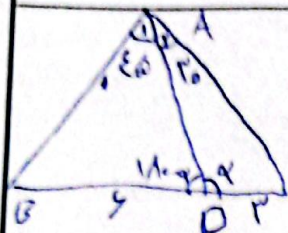


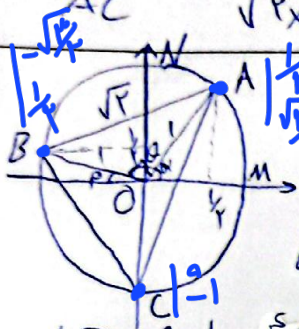
$O_1 = P \quad \alpha + \beta = 90 \rightarrow P = 90 - \alpha \quad \sin \beta = \frac{OT}{OB} \quad \cos \beta = \frac{OT}{OB} = \cos(90 - \alpha)$
 $\rightarrow \sin \alpha = \frac{OT}{OB} = \frac{1}{OA + AB} = \frac{1}{1 + AB} \rightarrow AB = \frac{1}{\sin \alpha} - 1$



$\frac{\sin A_1}{BD} = \frac{\sin(110 - \alpha)}{AB} \rightarrow \frac{\sqrt{2}}{2 \times 6} = \frac{\sin \alpha}{AB} \rightarrow AB = \frac{12 \sin \alpha}{\sqrt{2}}$

$\frac{\sin A_2}{DC} = \frac{\sin \alpha}{AC} = \frac{1}{2 \times 3} = \frac{\sin \alpha}{AC} \rightarrow AC = 6 \sin \alpha$

$\frac{AB}{AC} = \frac{12 \sin \alpha}{6 \sin \alpha} = \sqrt{2} \quad \checkmark$



$\cos \alpha = \frac{1}{2} \rightarrow \alpha = 60 \quad AB^2 = OB^2 + OA^2 \rightarrow AB = \sqrt{2}$
 $\sin \beta = \frac{1}{2} \rightarrow \beta = 30 \quad \alpha + \beta + \theta = 110 \rightarrow \theta = 90$

$\hat{B} = \frac{1}{\gamma} \widehat{AC} = \frac{1}{\gamma} (\widehat{AM} + \widehat{MC}) = \frac{1}{\gamma} (60 + 90) = 75^\circ$
 $\hat{C} = \frac{1}{\gamma} \widehat{BA} = \frac{1}{\gamma} 90 = 45^\circ \quad \hat{A} = 110 - 45 - 75 = 60$

ادامه در سوال بعد:

