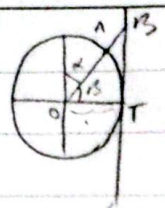
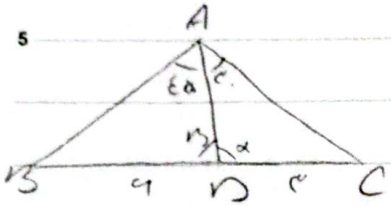


(۱

$\beta + \alpha = 90$

$\tan\left(\frac{\pi}{2} - \alpha\right) \cdot \cot\alpha = BT \Rightarrow \cot^2\alpha + OT^2 = OB^2 \cdot \cot^2\alpha + 1 = OB^2$

$OB = \sqrt{\cot^2\alpha + 1} = \frac{1}{|\sin\alpha|}$ $OB - 1 = AB \rightarrow \frac{1 - \sin^2\alpha}{\sin\alpha} = AB$



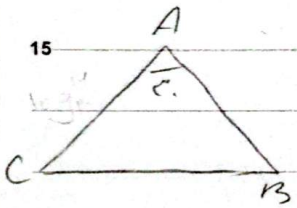
(۲

$\frac{m}{\sin\beta} = \frac{4}{\frac{\sqrt{2}}{2}} \rightarrow AB = \frac{4\sin\beta\sqrt{2}}{\sqrt{2}}$

$\frac{m}{\sin\alpha} = \frac{8}{\frac{1}{2}} \rightarrow AC = 8\sin\beta$

$\frac{AB}{AC} = \frac{\frac{4\sin\beta\sqrt{2}}{\sqrt{2}}}{8\sin\beta} = \frac{4\sqrt{2}}{8} = \frac{\sqrt{2}}{2} = \sqrt{2}$

(۳



(۴

$\frac{1}{2}\log_2^{27} \cdot \log_8^{16} \times \sin^{\frac{1}{2}}90$

$\frac{\log^{27}}{\log^2} = \frac{3\log^3}{\log^2} \times \frac{4\log^2}{\log^3} \times \frac{1}{4} = 3$

(۵

$2\cos^4 - \cos^2 - \sin^2\alpha(2\sin^2\alpha - 1) \Rightarrow \cos^2(2\cos^2\alpha - 1) + \sin^2(-2\sin^2\alpha + 1)$

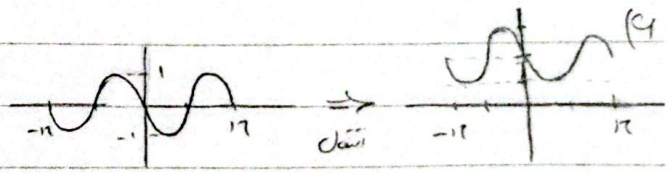
$-\cos 2\alpha \qquad \cos 2\alpha \qquad \cos 2\alpha$

$\cos 2\alpha(\cos^2\alpha + \sin^2\alpha) = 1 \rightarrow \cos 2\alpha = 1 \qquad \sin 2\alpha = 0$

(۶

الف) $-2\sin\alpha\cos\alpha + 2$

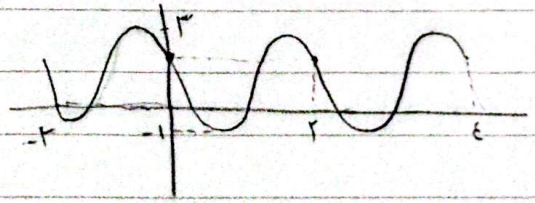
$= -\sin 2\alpha + 2 \Rightarrow T = \frac{2\pi}{|2|} = \pi$



ب) $2\cos\left(12\alpha + \frac{12}{2}\right) + 1$

$= -2\sin 12\alpha + 1$

$T = \frac{2\pi}{12} = 2$



max = 3

min = -1