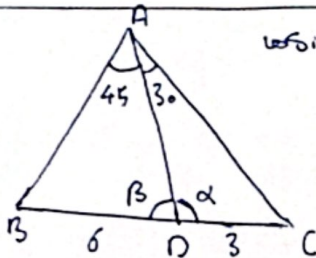
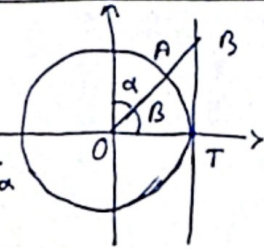


$$\alpha + \beta = 90^\circ \rightarrow \tan \alpha = \cot \beta = \frac{BT}{OT}$$

$$OT = OA = 1 \text{ (شعاع دایره متناهی)}$$

$$OB = \sqrt{OT^2 + BT^2} = \sqrt{1 + \cot^2 \alpha} = \sqrt{\frac{1}{\sin^2 \alpha}} = \left| \frac{1}{\sin \alpha} \right| = \frac{1}{\sin \alpha}$$

$$OA + 1 = OB \rightarrow OA = OB - 1 = \frac{1}{\sin \alpha} - 1 = \frac{1 - \sin \alpha}{\sin \alpha}$$



$$\text{طبق قضیه سین: } \frac{BD}{\sin 45^\circ} = \frac{AB}{\sin \beta} \quad \beta + \alpha = 180^\circ \rightarrow \frac{6}{\sin 45^\circ} = \frac{AB}{\sin \alpha} = \frac{12}{\sqrt{2}}$$

$$\triangle ADC \Rightarrow \frac{DC}{\sin 30^\circ} = \frac{AC}{\sin \alpha} = \frac{3}{\frac{1}{2}} \Rightarrow 6$$

$$\frac{AB}{AC} = \frac{12\sqrt{2}}{6\sqrt{2}} = \frac{2}{\sqrt{2}}$$

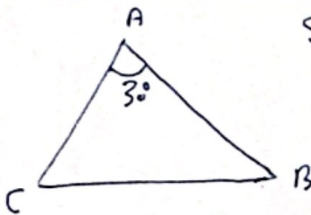
$$\begin{array}{l} A \left| \frac{1}{2} \right. \\ \left| \frac{\sqrt{3}}{2} \right. \\ B \left| \frac{\sqrt{3}}{2} \right. \\ \left| \frac{1}{2} \right. \\ C \left| 0 \right. \end{array}$$

$$AB = \sqrt{\left(\frac{1+\sqrt{3}}{2}\right)^2 + \left(\frac{1-\sqrt{3}}{2}\right)^2} = \sqrt{\frac{1+2\sqrt{3}+3+1-2\sqrt{3}+3}{4}} = \sqrt{2}$$

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

$$BC = \sqrt{\left(\frac{\sqrt{3}}{2}\right)^2 + \left(\frac{3}{2}\right)^2} = \sqrt{\frac{3+9}{4}} = \sqrt{3}$$

$$\sqrt{2} + \sqrt{3} + \sqrt{2+\sqrt{3}} \quad \text{ب. خطی:}$$



$$S_{\triangle ABC} = \frac{1}{2} AB \times AC \times \sin 30^\circ = \frac{1}{2} \times \log_2^{27} \times \log_3^{16} \times \frac{1}{2}$$

$$\log_2^{27} = 3 \log_2^3$$

$$\log_3^{16} = 4 \log_3^2 = \frac{4}{\log_2^3}$$

$$= \frac{1}{2} \times 3 \log_2^3 \times \frac{4}{\log_2^3} \times \frac{1}{2} = 12 \times \frac{1}{4} = 3$$

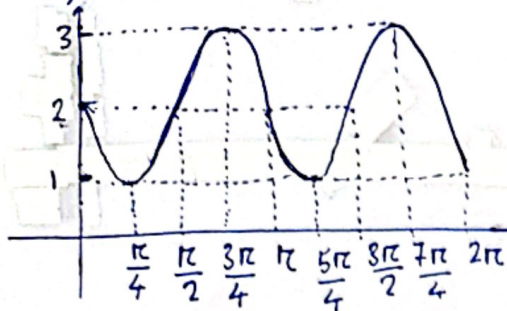
$$2x^4 - x^2 = \sin^2(\alpha)(2\sin^2\alpha - 1) \xrightarrow{x = \cos \alpha} 2\cos^4\alpha - \cos^2\alpha - 2\sin^4\alpha + \sin^2\alpha$$

$$\Rightarrow 2(\cos^4\alpha - \sin^4\alpha) + (\sin^2\alpha - \cos^2\alpha) = 2(\cos^2\alpha - \sin^2\alpha)(\cos^2\alpha + \sin^2\alpha) + \sin^2\alpha - \cos^2\alpha$$

