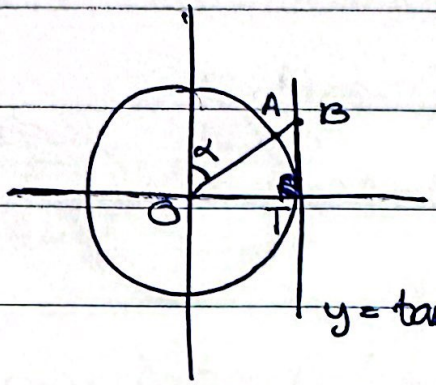
مریم توکلی دوازدهم A صبح تکلیف ۱۴

سوال یک)



A | $\cos(\frac{\pi}{2}-\alpha)=\sin\alpha$

$\sin(\frac{\pi}{2}-\alpha)=\cos\alpha$

B | 1

$\tan(\frac{\pi}{2}-\alpha)=\cot\alpha$

$\overline{AB}=\sqrt{(\sin\alpha-1)^2+(\cos\alpha-\cot\alpha)^2} \rightarrow AB=\frac{\sin\alpha-1}{\sin\alpha}$

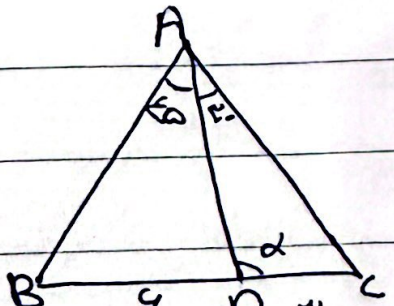
تبدیل به ۲

$\frac{\cos^2\alpha(\sin^2\alpha+1-2\sin\alpha)}{\sin^2\alpha}$

$=\frac{\sin^2\alpha(\sin^2\alpha+1-2\sin\alpha)+(1-\sin^2\alpha)(\sin^2\alpha+1-2\sin\alpha)}{\sin^2\alpha}=\frac{1+\sin^2\alpha-2\sin\alpha}{\sin^2\alpha}$

$AB=\sqrt{\frac{(\sin\alpha-1)^2}{\sin^2\alpha}} \rightarrow \boxed{AB=\frac{\sin\alpha-1}{\sin\alpha}}$

سوال ۲)



$\frac{\sqrt{3}}{2}=\frac{\sin\alpha}{AB} \rightarrow \frac{\sqrt{3}}{12}=\frac{\sin\alpha}{AB} \rightarrow AB=\frac{12\sin\alpha}{\sqrt{3}}$

$\frac{1}{2}=\frac{\sin\alpha}{AC} \rightarrow \frac{1}{4}=\frac{\sin\alpha}{AC} \rightarrow AC=4\sin\alpha$

$\frac{AB}{AC}=\frac{12\sin\alpha}{\sqrt{3}\,4\sin\alpha}=\boxed{\sqrt{3}}$

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سوال ۳)

الف)

$$\cos B = \frac{a^2+c^2-b^2}{2ac} \rightarrow \cos B = \frac{4+2-\sqrt{2}}{4\times\sqrt{2}\times\sqrt{2}} = \frac{\sqrt{2}(\sqrt{2}-1)}{\sqrt{2}\times 2\sqrt{2}}$$

$$\Rightarrow \cos B = \frac{\sqrt{2}-1}{2\sqrt{2}} \rightsquigarrow \sin B = \frac{1+\sqrt{2}}{2\sqrt{2}}$$

$$S = \frac{1}{2}\times\sqrt{2}\times\sqrt{2}\times\frac{1+\sqrt{2}}{2\sqrt{2}} = \boxed{\frac{2+\sqrt{2}}{4}}$$

ب)

$$A\left|\frac{\frac{1}{2}}{\frac{\sqrt{2}}{2}}\right. \quad B\left|\frac{-\frac{\sqrt{2}}{2}}{\frac{1}{2}}\right. \quad C\left|\begin{matrix}0\\-1\end{matrix}\right.$$

$$\overline{AB} = \sqrt{\left(\frac{1+\sqrt{2}}{2}\right)^2 + \left(\frac{\sqrt{2}-1}{2}\right)^2} = \sqrt{2}$$

$$\overline{BC} = \sqrt{\left(\frac{\sqrt{2}}{2}\right)^2 + \left(-\frac{\sqrt{2}}{2}\right)^2} = \sqrt{2}$$

$$\overline{AC} = \sqrt{\left(\frac{1}{2}\right)^2 + \left(\frac{\sqrt{2}+2}{2}\right)^2} = \sqrt{2+\sqrt{2}}$$

$$\boxed{\text{محیط} = \sqrt{2}+\sqrt{2}+\sqrt{2+\sqrt{2}}}$$

سوال ۴)

$$a^2 = b^2+c^2-2bc\cos 30^\circ \rightarrow c^2-\sqrt{2}bc+b^2-a^2 = 0$$

$$c = \frac{\sqrt{2}b \pm \sqrt{4a^2-b^2}}{2} \qquad S = \frac{1}{2}x$$

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سوال ۳)

