

بانک سوال رایگان

+ پاسخ
تشریحی

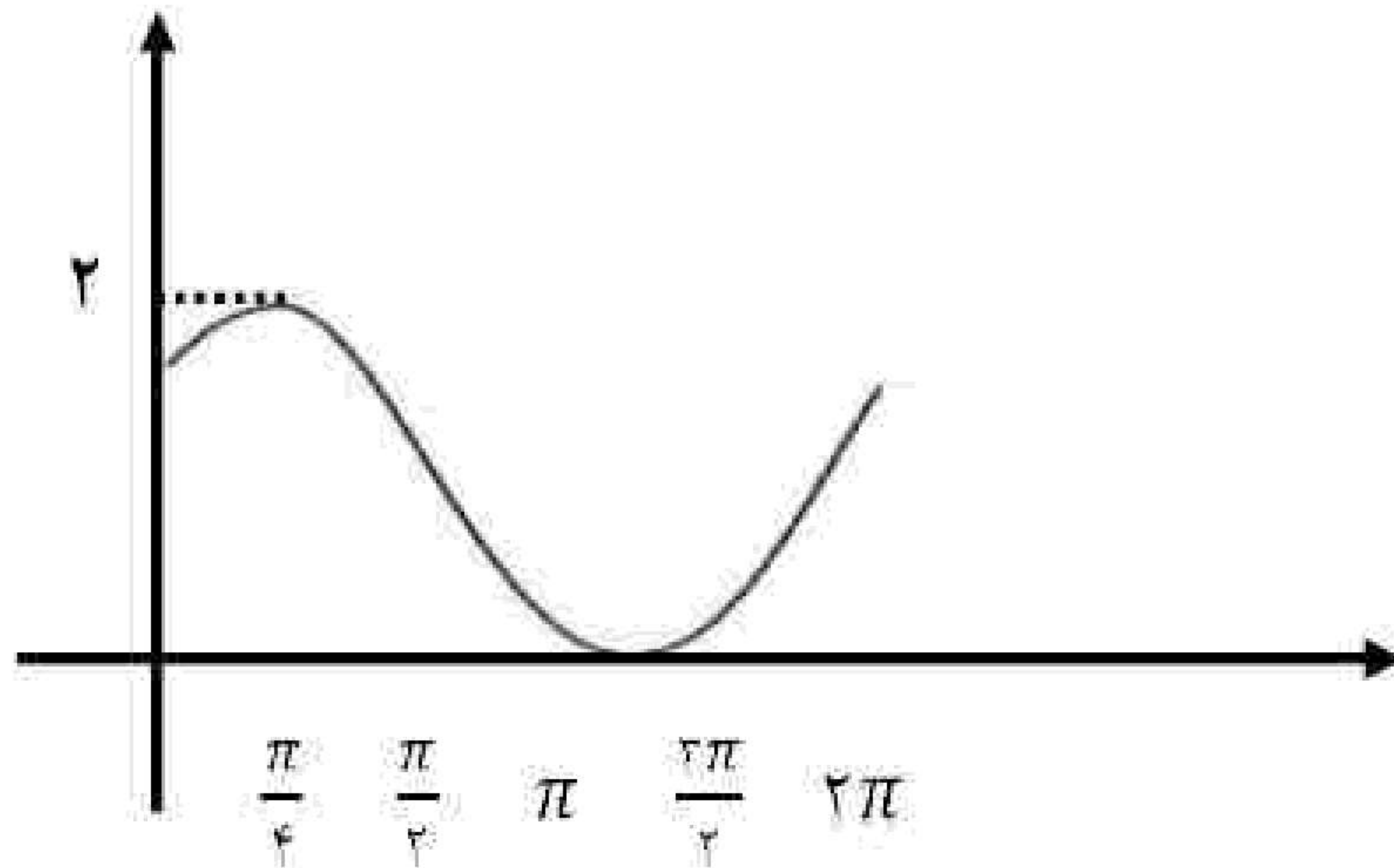
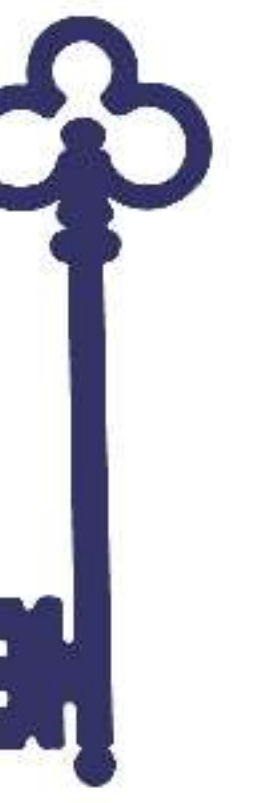
یاوران دانش



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۰۲۱ ۹۱۶ ۹۲۱ ۴۰



-۱

$$A = \sin\left(8\pi + \frac{\pi}{3}\right) - \cos\left(\pi - \frac{\pi}{4}\right) = \sin\frac{\pi}{3} + \cos\frac{\pi}{4} = \frac{\sqrt{3}}{2} + \frac{\sqrt{2}}{2}$$

-۲

$$B = \tan(3 \times 18^\circ + 6^\circ) + 2 \cos(18^\circ + 6^\circ) = \tan 60^\circ - 2 \cos 60^\circ = \sqrt{3} - 2 \left(\frac{1}{2}\right) = \sqrt{3} - 1$$

