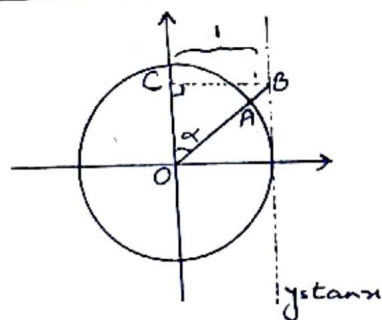


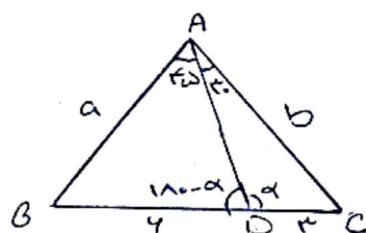


دایره است که طول پاره خط OA است.

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

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

۱



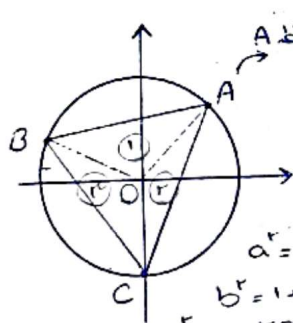
طبق قضیه سینوس ها:

$$\frac{a}{\sin(180-\alpha)} = \frac{r}{\sin \alpha} \rightarrow \frac{a}{\sin \alpha} = \frac{r}{\frac{1}{r}} \rightarrow a = 1r \times \sin \alpha$$

$$\frac{b}{\sin \alpha} = \frac{r}{\sin 120} \rightarrow \frac{b}{\sin \alpha} = \frac{r}{\frac{\sqrt{3}}{2}} \rightarrow b = 4 \sin \alpha$$

$$\frac{AB}{AC} = \frac{a}{b} = \frac{1r \times \sin \alpha}{4 \sin \alpha} = \frac{r}{4}$$

۲



$$A \text{ طول نقطه } C \cos \hat{A} = \frac{1}{r} \rightarrow A = 90^\circ$$

$$\sin B = \frac{1}{r} \rightarrow B = 150^\circ$$

$$S_{\triangle ABC} = S_1 + S_2 + S_3$$

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

$$S_2 = \frac{1}{2} \times 1 \times 1 \times \sin 150 = \frac{1}{4}$$

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

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

$$b) a^2 = b^2 + c^2 - 2bc \cos \hat{A}$$

$$a^2 = 1 + 1 - 2 \times 1 \times 1 \times \cos 120 \rightarrow a = \sqrt{3}$$

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

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

$$\text{مساحت: } \sqrt{3} + \sqrt{2} + \sqrt{2+\sqrt{3}}$$

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$$S_{\triangle} = \frac{1}{2} \times \sin \hat{A} \times AC \times BC \rightarrow S_{\triangle} = \frac{1}{2} \times \frac{1}{r} \times \log_r^{14} \times \log_r^{14}$$

$$\rightarrow = \frac{1}{2} \times \frac{1}{r} \times \log_r^{14} \times \log_r^{14} = \frac{1}{2} \times \frac{1}{r} \times r \times r = r$$

۴

در عبارات داده شده جای $\cos \alpha$ را بگذاریم و عبارات را برابر با مقدار باقی مانده (که ۱ است) قرار دهیم:

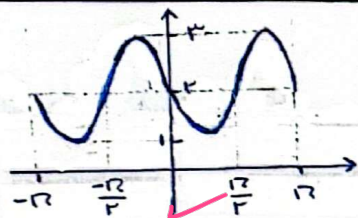
$$\rightarrow r \times \cos^2 \alpha - \cos^2 \alpha - r \sin^2 \alpha + \sin^2 \alpha = 1$$

$$\rightarrow \sin^2 \alpha - \cos^2 \alpha + r(\cos^2 \alpha - \sin^2 \alpha) = 1 \rightarrow -\cos^2 \alpha + r(\sin^2 \alpha + \cos^2 \alpha)(\cos^2 \alpha - \sin^2 \alpha) = 1$$

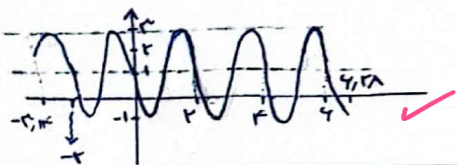
$$-\cos^2 \alpha + r \cos^2 \alpha = 1 \rightarrow \cos^2 \alpha = 1 \quad \sin^2 \alpha = 0$$