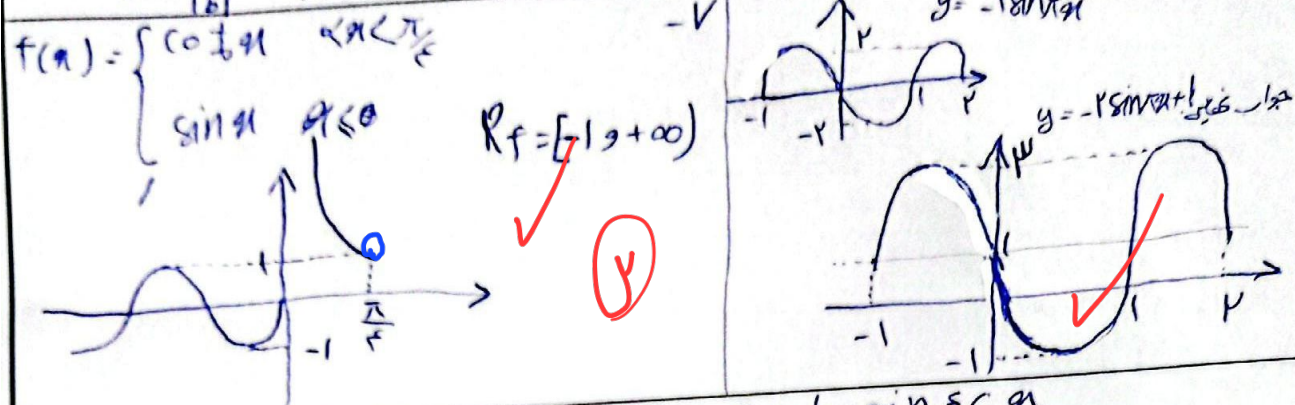
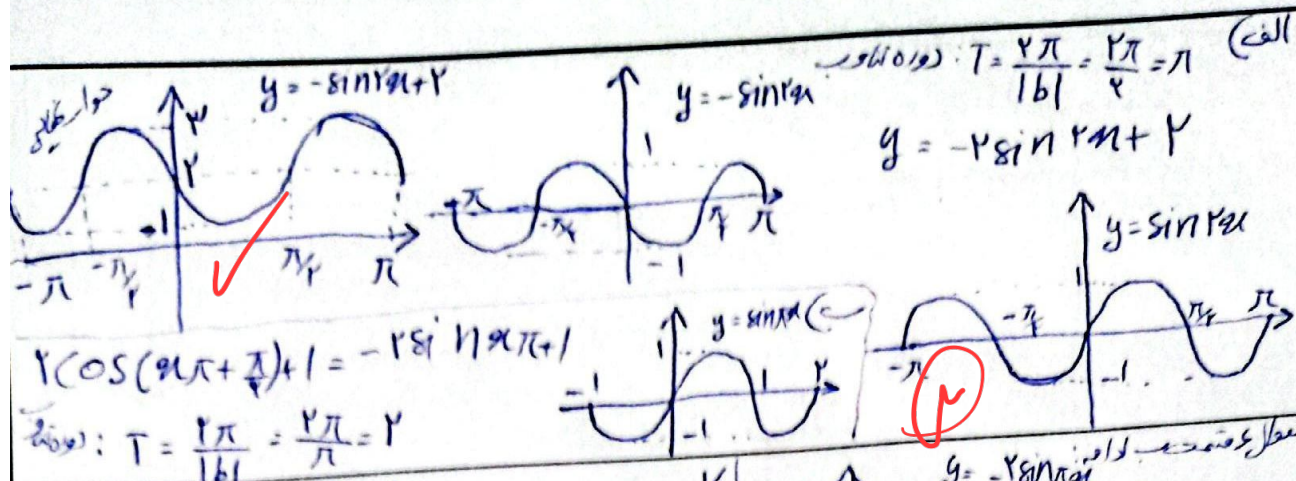
$\frac{\sin C}{BA} = \frac{\sin B}{AC} = \frac{\sin A}{BC} \rightarrow \frac{\sqrt{2}}{2 \times \sqrt{2}} = \frac{\sin 60}{BC} \rightarrow BC = \sqrt{3}$

$\frac{\sqrt{2}}{2 \times \sqrt{2}} = \frac{\sin(75)}{AC} = \frac{\sin(45 + 30)}{AC} = \frac{\sin 45 \cos 30 + \cos 45 \sin 30}{AC} = \frac{\frac{\sqrt{2}}{2} \times \frac{\sqrt{3}}{2} + \frac{\sqrt{2}}{2} \times \frac{1}{2}}{AC} = \frac{\frac{\sqrt{2} + \sqrt{6}}{2}}{AC}$
 $\Delta ABC = \sqrt{2} + \sqrt{3} + \frac{\sqrt{2} + \sqrt{6}}{2} = \frac{2\sqrt{2} + 2\sqrt{3} + \sqrt{2} + \sqrt{6}}{2} = \frac{3\sqrt{2} + 2\sqrt{3} + \sqrt{6}}{2}$

$S_{ABC} = \frac{1}{\gamma} \times AB \times AC \times \sin A = \frac{1}{\gamma} \times \sqrt{2} \times \frac{\sqrt{2} + \sqrt{6}}{2} \times \frac{1}{2} = \frac{2 + 2\sqrt{3}}{4} = \frac{1 + \sqrt{3}}{2}$

