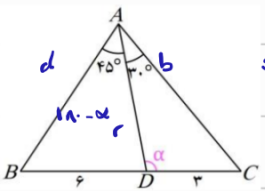


$$\sin \alpha = \frac{BC}{OB} \quad BC=1 \rightarrow \sin \alpha = \frac{1}{OB} \rightarrow OB = \frac{1}{\sin \alpha}$$

$$AB = OB - OA \rightarrow AB = \frac{1}{\sin \alpha} - 1 = \frac{1 - \sin \alpha}{\sin \alpha} \quad \checkmark$$

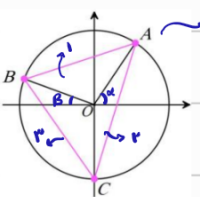
سوال ۱) واضح است که طول پاره خط OA، ۱ است



$$\frac{d}{\sin(40-\alpha)} = \frac{4}{\sin 40} \rightarrow \frac{d}{\sin \alpha} = \frac{4}{\frac{\sqrt{2}}{2}} \rightarrow d = \frac{4\sqrt{2} \sin \alpha}{\sqrt{2}}$$

$$\frac{b}{\sin \alpha} = \frac{3}{\sin 40} \rightarrow \frac{b}{\sin \alpha} = \frac{3}{\frac{1}{2}} \Rightarrow b = 4 \sin \alpha$$

$$\left\{ \begin{array}{l} \frac{AB}{AC} = \frac{d}{b} = \frac{\frac{4\sqrt{2} \sin \alpha}{\sqrt{2}}}{4 \sin \alpha} = \frac{2}{\sqrt{2}} = \sqrt{2} \end{array} \right.$$



طول شیب A = $\cos \alpha = \frac{1}{2} \rightarrow \alpha = 60^\circ$

عرض شیب B = $\sin \beta = \frac{1}{2} \rightarrow \beta = 30^\circ$

ان $S_{\triangle} = S_1 + S_2 + S_3$



$$S_1 = \frac{1}{2} \times 1 \times 1 \times \sin 90 = \frac{1}{2}$$

$$S_2 = \frac{1}{2} \times 1 \times 1 \times \sin 120 = \frac{1}{2} \times \frac{\sqrt{3}}{2} = \frac{\sqrt{3}}{4}$$

$$S_3 = \frac{1}{2} \times 1 \times 1 \times \sin 120 = \frac{\sqrt{3}}{4}$$

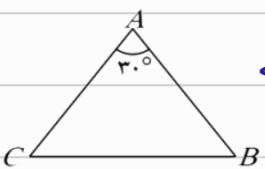
$$S_{\triangle} = \frac{1}{2} + \frac{1}{4} + \frac{\sqrt{3}}{4} = \frac{3 + \sqrt{3}}{4}$$

ب) $a^2 = b^2 + c^2 - 2bc \cos \hat{A} \rightarrow a^2 = 1 + 1 - 2 \cos 120 \rightarrow a = \sqrt{3}$

$b^2 = 1 + 1 - 2 \cos 150 \rightarrow b = \sqrt{2 + \sqrt{3}}$

$c^2 = 1 + 1 - 2 \cos 90 \rightarrow c = \sqrt{2}$

محيط مثل = $\sqrt{3} + \sqrt{2} + \sqrt{2 + \sqrt{3}}$



$$S_{\triangle} = \frac{1}{2} \times AC \times AB \times \sin \hat{A} \rightarrow S_{\triangle} = \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \sin 120 \times \frac{1}{2}$$

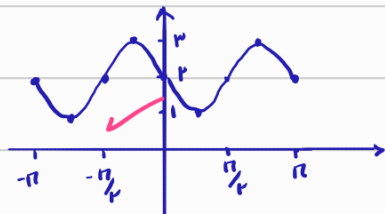
$$\rightarrow \frac{1}{2} \times 3 \times 4 \times \frac{1}{2} = 3 \quad \checkmark$$

سوال ۵) در عبارت داده شده بجای n ها، $\cos \alpha$ میذاریم و عبارت را برابر با دایمی مانند اسات قرار می دهیم

$$2n^4 - n^2 - \sin^2(\alpha)(2 \sin^2 \alpha - 1) \rightarrow 2 \cos^4 \alpha - \cos^2 \alpha - 2 \sin^4 \alpha + \sin^2 \alpha = 1 \rightarrow \sin^2 \alpha - \cos^2 \alpha + 2(\cos^2 \alpha - \sin^2 \alpha) = 1 \quad \checkmark$$

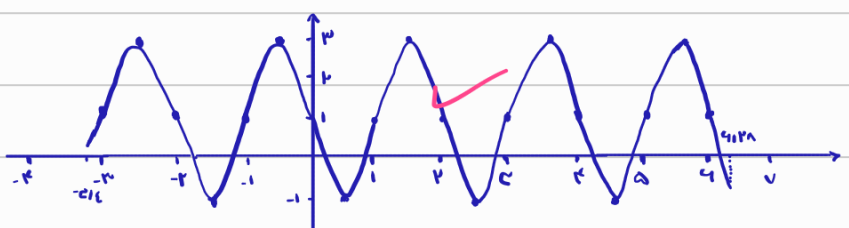
$$\rightarrow -\cos^2 \alpha + 2 \cos^2 \alpha = 1 \rightarrow \cos^2 \alpha = 1 \Rightarrow \sin \alpha = 0 \quad \checkmark$$

