

$$B(1, \tan \theta) \quad AB^2 = (1 - \cos \theta)^2 + (\tan \theta - \sin \theta)^2 \rightarrow AB = \frac{1 - \cos \theta}{\cos \theta}$$

$$A(\cos \theta, \sin \theta)$$

$$\alpha = \frac{\pi}{2} - \theta \rightarrow \sin \alpha = \cos \theta \rightarrow AB = \frac{1 - \sin \alpha}{\sin \alpha}$$

$$\frac{BD}{DC} = r = \frac{y}{x} = \frac{AB \sin \alpha}{AC \sin \alpha} = \frac{\frac{1}{r} AB}{\frac{1}{r} AC} = r \Rightarrow \frac{AB}{AC} = r \rightarrow \frac{AB}{AC} = r$$

$$x_A = \frac{1}{r}, y_A = \sqrt{1 - (\frac{1}{r})^2} = \frac{\sqrt{r^2 - 1}}{r}$$

$$y_B = \frac{1}{r}, x_B = -\frac{\sqrt{r^2 - 1}}{r}$$

$$x_C = 0, y_C = -1$$

نقطه A در ربع اول، B در ربع دوم است. اختلاف ارتفاعها ۹۰ درجه است بنابراین زاویه C که مقابل آن است ۹۰ درجه است.

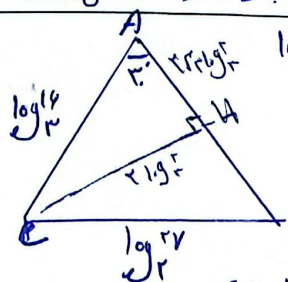
$$AB = \sqrt{(x_B - x_A)^2 + (y_B - y_A)^2} = \sqrt{(\frac{-\sqrt{r^2 - 1}}{r} - \frac{1}{r})^2 + (\frac{1}{r} - \frac{\sqrt{r^2 - 1}}{r})^2} = \sqrt{r^2 - 1}$$

$$BC = \sqrt{\frac{1}{r^2} + \frac{1}{r^2}} = \sqrt{2}$$

$$CA = \sqrt{\frac{1}{r^2} + (\frac{\sqrt{r^2 - 1}}{r})^2} = \sqrt{r^2 + 1}$$

$$S = \frac{1}{2} \sin \alpha \times BC \times AC = \frac{\sqrt{2}}{2} \times \sqrt{r^2 + 1}$$

$$P = AB + BC + CA = \sqrt{r^2 - 1} + \sqrt{2} + \sqrt{r^2 + 1}$$



$$\log \frac{1}{r} = \frac{1}{r} \log r$$

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$$S = \frac{1}{2} \sin \alpha \times AB \times AC$$

$$S = \frac{1}{2} \sin \alpha \times \log \frac{1}{r} \times (\frac{\sqrt{9 - 4(\log \frac{1}{r})^2}}{\log \frac{1}{r}} + 2r \log \frac{1}{r}) \rightarrow S = \sqrt{9 - 4(\log \frac{1}{r})^2} + 2r \log \frac{1}{r}$$

$$x = \cos \alpha \Rightarrow f(\cos \alpha) = 2 \cos^2 \alpha - \cos \alpha - \sin^2 \alpha (2 \sin^2 \alpha - 1) = 2 \cos^2 \alpha - \cos \alpha - 2 \sin^2 \alpha + \sin^2 \alpha$$

$$= 2(\cos^2 \alpha - \sin^2 \alpha) - (\cos^2 \alpha - \sin^2 \alpha) = 2(\cos^2 \alpha - \sin^2 \alpha) - (\cos^2 \alpha - \sin^2 \alpha)$$

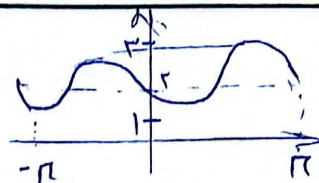
$$(\sin^2 \alpha + \cos^2 \alpha)(\cos^2 \alpha - \sin^2 \alpha)$$

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

$$\cos^2 \alpha + \sin^2 \alpha = 1$$

$$a) \Rightarrow y = -\sin 2x + 2 \quad T = \frac{2\pi}{|b|} = \pi \checkmark$$

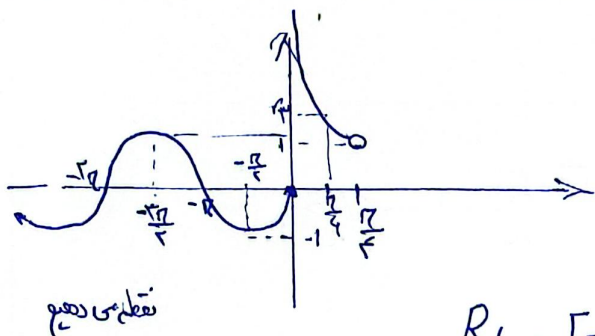
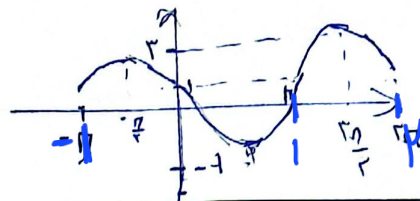
بافتتاحه دارد نمودار را رسم می کنیم



$$b) y = 2\cos(x + \frac{\pi}{4}) + 1 = 2\cos(x + \frac{\pi}{4}) + 1$$

$$T = \frac{2\pi}{|a|} = \pi \checkmark$$

1, 1, 0



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

$$f(x) = a + b \sin(cx) \cos(cx) \cos(2cx) = a + b \frac{1}{4} \sin(4cx) = 2 + 2 \sin 4x$$

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

$$T = \frac{\pi}{c} - \frac{\pi}{c} = \frac{\pi}{2}$$

$$\Rightarrow \frac{b}{a} = \frac{1 \times \frac{\pi}{2}}{2} = \frac{1}{4}$$

$$max = |a| + b = 4 \Rightarrow a = 2$$

$$min = -|a| + b = 0 \Rightarrow b = 2$$

در اینجا نمودار سینوس را رسم می کنیم

$$max = |a| + c = 2 \Rightarrow c = -1$$

$$min = -|a| + c = -2 \Rightarrow a = \pm 2 \rightarrow a = -2$$

$$T = \pi$$

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

برای هر دو صورت

$$f(x) = -2\cos 2x - 1 \Rightarrow f(a) = -2\cos 2a - 1 = 0 \Rightarrow \cos 2a = -\frac{1}{2}$$

$$\sin 2a = 1 - \cos 2a = 1 - (-\frac{1}{2}) = \frac{3}{2} \Rightarrow \sin 2a = \frac{3}{2} \Rightarrow |tan 2a| = \left| \frac{\frac{3}{2}}{-\frac{1}{2}} \right| = 3 \checkmark$$

$$T = 3$$

$$\rightarrow f(x+3) = f(x)$$

$$x = -3t, 0 + 2k \rightarrow -1 \sqrt{-3t, 0 + 2k} \sqrt{2} \rightarrow k = 1 \rightarrow x = -3t, 0 + 2 \times 1 = 1, 0$$

1, 1, 2, 3, 2

$$\rightarrow f(-3t, 0) = f(1, 0) \Rightarrow f(1, 0) = -\frac{1}{2}x + 1 = -\frac{1}{2}(\frac{1}{2}) + 1 = -\frac{1}{4} + 1 = \frac{3}{4} \checkmark$$