۵

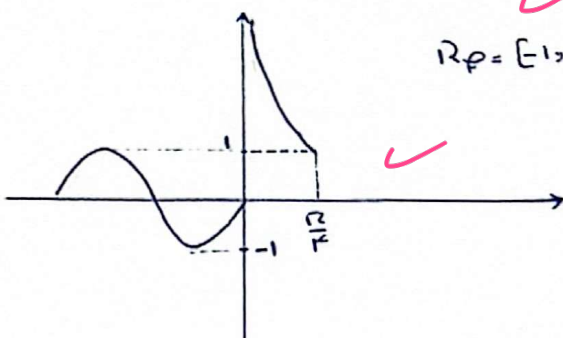
الف) $-r \sin C \sin + r = -\sin r x + r$ درستی: $\frac{r}{|b|} = \frac{r}{r} = 1 \rightarrow$



ب) $r \cos(x + \frac{1}{r})n + 1 = r \cos(n x + \frac{r}{r}) + 1$
 $\rightarrow -r \sin(n x) + 1 \rightarrow$ درستی: $\frac{r}{r} = 1, [-r, r]$



$$f(x) = \begin{cases} C \tan x & 0 < x < \frac{\pi}{2} \\ \sin x & x \leq 0 \end{cases}$$



$R_f = [1, +\infty)$

$a + b \times \sin(Cx) \times \cos(Cx) \times \cos(rCx) \rightarrow a + b \times \frac{\sin(rCx) \times \cos(rCx)}{r} = a + b \times \frac{1}{r} \times \sin(rCx)$

درستی: $\frac{r}{r} - \frac{r}{r} = \frac{r}{r} = \frac{r}{r}$

$\frac{r}{|fC|} = \frac{r}{\Delta} \rightarrow |fC| = \Delta \rightarrow C = \frac{\Delta}{f}$

$\frac{J_{max} + J_{min}}{r} = a \rightarrow \frac{r + r}{r} = r = a$

$\frac{J_{max} - J_{min}}{r} = |b| \rightarrow \frac{r - r}{r} = |b| \rightarrow b = 0$

$\rightarrow \frac{r - r}{r} = r = \frac{b}{f} \rightarrow b = r$

$\frac{b \times C}{a} = \Delta$

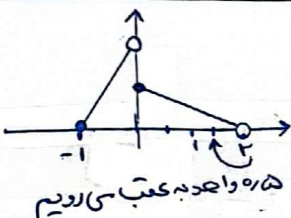
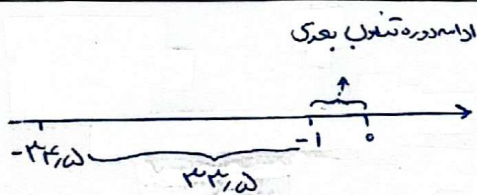
طبق شکل دوره تناوب n است. $\leftarrow \frac{r}{|b|} = n \leftarrow |b| = r \rightarrow C \sin x$ است تغییراتی ندارد پس $b = r$

$\frac{J_{max} + J_{min}}{r} = C \rightarrow \frac{r - r}{r} = -1 = C$

$\frac{J_{max} - J_{min}}{r} = |a| \rightarrow \frac{r + r}{r} = 2 = |a| \rightarrow a = 2$

چون تابع گسسته با محور شروع شده است پس $a < 0$ و $a = -2$ است.

$\rightarrow f(x) = -2 \cos 2x - 1 \xrightarrow{x = \alpha} -2 \cos 2\alpha - 1 = 0 \rightarrow \cos 2\alpha = -\frac{1}{2} \rightarrow 1 + \tan^2 \alpha = \frac{1}{\cos^2 \alpha}$
 $1 + \tan^2 \alpha = \frac{1}{\frac{1}{4}} \rightarrow | \tan \alpha | = \sqrt{3}$



محاولی مستقیم را باید به دست آوریم تا بتوانیم به ازای $x = \frac{\pi}{2}$ و $y = 1$ داشته باشیم:

$y = \frac{1}{r}x + 1 \xrightarrow{x = \frac{\pi}{2}} y = \frac{1}{r} \times \frac{\pi}{2} + 1$

$\frac{1}{r} \times \frac{\pi}{2} + 1 = 1 \rightarrow \frac{1}{r} \times \frac{\pi}{2} = 0 \rightarrow r = \frac{\pi}{2}$

در اینجا دوره واحد به عقب رفته است.