

$$r^2 - x^2 - \sin^2 \alpha (r \sin^2 \alpha - 1) \xrightarrow{x = \cos \alpha} \rightarrow$$

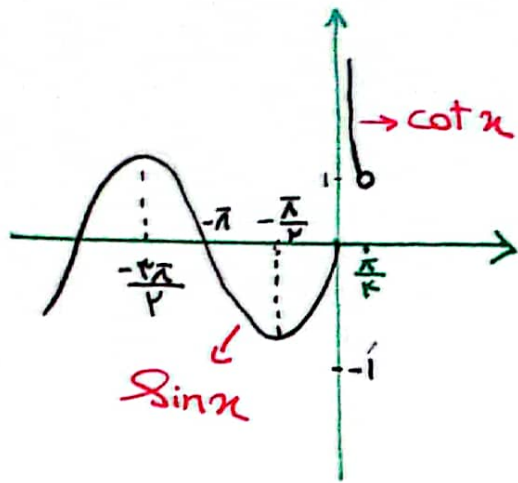
$$r \cos^2 \alpha - \cos^2 \alpha - r \sin^2 \alpha + \sin^2 \alpha \xrightarrow{\begin{matrix} \cos^2 \alpha - \sin^2 \alpha = \cos 2\alpha \\ -\cos 2\alpha = \sin^2 \alpha - \cos^2 \alpha \end{matrix}} \rightarrow$$

$$r \cos 2\alpha - \cos 2\alpha = \cos 2\alpha = 1$$

$$\cos^2(r\alpha) + \sin^2(r\alpha) = 1 \rightarrow \sin^2(r\alpha) = 0 \rightarrow \boxed{\sin^2 \alpha = 0} \xrightarrow{\begin{matrix} \sin^2 \alpha = 0 \\ \sin \alpha = 0 \end{matrix}}$$

پس $\sin \alpha = 0$

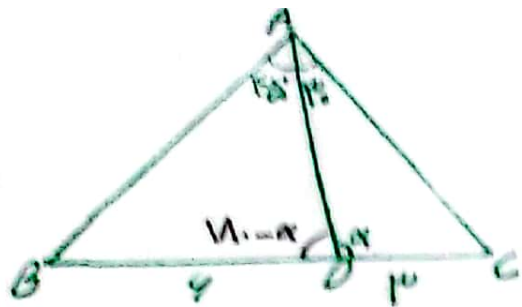
جواب سوال (د)



$$R_f = [-1, +\infty)$$

جواب سوال ۷

جواب سوال ۲

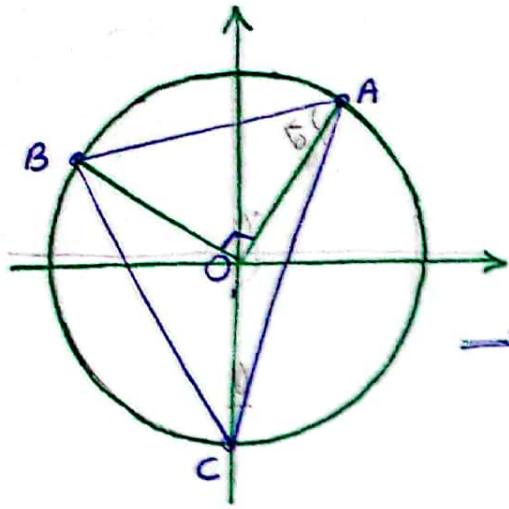


$$\hat{ABD} = \frac{AB}{\sin(\alpha - \alpha)} = \frac{y}{\sin 120^\circ} \rightarrow \frac{y \times \frac{1}{\sqrt{3}}}{\frac{1}{\sqrt{3}}} = \frac{1 \times \sqrt{3}}{1} = \sqrt{3}y$$

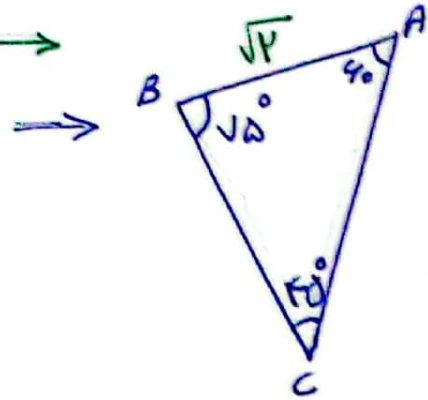
$$\frac{AB}{\sin \alpha} = \sqrt{3}y \rightarrow \boxed{AB = \sqrt{3}y \sin \alpha}$$

$$\hat{ACD} = \frac{AC}{\sin \alpha} = \frac{x}{\sin 120^\circ} \Rightarrow \frac{AC}{\sin \alpha} = y \rightarrow AC = y \sin \alpha$$

$$\frac{AB}{AC} = \frac{\sqrt{3}y \sin \alpha}{y \sin \alpha} = \boxed{\sqrt{3}} \rightarrow \text{جواب}$$