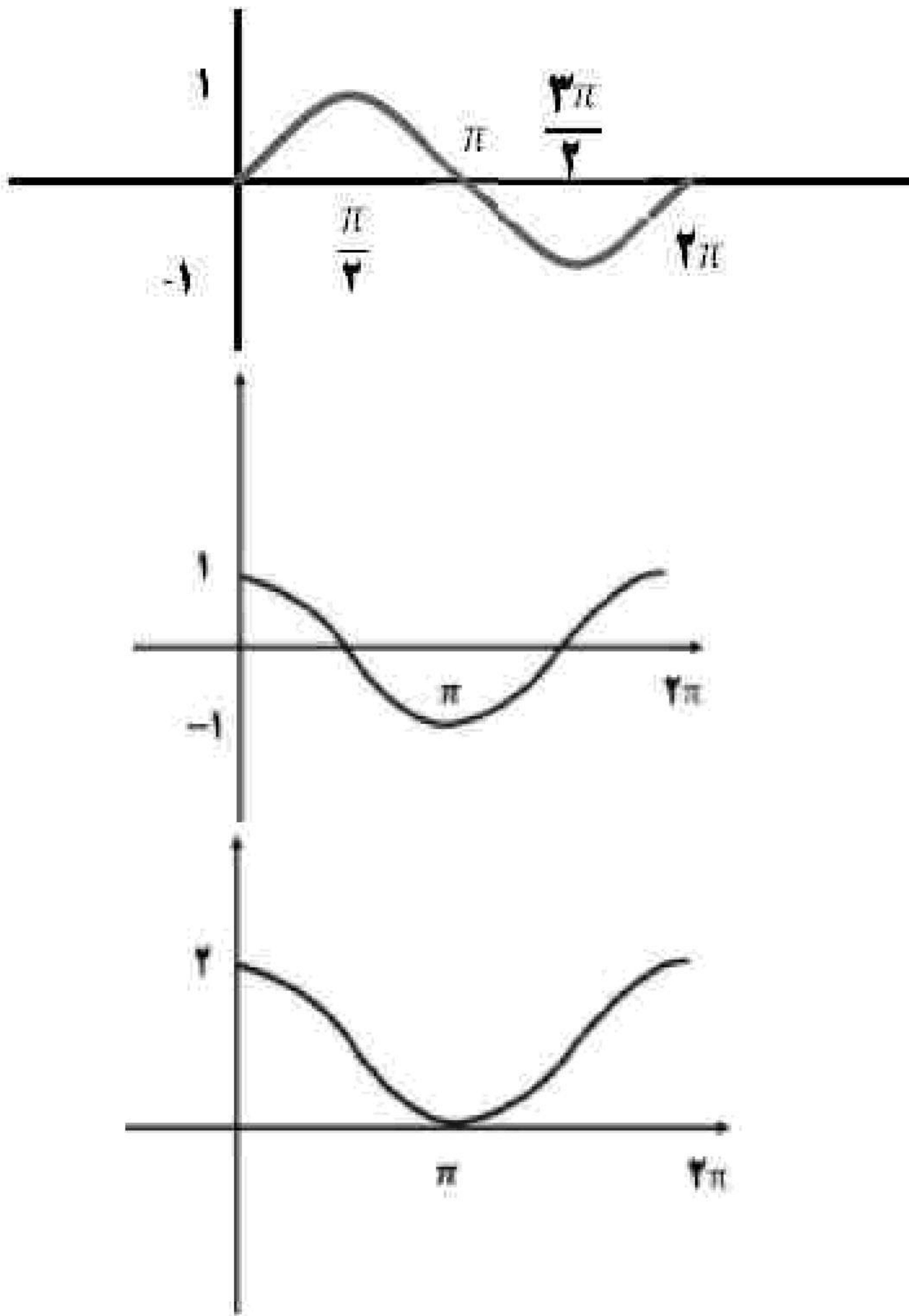
$$\theta = 120^\circ = \frac{2\pi}{3} \quad \theta = \frac{L}{r} \Rightarrow \frac{2\pi}{10} \Rightarrow L = \frac{20\pi}{3}$$

-۳

$$x = 35^\circ$$

-۴

۵- نادرست



۶- مرحله اول $y = \sin(x)$

مرحله دوم $y = \sin\left(x + \frac{\pi}{2}\right)$

مرحله سوم $y = 1 + \sin\left(x + \frac{\pi}{2}\right)$

$$\sin \frac{5\pi}{4} = -\sin \frac{\pi}{4} = -\frac{\sqrt{2}}{2}$$

-۷

$$\cos \frac{5\pi}{6} = -\cos \frac{\pi}{6} = -\frac{\sqrt{3}}{2}$$

$$\cos \frac{7\pi}{4} = \cos \frac{\pi}{4} = \frac{\sqrt{2}}{2}$$

$$2\left(-\frac{\sqrt{2}}{2}\right) - \left(-\frac{\sqrt{3}}{2}\right) + 2\left(\frac{\sqrt{2}}{2}\right) = \frac{\sqrt{3}}{2}$$

$$45^\circ = \frac{\pi}{4} \text{ رادیان} \Rightarrow \frac{\pi}{4} = \frac{L}{r} = \frac{L}{\lambda} \Rightarrow L = 2\pi$$

-۸

۹- درست

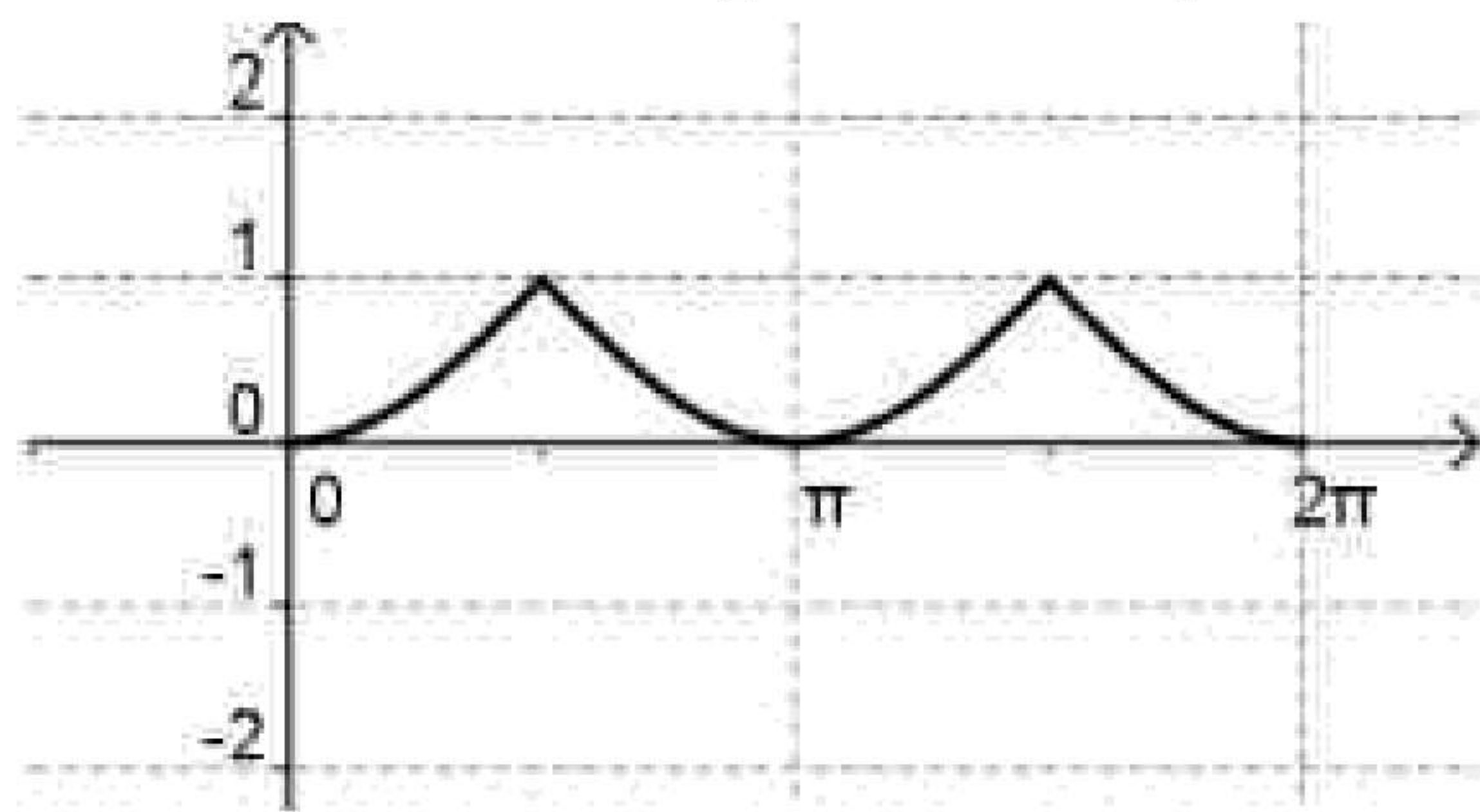


$$\frac{\sin(4\pi + \alpha) + \cos\left(\alpha - \frac{\pi}{2}\right)}{\cos\left(\frac{3\pi}{2} - \alpha\right)} = \frac{\sin(\alpha) + \sin(\alpha)}{-\sin(\alpha)} = \frac{2\sin(\alpha)}{-\sin(\alpha)} = -2 \quad -10$$

$$f\left(\frac{11\pi}{6}\right) = -6\cos\left(\frac{3\pi}{2} + \frac{11\pi}{6}\right) - 1 = -6\cos\left(\frac{10\pi}{3}\right) - 1 = -6\cos\left(\pi + \frac{\pi}{3}\right) - 1$$

$$= 6\cos\left(\frac{\pi}{3}\right) - 1 = 6\left(\frac{1}{2}\right) - 1 = 2 \quad -11$$