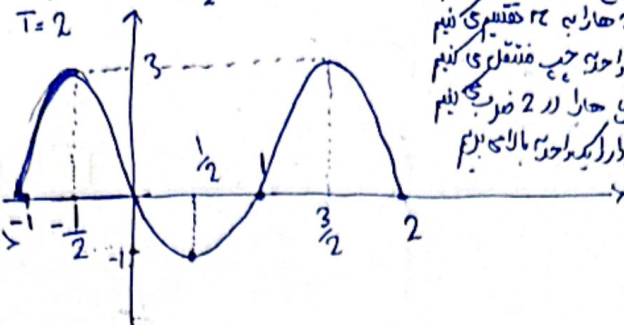
$$2\cos^2\alpha - 2\sin^2\alpha + \sin^2\alpha - \cos^2\alpha = \cos^2\alpha - \sin^2\alpha = 1 \rightarrow \begin{array}{l} \sin \alpha = 0 \\ \cos \alpha = 1 \end{array}$$

$$\sin 2\alpha = 2\sin \alpha \cos \alpha = 0$$

الف) $-2\sin x \cos 2x + 2 = -\sin 2x + 2$

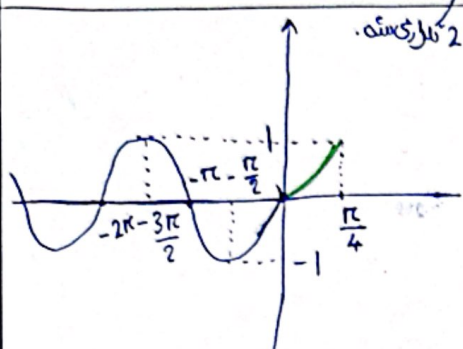


ب) $2\cos(x + \frac{1}{2})\pi + 1$



اول تابع $y = \cos(x)$ را رسم می کنیم.
(2) x ها را به 2π تقسیم می کنیم
(3) $\frac{1}{2}$ واحد چپ منتقل می کنیم
(4) y ها را در 2 ضرب می کنیم
(5) نمودار را یک واحد بالا می کشیم

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تابع $\sin$ (قسمت آبی رنگ نمودار) متناوب است با دوره تناوب 2π تکلیفی شده.
رابطه $\cos$ در بازه داده شده (قسمت سبز رنگ) بین 0 و 1 باشد

پس $R_f = [-1, 1]$

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$\sin(Cx) \cos(Cx) = \frac{1}{2} \sin(2Cx)$

$\frac{1}{2} \sin(2Cx) \cos(2Cx) = \frac{1}{4} \sin(4Cx)$

$f(x) = a + \frac{b}{4} \sin(4Cx)$

$a + \frac{b}{4} = 4$

$a - \frac{b}{4} = 0$

$\frac{2a = 4}{a = 2} \quad |b| = 8 \rightarrow b = 8$

$T = \frac{2\pi}{4C} = \frac{\pi}{2} - \frac{\pi}{10} = \frac{2\pi}{5}$

$C = \frac{5}{4}$

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

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$|a| + C = 2$

$-|a| + C = -4$

$C = -1$

$|a| = 3 \rightarrow a = -3$ با توجه به شکل

$T = \pi$ (با توجه به شکل)

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

به تاثیر درجه سیرال
نکته پس 2 فرض می کنیم

$f(x) = -3\cos 2x - 1 \xrightarrow{x=\alpha} -3\cos 2\alpha - 1 = 0$

$\cos 2\alpha = -\frac{1}{3}, \sin^2 2\alpha = \frac{8}{9}$

$\sin 2\alpha = \pm \frac{2\sqrt{2}}{3}$

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

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$-3415 \in [-35, -32] \rightarrow f(-3415) = f(-\frac{1}{2})$

معادله خط
می نویسیم: $\begin{vmatrix} 1 & -1 \\ 2 & 0 \end{vmatrix} \rightarrow m = \frac{2}{1} = 2 \rightarrow 2x + 2$

$x = -\frac{1}{2} \rightarrow \varphi(-\frac{1}{2}) = 1$

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