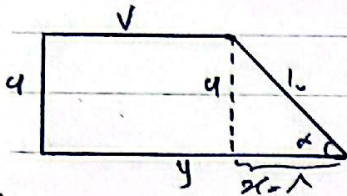
$$2 \tan^2 (1 - \tan^2 40^\circ) = \frac{2}{\sqrt{3}} \left(1 - \frac{1}{3}\right) = \frac{2}{\sqrt{3}} \times \frac{2}{3} = \frac{4}{3\sqrt{3}} = \frac{4\sqrt{3}}{9} = \tan \theta$$

1, 2, 5

$$\tan \theta = \frac{1}{2} \quad 1 + \tan^2 \theta = \frac{1}{\cos^2 \theta} \rightarrow 1 + \frac{1}{4} = \frac{1}{\cos^2 \theta} \quad \cos \theta = \frac{1}{\sqrt{5}} \quad -4$$

$$1 + \cot^2 \theta = \frac{1}{\sin^2 \theta} \quad 1 + \frac{1}{4} = \frac{1}{\sin^2 \theta} \quad \sin \theta = \frac{2}{\sqrt{5}} \quad \text{پ}$$

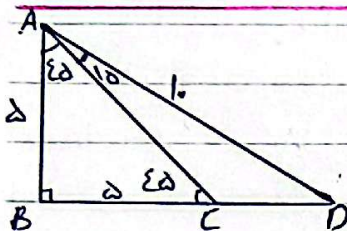
$$\frac{3 \sin \theta - \cos \theta}{\sin \theta - 2 \cos \theta} = \frac{\frac{12}{\sqrt{5}} - \frac{1}{\sqrt{5}}}{\frac{2}{\sqrt{5}} - \frac{2}{\sqrt{5}}} = \frac{\frac{11}{\sqrt{5}}}{\frac{0}{\sqrt{5}}} = \frac{11}{0} \quad \checkmark$$



$$\sin \alpha = \frac{\text{مقابل}}{\text{وتر}} = \frac{4}{17} \Rightarrow \text{وتر} = 17$$

$$x^2 + 4^2 = 17^2 \quad x^2 + 16 = 289 \quad x^2 = 273 \quad x = \sqrt{273} \quad \text{پ}$$

$$y = x + 4 = \sqrt{273} + 4 \Rightarrow P = 4 + \sqrt{273} + 17 = 21 + \sqrt{273}$$



$$\cos 40^\circ = \frac{1}{\sqrt{5}} = \frac{\text{مجاور}}{\text{وتر}} \Rightarrow \text{مجاور} = \frac{1}{\sqrt{5}} \times \sqrt{5} = 1 \quad -1$$

$$BC = 2 \quad 2^2 + BD^2 = 1^2 \quad BD^2 = 1 - 4 = -3 \quad \text{این حالت ممکن نیست}$$

$$2 + CD = \sqrt{5} \Rightarrow CD = \sqrt{5} - 2$$

1,25

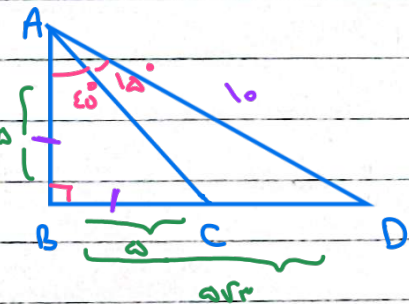
الف) در ناحیه سوم قرار دارد

ب) در ناحیه دوم قرار دارد

ج) در ناحیه اول قرار دارد

$$1 + \tan^2 \theta = \frac{1}{\cos^2 \theta} \quad 1 + \frac{1}{4} = \frac{1}{\cos^2 \theta} \quad \cos \theta = \frac{1}{\sqrt{5}} \quad \text{پ}$$

$$1 + \cot^2 \theta = \frac{1}{\sin^2 \theta} \quad 1 + \frac{1}{4} = \frac{1}{\sin^2 \theta} \quad \sin \theta = \frac{2}{\sqrt{5}} \quad \text{پ}$$



$$A = 45^\circ \Rightarrow \frac{AB}{BC} = \frac{1}{1} = 1 \Rightarrow AB = BC$$

$$AB = BC \Rightarrow BC = 1$$

$$CD = \sqrt{2} - 1$$

Parsian

$$\frac{BD}{1} = \frac{1}{\sqrt{2}} \Rightarrow BD = \frac{1}{\sqrt{2}}$$

$$\frac{2 \tan \pi/3 (1 - \tan^2 \pi/3)}{(1 - \tan^2 \pi/3)^2} = \frac{2 \frac{\sqrt{3}}{3} (1 - \frac{1}{3})}{(1 - \frac{1}{3})^2} = \frac{\frac{2\sqrt{3}}{3}}{\frac{4}{9}} = \sqrt{3}$$

$$\tan \theta = \sqrt{3} \rightarrow \theta = \frac{\pi}{3} \leq \pi/2$$

سوال ۳ - ب

$$\frac{\tan^2 \pi/6 + \tan^2 \pi/3 + \tan^2 \pi/2}{\cot \pi/6 - \cot \pi/2} = \frac{\frac{1}{3} + 1 + \infty}{\sqrt{3} - \frac{\sqrt{3}}{3}}$$

$$\frac{\frac{1 + 3 + 9}{3}}{\frac{3\sqrt{3} - \sqrt{3}}{3}} = \frac{13}{2\sqrt{3}} = \boxed{\frac{13\sqrt{3}}{6}}$$