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$$\text{برد} = [0, 1] \quad -12$$

$$\sin^2 \theta = 1 - \cos^2 \theta = 1 - \frac{9}{25} \xrightarrow{\frac{3\pi}{2} < \theta < 2\pi} \sin \theta = -\frac{4}{5} \quad -13$$

$$\sin 2\theta = 2 \sin \theta \cos \theta = 2\left(-\frac{4}{5}\right)\left(\frac{3}{5}\right) = -\frac{24}{25}$$

۱۴- نادرست

$$\sin(\alpha - \pi) = -\sin(\pi - \alpha) = -\sin \alpha \quad -15$$

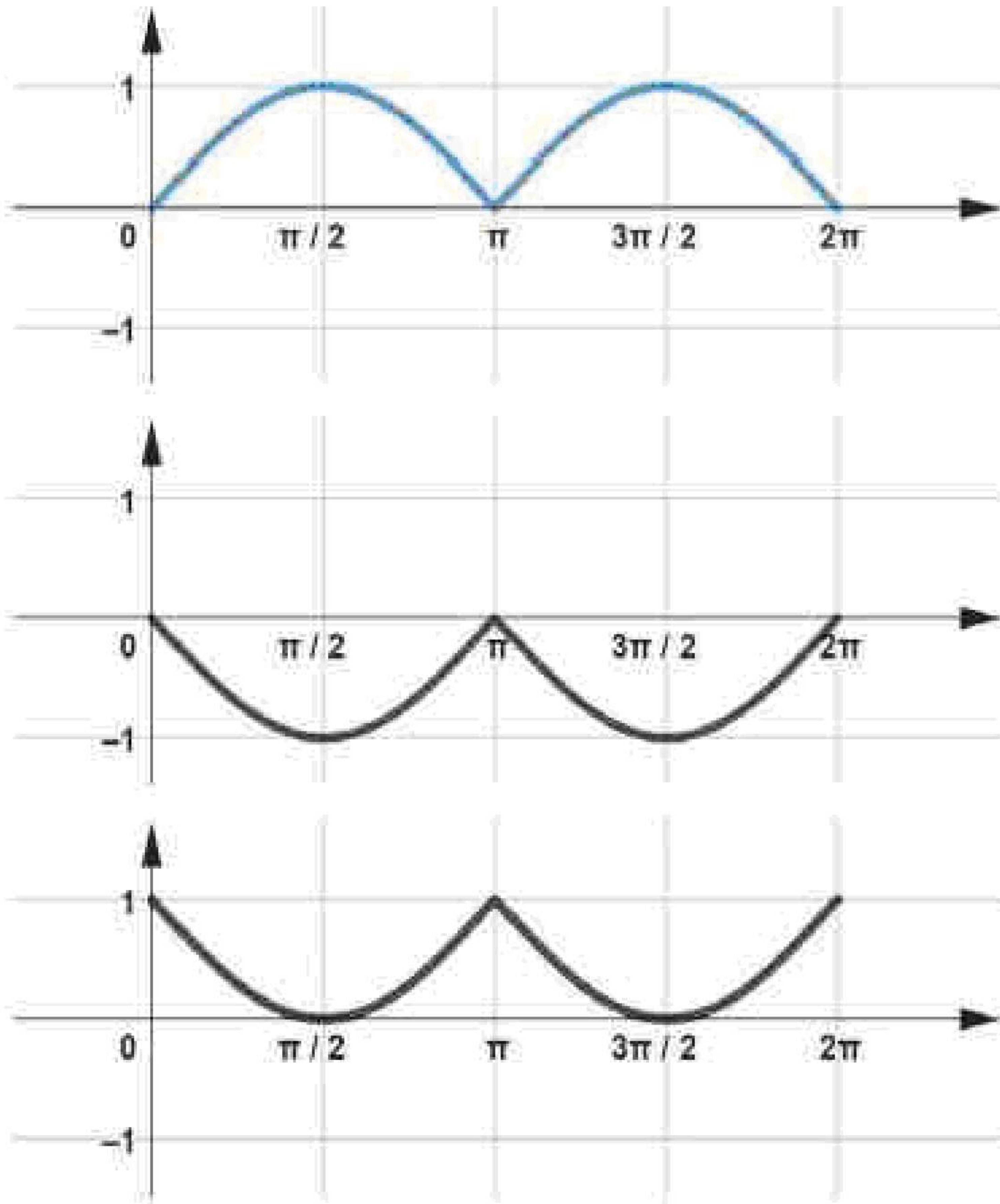
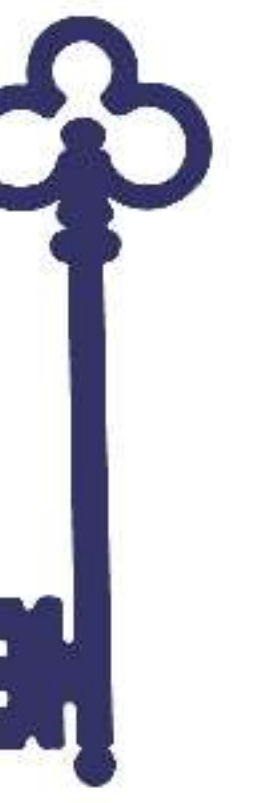
$$\cos\left(\frac{3\pi}{2} + \alpha\right) = \cos\left(\pi + \frac{\pi}{2} + \alpha\right) = -\cos\left(\frac{\pi}{2} + \alpha\right) = \sin \alpha$$

$$\sin(4\pi + \alpha) + \sin(\alpha - \pi) + 2\cos\left(\frac{3\pi}{2} + \alpha\right) = \sin \alpha - \sin \alpha + 2\sin \alpha = 2\sin \alpha = \frac{2}{5}$$

$$\sin \alpha = \frac{4}{5} \xrightarrow{\alpha \text{ حاده}} \cos \alpha = \sqrt{1 - \left(\frac{4}{5}\right)^2} = \frac{3}{5} \quad -16$$

$$\cos \beta = -\frac{12}{13} \xrightarrow{\beta \text{ در ربع سوم}} = -\sqrt{1 - \left(-\frac{12}{13}\right)^2} = -\frac{5}{13}$$

$$\sin(\alpha - \beta) = \sin \alpha \cos \beta - \cos \alpha \sin \beta = \left(\frac{4}{5}\right)\left(-\frac{12}{13}\right) - \left(\frac{3}{5}\right)\left(-\frac{5}{13}\right) = \frac{-48 + 15}{65} = -\frac{33}{65}$$