$\eta = \cos\alpha \quad 2\cos^4\alpha = \cos^2\alpha - \sin^2\alpha(2\sin^2\alpha + 1) = 1$

$\cos^2\alpha(\underbrace{2\cos^2\alpha - 1}_{\cos 2\alpha}) - \sin^2\alpha(\underbrace{2\sin^2\alpha - 1}_{-\cos 2\alpha}) = 1$

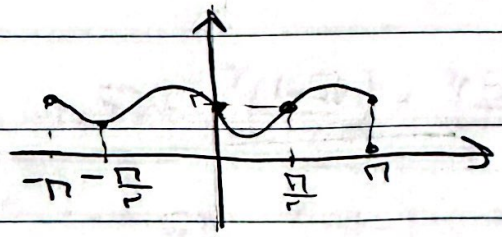
$\rightarrow \cos 2\alpha(\cancel{\cos^2\alpha + \sin^2\alpha}^{1}) = 1 \rightarrow \cos 2\alpha = 1 \rightarrow \boxed{\sin 2\alpha = 0}$

سوال ۴)

الف)

$T = \frac{2\pi}{|b|} = \frac{2\pi}{2} = \pi \quad y = -2\sin\pi x\cos\pi x + 2$

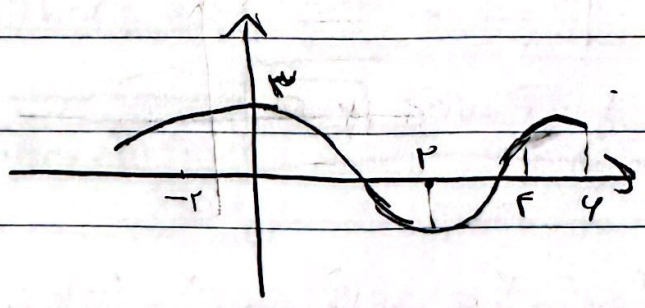
$= y = -\sin 2\pi x + 2$



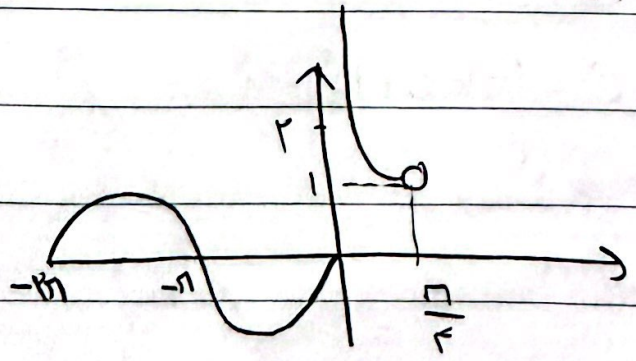
ب)

$y = 2\cos(x + \frac{1}{2})\pi + 1 = -2\sin\pi x + 1$

$T = \frac{2\pi}{|b|} = \frac{2\pi}{\pi} = 2$



سوال ۷)



$R = (-1, +\infty)$

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سوال ۸)

$$f(x) \overset{a+}{=} \underbrace{b\sin(cx)\cos(cx)}\cos(2cx) = \frac{b}{4}\sin(4cx) + a$$

$$\frac{b}{2}\sin(2cx)$$

$$\left|\frac{b}{4}\right| + a = 4 \quad -\left|\frac{b}{4}\right| + a = 0 \rightarrow 2a = 4 \rightarrow a = 2$$

$$|b| = 8 \rightarrow b = +8$$

$$T = \frac{\pi}{2} - \frac{\pi}{10} = \frac{2\pi}{5} = \frac{2\pi}{|4c|} \rightarrow |c| = \frac{5}{4} \xrightarrow{c>0} c = \frac{5}{4}$$

$$\frac{bc}{a} = \frac{8 \times \frac{5}{4}}{2} = \boxed{5}$$

سوال ۹)

به دلیل اینکه بردار ۳ ضرب شده و یک واحد به پایین منتقل شده پس
و ترسیم شده

$$c = -1 \quad a = -3$$

$$\frac{2\pi}{|b|} = \frac{2\pi}{\pi} = 2 \rightarrow f(x) = -3\cos(2x) - 1 \rightarrow f(\alpha) = -3\cos 2\alpha - 1 = 0$$

$$\cos 2\alpha = -\frac{1}{3}$$

$$|\sin 2\alpha| = \frac{2\sqrt{2}}{3} \rightarrow |\tan(2\alpha)| = \boxed{2\sqrt{2}}$$

سوال ۱۰)

آپادانا