جواب سوال ۳ زاویے $90^\circ = \angle BOA$ و $AO = BO = 1$ (رادیو مساوی)



$$\frac{AB}{\sin 90^\circ} = \frac{BO}{\sin 45^\circ} \Rightarrow \frac{AB}{1} = \frac{1}{\frac{\sqrt{2}}{2}} \rightarrow AB = \frac{2}{\sqrt{2}} = \sqrt{2}$$

$$\cos 2\alpha = 1 - 2\sin^2 \alpha \rightarrow \cos 120^\circ = 1 - \sin^2 60^\circ$$

$$-\frac{\sqrt{3}}{2} = 1 - 2\sin^2 \alpha \rightarrow \sin^2 \alpha = \frac{\sqrt{3} + 2}{4}$$

$\downarrow$
 60°

$$\frac{AC^2}{\sin^2 60^\circ} = \frac{(\sqrt{2})^2}{\left(\frac{\sqrt{2}}{2}\right)^2} \rightarrow \frac{AC^2}{\frac{\sqrt{3} + 2}{4}} = \frac{2}{\frac{1}{2}} \rightarrow AC = \sqrt{\sqrt{3} + 2}$$

$$\frac{BC}{\sin 90^\circ} = \frac{\sqrt{2}}{\frac{\sqrt{2}}{2}} \Rightarrow \frac{\sqrt{3} BC}{2} =$$

$$f(x) = a + b \underbrace{\frac{\sin(cx) \cdot \cos(cx) \cdot \cos(rx)}{\frac{1}{r} \sin(rx)}}_{\frac{1}{r} \sin(rx)}$$

جواب سوال ۸

$$\rightarrow f(x) = a + \frac{b}{r} \sin(rx)$$

$$T = \frac{\pi}{r} - \frac{\pi}{10} = \frac{4\pi}{10} = \frac{2\pi}{5} = \frac{2\pi}{|rc|} \rightarrow rc = 5 \rightarrow \boxed{c = \frac{5}{r}}$$

min و max تابع به ترتیب ۴ و ۵ است.

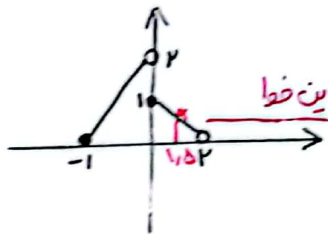
$$\begin{cases} |\frac{b}{r}| + a = 4 \\ -|\frac{b}{r}| + a = 0 \end{cases} \rightarrow ra = 4 \rightarrow \boxed{a = 4}$$

$$|\frac{b}{r}| = 2 \rightarrow b = \pm 8 \rightarrow b = 8$$

$$\frac{bc}{a} = \frac{8 \times \frac{5}{r}}{4} = \frac{10}{r} = \boxed{5}$$

جواب سوال ۱۵

$$f(-2, 5) \rightarrow f(-2, 5 + \underbrace{12 \times 3}_{\text{۱۲ دور و ۳ سانتی متر}}) \rightarrow f(1, 5)$$



$$(0, 1) (2, 0) \rightarrow y = -\frac{1}{2}x + 1$$

$$x = \frac{\pi}{2} \rightarrow y = -\frac{1}{2} \times \frac{\pi}{2} + 1 = -\frac{\pi}{4} + 1 \Rightarrow \boxed{\frac{1}{4}} \rightarrow \text{جواب}$$

جواب سوال ۹

$$f(x) = a \cos bx + c$$

$$T = \pi - 0 = \pi = \frac{2\pi}{|b|} \rightarrow b = 2$$

مالتیپلیم و مینیموم تابع ۲ و -۴ است.

$$\begin{cases} |a| + c = 2 \\ -|a| + c = -4 \end{cases} \rightarrow rc = -2 \rightarrow \boxed{c = -1} \quad |a| = 3 \rightarrow \boxed{a = 3}$$

$$\rightarrow -3 \cos 2x - 1 = 0 \rightarrow -3 \cos 2x = 1 \rightarrow \cos 2x = -\frac{1}{3}$$

$$\boxed{\alpha = 2x}$$

$$\sin 2x = -\frac{\sqrt{8}}{3}$$

$$\tan 2x = \frac{2\sqrt{2}}{3}$$

$$\tan \alpha = \frac{r \tan \alpha}{1 - \tan^2 \alpha} = \frac{3\sqrt{2}}{-2}$$

$$|\tan \alpha| = \frac{3\sqrt{2}}{2}$$