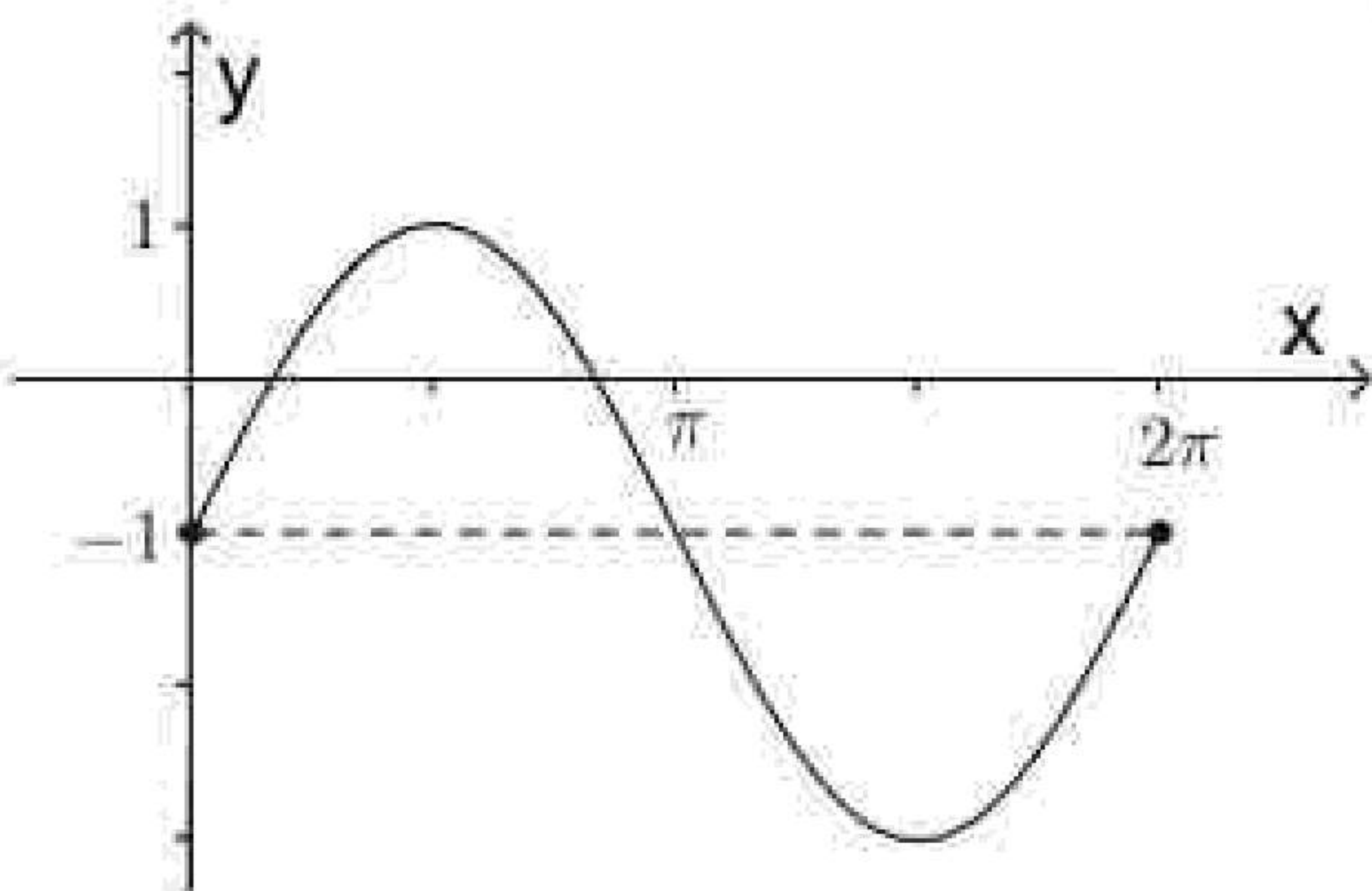
$$R = [0, 1]$$

-۱۷

۱۸- نادرست

۱۹- یک

۲۰- الف)



$$R = [-3, 1]$$

ب)

$$\sin 210^\circ + \tan 120^\circ + \cos \frac{3\pi}{4} = \sin(180^\circ + 30^\circ) + \tan(180^\circ - 60^\circ) + \cos\left(\pi - \frac{\pi}{4}\right)$$

-۲۱

$$= -\frac{1}{2} + (-\sqrt{3}) + \left(-\frac{\sqrt{2}}{2}\right) = \frac{-1 - 2\sqrt{3} - \sqrt{2}}{2}$$



۲۲- ۲۰۵°

$$\sin 390^\circ + \tan 135^\circ + \cos \frac{23\pi}{4} = \sin(360^\circ + 30^\circ) + \tan(180^\circ - 45^\circ) + \cos\left(6\pi - \frac{\pi}{4}\right) \quad -23$$

$$\sin 30^\circ - \tan 45^\circ + \cos \frac{\pi}{4} = \frac{\sqrt{2}}{2} - \frac{1}{2}$$

$$\cos(2 \times 180^\circ + 30^\circ) + \tan(3 \times 180^\circ + 60^\circ) - \sin(2 \times 180^\circ - 30^\circ) \quad -24$$

$$= \cos(30^\circ) + \tan(60^\circ) + \sin(30^\circ) = \frac{\sqrt{3}}{2} + \sqrt{3} + \frac{1}{2} = \frac{3\sqrt{3} + 1}{2}$$

۲۵- ۷π

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$$\text{الف) } \cos(-240^\circ) + \tan \frac{7\pi}{4} - \sin^2 135^\circ = \frac{-1}{2} + (-1) - \left(\frac{\sqrt{2}}{2}\right)^2 = -2 \quad -26$$

$$\text{ب) } \cos^2(22/5^\circ) = \frac{1 + \cos(45^\circ)}{2} = \frac{1 + \frac{\sqrt{2}}{2}}{2} \Rightarrow \cos^2(22/5^\circ) = \frac{2 + \sqrt{2}}{4}$$

$$\Rightarrow \cos(22/5^\circ) = \frac{\sqrt{2 + \sqrt{2}}}{2}$$

$$\frac{150}{180} = \frac{R}{\pi} \Rightarrow R = \frac{5\pi}{6} \quad -27 \text{ الف}$$

$$L = r\theta = 30 \times \frac{5\pi}{6} \Rightarrow L = 25\pi \approx 75 \text{ cm} \quad \text{ب)}$$