$9 = \cos \alpha \rightarrow \gamma \cos^2 \alpha - \cos^2 \alpha - \sin^2 \alpha (\gamma \sin^2 \alpha - 1) =$
 $\gamma \cos^2 \alpha - \cos^2 \alpha - \gamma \sin^2 \alpha + \sin^2 \alpha = \gamma (\cos^2 \alpha - \sin^2 \alpha) (\cos^2 \alpha + \sin^2 \alpha)$
 $= (\gamma \cos^2 \alpha - \sin^2 \alpha) = \gamma \cos 2\alpha - \cos 2\alpha = \cos 2\alpha = 1$

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



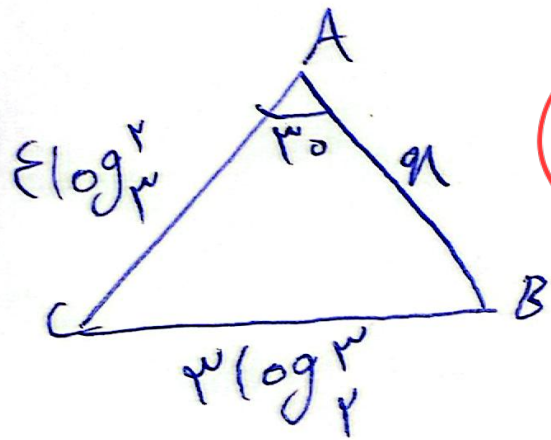
$f(x) = a + \frac{b}{\epsilon} \sin \epsilon x \cos \epsilon x = a + \frac{b}{\epsilon} \sin \epsilon x$
 $T = \frac{\pi}{\epsilon} - \frac{\pi}{\epsilon} = \frac{2\pi}{\epsilon} = \frac{2\pi}{|b|} \rightarrow |b| = \epsilon \rightarrow C = \pm \frac{a}{\epsilon} \text{ and } C > 0 \rightarrow C = \frac{a}{\epsilon}$
 $\frac{b}{\epsilon} = 1 \rightarrow b = \epsilon \text{ and } a = 1$
 $\frac{bC}{a} = \frac{1 \times \frac{a}{\epsilon}}{1} = a$

$f(x) = a \cos(bx) + C$
 $T = \pi = \frac{2\pi}{|b|} \rightarrow |b| = 2 \rightarrow b = \pm 2$
 $\cos 2x = \cos -2x$
 $\max f = 1$
 $\min f = -1 \rightarrow a = -1 \rightarrow C = 1$
 $x = \alpha \rightarrow -1 \cos 2\alpha - 1 = 0 \rightarrow \cos 2\alpha = -1$
 $1 + \tan^2 \alpha = \frac{1}{\cos^2 \alpha} \rightarrow \tan^2 \alpha = 9 \rightarrow |\tan \alpha| = 3$

$f(-1/a) = f(-1/10 + 1/a) = f(1/a)$

$(1/10) \rightarrow a = \frac{0-1}{1-0} = -1 \text{ and } b = 1 \rightarrow y = -1x + 1$

$f(1/a) = f(-1/a) = -\frac{1}{10} \times \frac{1}{10} + 1 = \frac{9}{10}$



٢

سؤال ٤: با فرض متساوی الاضلاعین بودن مثلث دایره

$$\eta = \epsilon \log_r^2 \rightarrow S_{\triangle ABC} = \frac{1}{2} \times \overline{AC} \times \overline{AB} \times \sin A =$$

$$\frac{1}{2} \times 16 (\log_r^2)^2 \times \frac{1}{2} = 8 (\log_r^2)^2$$

$$S_{ABC} = \frac{1}{2} \times \log_r^{\mu^2} \times \log_r^{\nu^2} \times \frac{1}{2} = \frac{1}{2} \times 3 \times 4 \times \log_r^3 \times \log_r^2 = 3$$