ان) $-2 \sin \pi \cos \pi + 2 = -\sin 2\pi + 2$ درون قوس = $\frac{\pi \pi}{16} = \frac{\pi \pi}{2} = \pi \quad \checkmark$



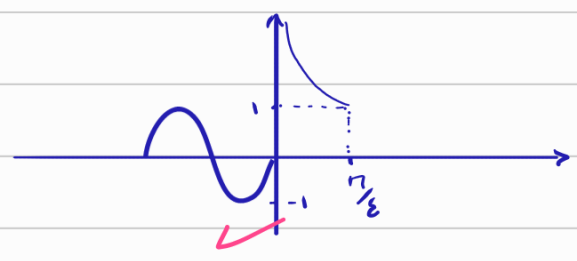
ب) $2 \cos(n + \frac{1}{2})\pi + 1 = 2 \cos(\pi n + \frac{\pi}{2}) + 1$ $[-\pi, \pi]$ $\hookrightarrow 4\pi n$

$$\rightarrow -2 \sin(\pi n) + 1 \rightarrow \text{در قوس: } \frac{\pi \pi}{\pi} = \pi \quad \checkmark$$

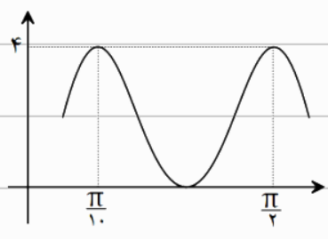


$$f(n) = \begin{cases} \cos n & ; 0 < n < \frac{\pi}{2} \\ \sin n & ; n < 0 \end{cases}$$

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



سوال ۷) ۱,۷۵



$$a + b + \sin(cn) \cos(cn) \cos(cn) = a + b + \frac{1}{4} \sin(4cn) \cos(4cn) = a + b + \frac{1}{4} \sin(4cn)$$

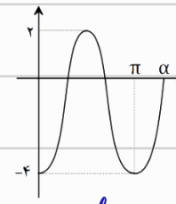
سوال ۸)

دوره تناوب $\frac{\pi}{4} - \frac{\pi}{4} = \frac{\pi}{2} = \frac{2\pi}{\omega} \Rightarrow \omega = 4$

$\frac{y_{max} + y_{min}}{2} = a \rightarrow \frac{1 + (-1)}{2} = a \Rightarrow a = 0$, $\frac{y_{max} - y_{min}}{2} = |b| \rightarrow \frac{1 - (-1)}{2} = |b| \Rightarrow |b| = 1$

$\hookrightarrow \frac{1 - (-1)}{2} = 1 = \frac{b}{4} \rightarrow b = 4$ $\frac{bc}{a} = \frac{1 \times 4}{0} = \infty$

۲

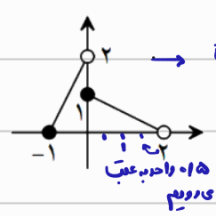


دوره تناوب $\pi \rightarrow \frac{2\pi}{\omega} = \pi \Rightarrow \omega = 2$ $\Rightarrow b = 2$

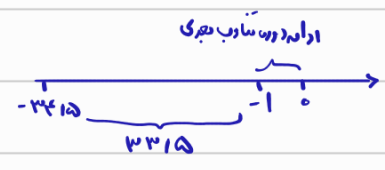
سوال ۹)

$\frac{y_{max} + y_{min}}{2} = c \rightarrow \frac{1 + (-1)}{2} = c \Rightarrow c = 0$, $\frac{y_{max} - y_{min}}{2} = |a| \rightarrow \frac{1 - (-1)}{2} = |a| \Rightarrow |a| = 1$

$\rightarrow f(n) = 1 \cos 2n - 1 \sin 2n = \cos 2n - \sin 2n$ $\rightarrow \cos 2n - \sin 2n = 0 \rightarrow \cos 2n = \sin 2n \rightarrow 1 + \tan^2 2n = \frac{1}{\cos^2 2n} \rightarrow 1 + \tan^2 2n = \frac{1}{\cos^2 2n} \rightarrow |\tan 2n| = 1$



مقادیر مثبت دوم را باید درست آوریم تا
بقیانی به ازای $x = \frac{\pi}{4}$ را داشته باشیم:
 $y = -\frac{1}{4}x + 1 \rightarrow x = \frac{\pi}{4} \rightarrow y = \frac{3}{4}$



سوال ۱۰) یعنی ۱۱ در این تکرار شده که این اثر $\frac{3}{11}$ است در اینجا ۱۵ واحد به عقب رفته است