۲۸- ۵۷°

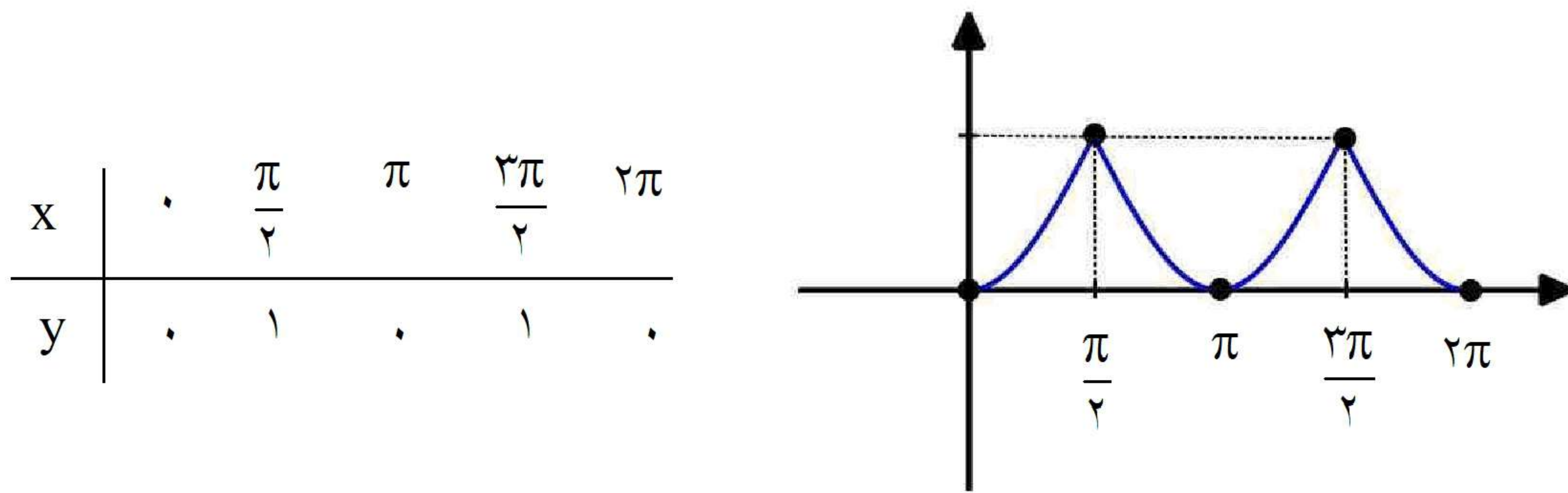
۲۹- درست



$$\cos \alpha = \pm \sqrt{1 - \sin^2 \alpha} = \frac{4}{5}, \quad \frac{1}{\cos^2 \beta} = 1 + \tan^2 \beta = \frac{9}{5} \quad -30$$

$$\sin \beta = \cos \beta \tan \beta, \quad \sin 2\alpha = 2 \sin \alpha \cos \alpha = \frac{24}{25}$$

$$\cos(\alpha + \beta) = \cos \alpha \cdot \cos \beta - \sin \alpha \sin \beta = \frac{4}{5} \times \frac{-\sqrt{5}}{3} - \frac{3}{5} \times \frac{2}{3} = \frac{-4\sqrt{5} - 6}{15}$$



-31

$$R_f = [0, 1]$$

۴-32

33- درست

$$\cos^2 \alpha = 1 - \sin^2 \alpha = 1 - \frac{9}{25} = \frac{16}{25} \xrightarrow{\alpha \text{ حاده}} \cos \alpha = \frac{4}{5} \quad -34$$

$$\sin^2 \beta = 1 - \cos^2 \beta = 1 - \frac{2}{4} = \frac{1}{2} \xrightarrow{\alpha \text{ منفرجه}} \sin \beta = \frac{\sqrt{2}}{2}$$

$$\cos(\alpha - \beta) = \cos \alpha \cdot \cos \beta + \sin \alpha \cdot \sin \beta = \left(\frac{4}{5} \times -\frac{\sqrt{2}}{2} \right) + \left(\frac{3}{5} \times \frac{\sqrt{2}}{2} \right) = -\frac{\sqrt{2}}{10}$$

$$\tan\left(-\frac{23\pi}{4}\right) = -\tan\left(\frac{23\pi}{4}\right) = -\tan\left(6\pi - \frac{\pi}{4}\right) = \tan\frac{\pi}{4} = 1 \quad -35$$

$$\theta = 90^\circ = \frac{\pi}{2} \quad -36$$

$$\theta = \frac{1}{r} \Rightarrow 1 = 10 \times \frac{\pi}{2} = 5\pi$$

37- گزینه ۲ پاسخ صحیح است. گزینه ۲ باید به صورت زیر باشد.

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

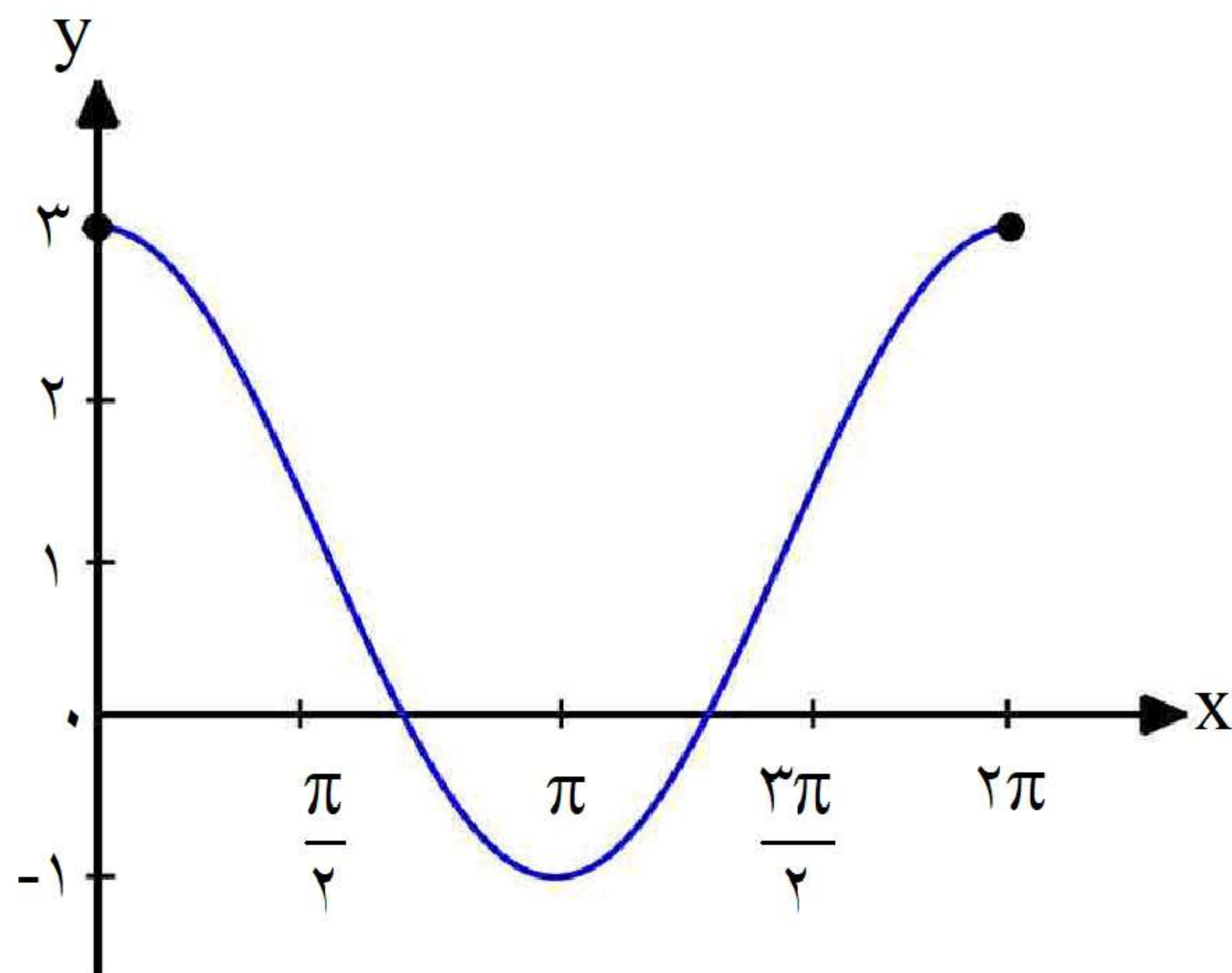


۳۸- $[-1, 1]$

۳۹- درست

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۴۰- نمودار رسم شده، نمودار ب است. نمودار الف به صورت زیر است:

