

از A عمودی بر محور x رسم کرده برای عمودها H می‌نایم.

$$AH = \sin(90^\circ - \alpha) = \cos \alpha$$

$$BT = \tan(90^\circ - \alpha) = \cot \alpha$$

$$\text{نسبت: } \frac{OA}{OB} = \frac{AH}{BT} \Rightarrow \frac{1}{1+AB} = \frac{\cos \alpha}{\cot \alpha} = \sin \alpha \Rightarrow AB = \frac{1 - \sin \alpha}{\sin \alpha} \checkmark$$

$$\frac{BD}{\sin 60^\circ} = \frac{AB}{\sin(180^\circ - \alpha)} \Rightarrow \frac{4}{\frac{\sqrt{3}}{2}} = \frac{AB}{\sin \alpha} \quad \left\{ \frac{AB}{AC} = \sqrt{2} \right. \quad \text{نسبت}$$

$$\frac{AC}{\sin \alpha} = \frac{DC}{\sin 60^\circ} \Rightarrow \frac{12}{\frac{1}{2}} = \frac{AC}{\sin \alpha} \quad \left. \frac{AB}{AC} = \sqrt{2} \right\} \checkmark$$

$$\hat{AOB} = 90^\circ \quad \hat{AOC} = 150^\circ \quad \hat{BOC} = 110^\circ$$

$$S_{ABC} = S_{AOC} + S_{AOB} + S_{BOC} = \frac{1}{2} \times 1 \times 1 \times \sin 150^\circ + \frac{1}{2} \times 1 \times 1 \times \sin 90^\circ \Rightarrow$$

$$\Rightarrow + \frac{1}{2} \times 1 \times 1 \times \sin 110^\circ = \frac{1}{2} + \frac{1}{2} + \frac{\sqrt{2}}{2} = \frac{1 + \sqrt{2}}{2} \checkmark \quad \underline{S = 1 + \sqrt{2}}$$

$$AB = \sqrt{1^2 + 1^2} = \sqrt{2}$$

$$\hat{BOC} = 110^\circ \Rightarrow BC = BO \sqrt{2} = \sqrt{2} \quad AC^2 = 1 + 1 - 2 \cos 150^\circ = 2 - \sqrt{3}$$

$$AC = \sqrt{2 - \sqrt{3}} \quad P = \sqrt{2} + \sqrt{2} + \sqrt{2 - \sqrt{3}}$$

$$S = \frac{1}{2} \times \sin 110^\circ \times (1 \times \log_{10} 1) \times 10 \log_{10} 10 = 10$$

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

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

$$\cos^2 \alpha = 1 \Rightarrow \sin^2 \alpha = 0 \checkmark$$

الف) $y = -\sin kx + 1$		6
ب) $y = 2 \cos(\pi(x + \frac{1}{\pi})) + 1$ $T = \frac{2\pi}{\pi} = 2$		7
	$R_f = [-1, +\infty)$	8
$f(x) = a + \frac{b}{k} \times \sin(kx)$ $\text{Max}(f) = a - \frac{b}{k} = 1$ $\text{Min}(f) = a + \frac{b}{k} = 0$ $a = 2$ $b = -1$	$T = \frac{\pi}{k} = \frac{\pi}{10} \Rightarrow k = 10$ $\Rightarrow C = \omega \rightarrow C = \frac{\omega}{k}$ بأنه به اطراف اولین max تابع $b < 0$ $\frac{bc}{a} = \frac{-1 \times \omega}{2} = -\frac{\omega}{2} \rightarrow \omega = 2$	9
$C = \frac{\text{Max} + \text{Min}}{2} = -1$ $\text{Max}(f) = C - a = 1 \Rightarrow a = -2$ $T = \pi = \frac{2\pi}{b} \Rightarrow b = 2$	بأنه به منفرجه $a < 0$ $f(x) = -2 \cos kx - 1 = 0$ $\cos kx = -\frac{1}{2}$ $ \tan kx = \sqrt{3}$	10
$f(-\sqrt{2}\omega) = f(1/\omega)$ $f(1/\omega) = -\frac{\omega}{k} + 1 = \frac{1}{k}$	$0 \leq x \leq 2 \Rightarrow f(x) = -\frac{1}{\pi}x + 1$	