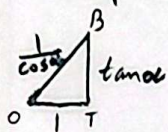


$$\sin\left(\frac{\pi}{4} - \alpha\right) = \tan \alpha \rightarrow \cos \alpha = \tan \alpha \rightarrow \cos^2 \alpha = \sin \alpha$$



$$OB^2 = 1 + \tan^2 \alpha = \frac{1}{\cos^2 \alpha} \rightarrow OB = \frac{1}{\cos \alpha}$$

$$AB = OB - 1 = \frac{1}{\cos \alpha} - 1 = \frac{1 - \cos \alpha}{\cos \alpha} = \frac{1 - \sqrt{\sin \alpha}}{\sqrt{\sin \alpha}} = \frac{\sqrt{\sin \alpha} - \sin \alpha}{\sin \alpha}$$

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$$\frac{BD}{\sin 45^\circ} = \frac{AD}{\sin \beta} = \frac{AB}{\sin \left(\frac{\pi}{2} - \alpha\right)} \rightarrow \frac{4}{\frac{\sqrt{2}}{2}} = \frac{AB}{\sin \alpha} \rightarrow AB = 4\sqrt{2} \sin \alpha$$

$$\frac{DC}{\sin 30^\circ} = \frac{AD}{\sin \hat{C}} = \frac{AC}{\sin \alpha} \rightarrow \frac{4}{\frac{1}{2}} = \frac{AC}{\sin \alpha} \rightarrow AC = 4 \sin \alpha$$

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

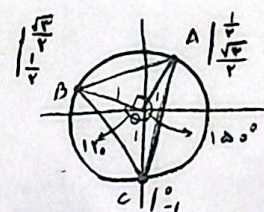
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$$\text{الف) } \angle BOC = \frac{\frac{\sqrt{2}}{2} \times 1}{\frac{1}{2}} = \frac{\sqrt{2}}{1} = \frac{1}{2} \times BO \times CO \times \sin \alpha$$

$$\angle AOC = \frac{\frac{1}{2} \times 1}{\frac{1}{2}} = \frac{1}{1} = \frac{1}{2} \times AO \times CO \times \sin \alpha$$

$$\angle AOB = \frac{1 \times 1}{\frac{1}{2}} = \frac{1}{\frac{1}{2}}$$

$$\angle ABC = \frac{2 + \sqrt{2}}{4}$$



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$$\text{ب) } BC = \sqrt{\frac{2}{4} + \frac{9}{4}} = \sqrt{3}$$

$$AC = \sqrt{1 + 1 - 2 \times 1 \times 1 \times \left(-\frac{\sqrt{2}}{2}\right)} = \sqrt{2 + \sqrt{2}}$$

$$AB = \sqrt{2}$$

$$b_{\text{max}} = \sqrt{2} + \sqrt{3} + \sqrt{2 + \sqrt{2}}$$

$$BC = 2 \log_2 4 = 2t$$

$$AC = 4 \log_2 2 = \frac{4}{t}$$

$$BC^2 = AC^2 + AB^2 - 2 \times AC \times AB \times \frac{\sqrt{2}}{2}$$

$$4t^2 = \frac{16}{t^2} + 4 - \frac{4\sqrt{2} \times 4}{t} = \frac{16 + t^2 \times 4 - 4\sqrt{2} \times 4}{t^2}$$

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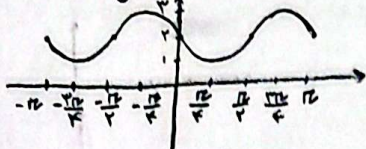
$$2 \cos^2 \alpha - \cos^2 \alpha - \sin^2 \alpha (1 - 2 \cos^2 \alpha) = \cos^2 \alpha (2 \cos^2 \alpha - 1) + \sin^2 \alpha (2 \cos^2 \alpha - 1)$$

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

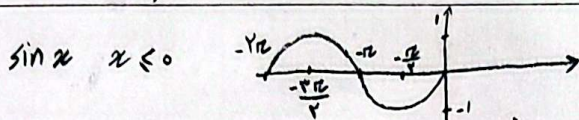
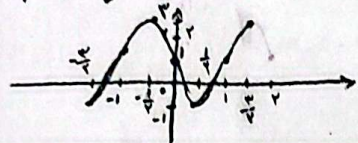
$$\sin 2\alpha = \sqrt{1 - \cos^2 2\alpha} = 0$$

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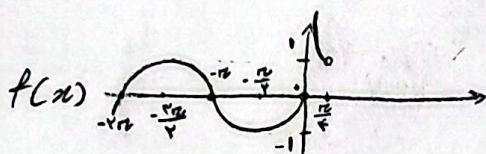
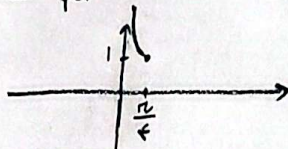
الف) $y = -\sin \gamma x + \gamma \quad [-\pi, \pi] \quad T = \frac{\gamma \pi}{\gamma} = \pi$



ب) $y = \gamma \cos(\pi x + \frac{\pi}{\gamma}) + 1 \quad [-\pi, \pi] \quad T = \frac{\gamma \pi}{\pi} = \gamma$



$\cot x \quad 0 < x < \frac{\pi}{\gamma}$



$f(x) = \frac{b}{\gamma} \sin(\gamma x) \cos(\gamma x) + a = \frac{b}{\gamma} \sin(\gamma x) + a$

$\frac{b}{\gamma} = \gamma \rightarrow b = \gamma^2 \quad a = \gamma$

$f(x) = \gamma \sin(\gamma x) + \gamma$

$\frac{bc}{a} = \frac{\gamma^2 \times \frac{\pi}{\gamma}}{\gamma} = \frac{\gamma \pi}{\gamma} = \pi$

$\frac{\pi}{\gamma} - \frac{\pi}{10} = \frac{\gamma \pi}{\omega} = \frac{\gamma \pi}{|\gamma c|} \rightarrow c = \frac{\pi}{\gamma}$

$f(x) = a \cos bx + c$

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

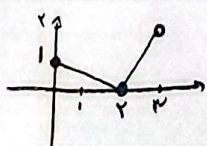
$f(x) = -\gamma \cos bx - 1$

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

$f(x) = -\gamma \cos \gamma x - 1 = 0 \rightarrow \cos \gamma x = -\frac{1}{\gamma}$

$\sin \gamma x = \sqrt{1 - \cos^2 \gamma x} = \frac{\gamma \sqrt{\gamma^2 - 1}}{\gamma}$

$|\tan \gamma x| = \left| \frac{\frac{\gamma \sqrt{\gamma^2 - 1}}{\gamma}}{-\frac{1}{\gamma}} \right| = \gamma \sqrt{\gamma^2 - 1}$



$\frac{\gamma \pi}{\omega} = \frac{\gamma \pi}{\gamma} = \pi$

$f(-\pi, 0) = f(-1, 0) = f(1, \omega) = -\frac{1}{\gamma} \times \frac{\gamma}{\gamma} + \gamma = \frac{\gamma^2 - 1}{\gamma}$

$0 \leq x \leq 1 \quad -\frac{1}{\gamma}x + \gamma$

$1 \leq x \leq 2 \quad \gamma x - \gamma$