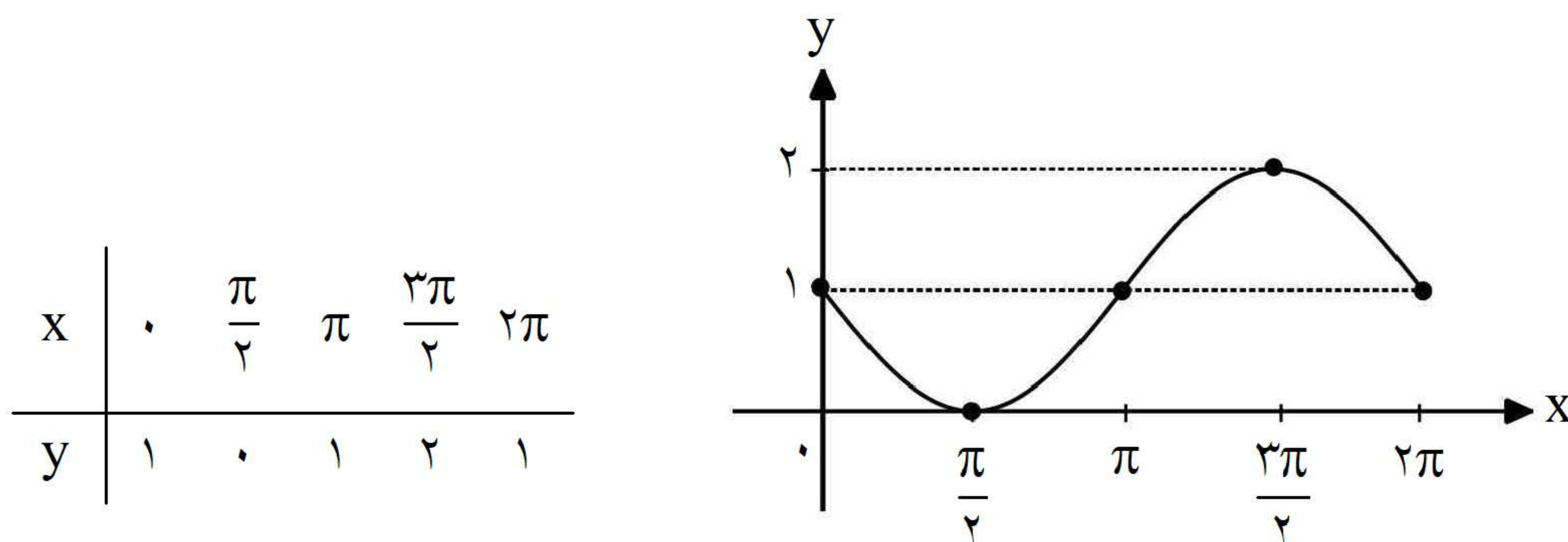


$$\begin{aligned} \sin\left(8\pi + \frac{\pi}{3}\right) - \cos\left(\pi - \frac{\pi}{6}\right) - \operatorname{tg}\left(\pi + \frac{\pi}{3}\right) &= \sin\frac{\pi}{3} + \cos\frac{\pi}{6} - \operatorname{tg}\frac{\pi}{3} \\ &= \frac{\sqrt{3}}{2} + \frac{\sqrt{3}}{2} - \sqrt{3} = 0 \end{aligned} \quad -41$$

$$x = 2k\pi, \quad -42$$

$$A = \sin(90^\circ + 30^\circ) - \cos(180^\circ - 30^\circ) = \cos 30^\circ - (-\cos 30^\circ) = \frac{\sqrt{3}}{2} + \frac{\sqrt{3}}{2} = \sqrt{3} \quad -43$$

$$-44 \text{ مقدار ماکسیمم} = 2 / \text{مقدار مینیمم} = 0$$

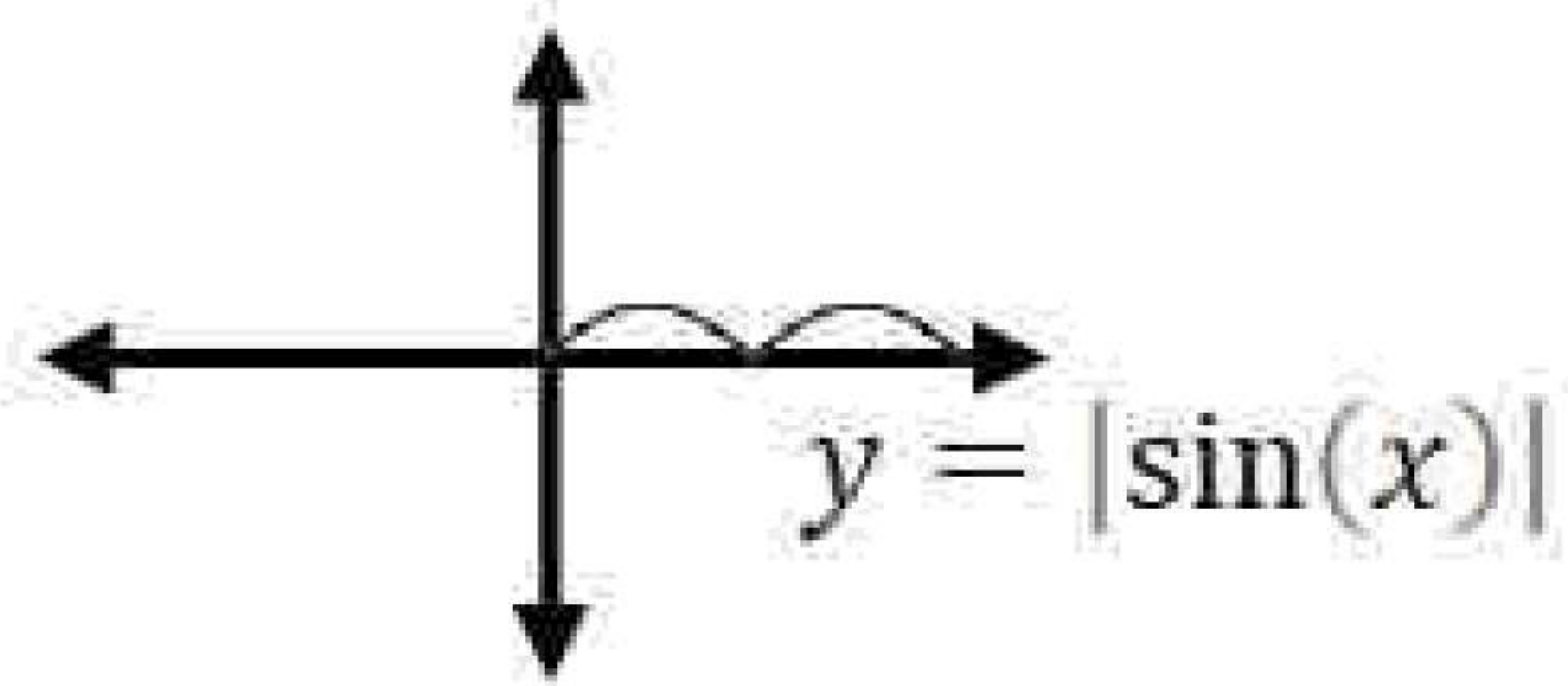
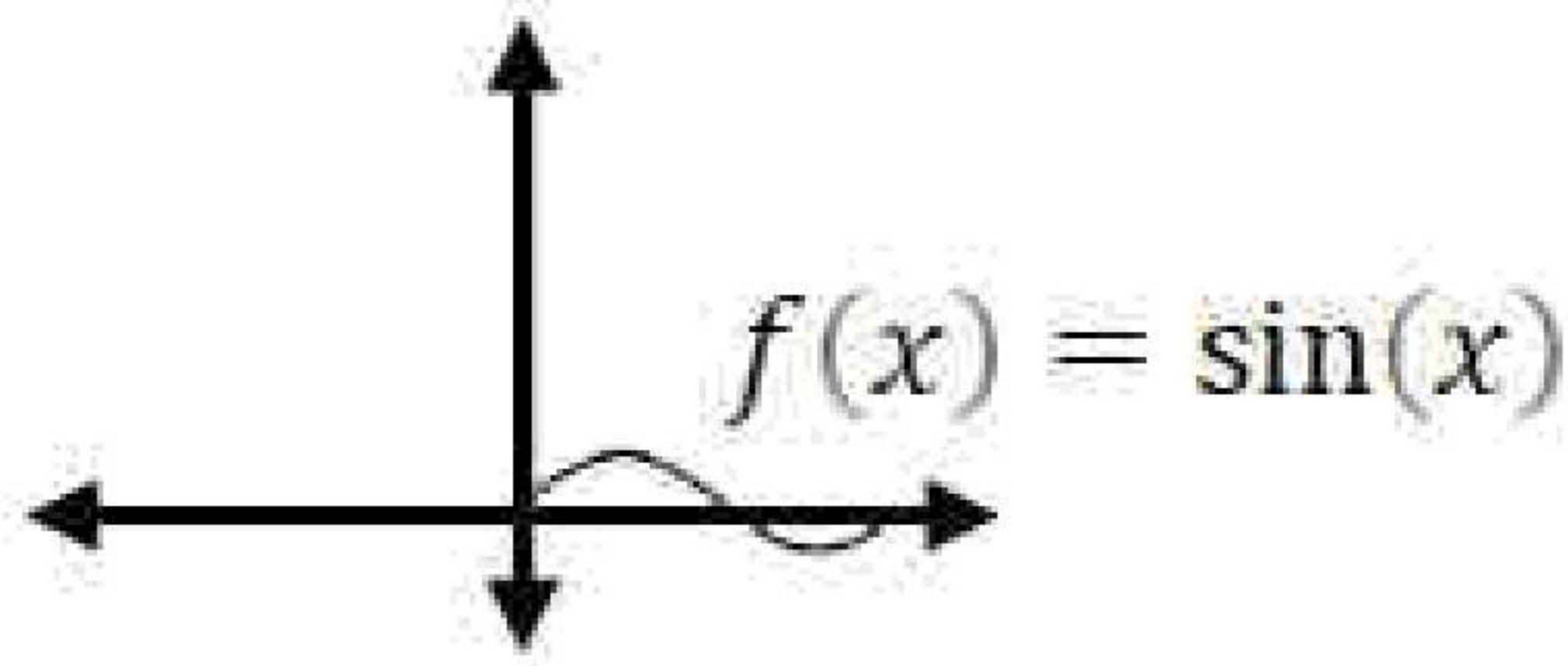


$$\sin 2\alpha = \sin(\alpha + \alpha) = \sin\alpha \cdot \cos\alpha + \cos\alpha \cdot \sin\alpha = 2\sin\alpha \cdot \cos\alpha \quad -45$$



$$60^\circ = \frac{\pi}{3} \text{ rad} \Rightarrow \theta = \frac{L}{r} \Rightarrow \frac{\pi}{3} = \frac{L}{25} \Rightarrow L = 25 \times \frac{\pi}{3} = 25$$

-۴۶



-۴۷

الف) $\text{tg}\left(\frac{9\pi}{4}\right) = \text{tg}\left(2\pi + \frac{\pi}{4}\right) = \text{tg}\frac{\pi}{4} = 1$

-۴۸

ب) $\text{Cos } 135^\circ = \text{Cos}(90^\circ + 45^\circ) = -\text{Sin } 45^\circ = -\frac{\sqrt{2}}{2}$

-۴۹- گزینه ۳ پاسخ صحیح است.

$$\frac{7\pi}{5} = \frac{5\pi + 2\pi}{5} = \pi + \frac{2\pi}{5}$$

بنابراین انتهای کمان در ربع سوم است.

-۵۰- شعاع دایره

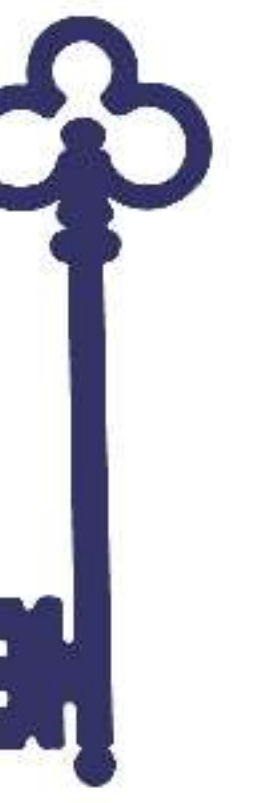
$$\text{Sin}^2 \beta = 1 - \text{Cos}^2 \beta = 1 - \left(\frac{12}{13}\right)^2 = 1 - \frac{144}{169} = \frac{25}{169} \Rightarrow \text{Sin} \beta = \frac{5}{13}$$

-۵۱

$$\text{Cos}^2 \alpha = 1 - \text{Sin}^2 \alpha = 1 - \left(-\frac{4}{5}\right)^2 = 1 - \frac{16}{25} = \frac{9}{25} \Rightarrow \text{Cos} \alpha = \frac{3}{5}$$

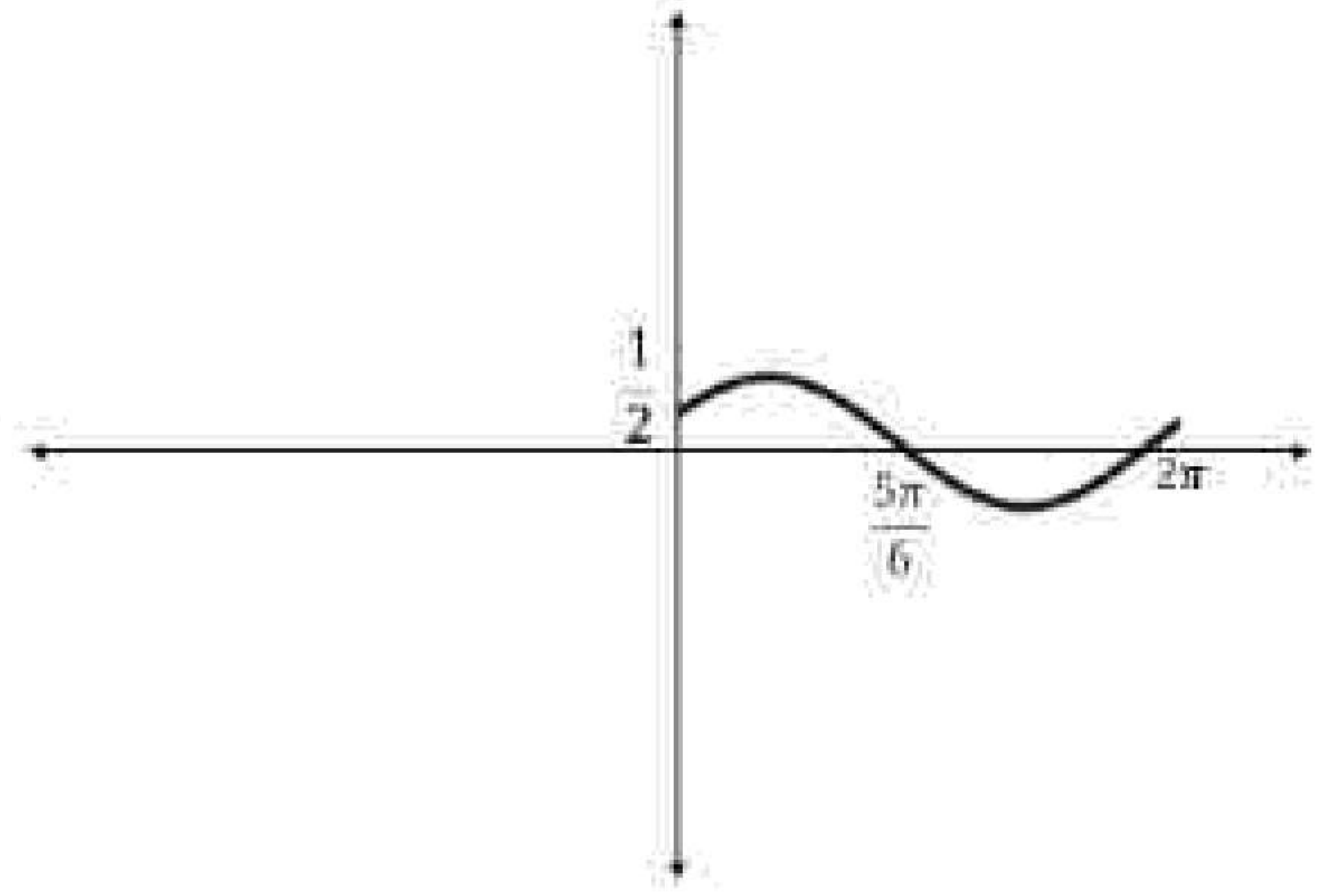
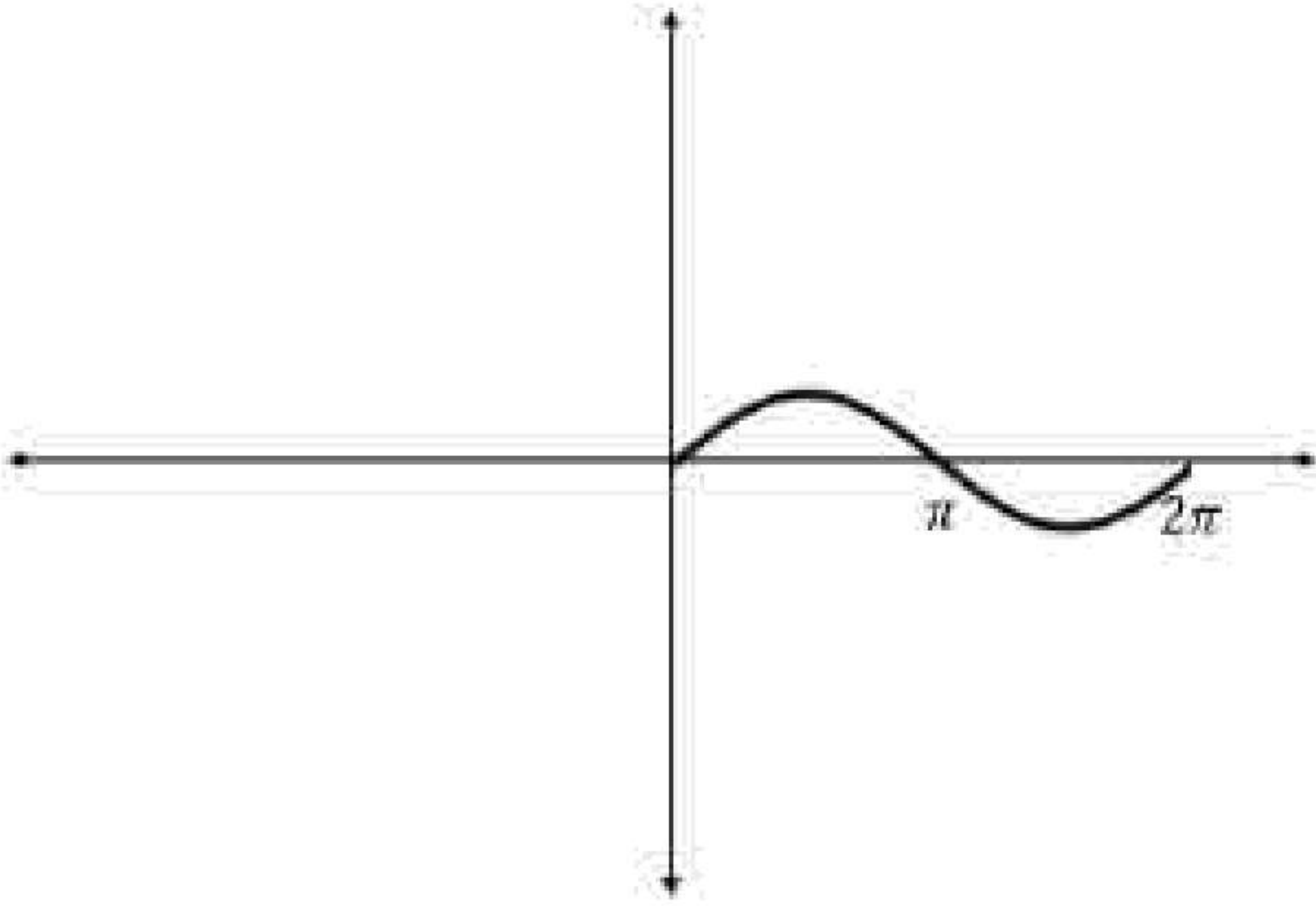
$$\text{Cos}(\alpha - \beta) = \text{Cos} \alpha \text{Cos} \beta + \text{Sin} \alpha \text{Sin} \beta = \left(\frac{3}{5}\right)\left(\frac{12}{13}\right) + \left(-\frac{4}{5}\right)\left(\frac{5}{13}\right) = \frac{16}{65}$$

-۵۲- نمودار تابع در نقاط $\frac{5\pi}{6}$ ، $\frac{11\pi}{6}$ محور X ها را قطع می کند.



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۵۳- با توجه به نمودار $y = \sin(x)$ و با انتقال این نمودار به اندازه $\frac{\pi}{6}$ به سمت چپ بر روی محور X ها نمودار موردنظر به دست می آید.



۵۴- گزینه ۴ پاسخ صحیح است.

$$\operatorname{tg}\left(\theta - \frac{\pi}{2}\right) = \tan\left(-\left(\frac{\pi}{2} - \theta\right)\right) = -\tan\left(\frac{\pi}{2} - \theta\right) = -\cot\theta$$

$$\frac{1}{32} - 55$$

$$-\sqrt{3} - 56$$