



۱- الف) کتبی دقت روی خط ۳ و ساعت بین ۳ و ۴ = ۱۵۳

ج) $h = 3, m = 10 \Rightarrow \text{دقیقه زاویه} = |30h - 5m + (\frac{m}{2})|$

$|30(3) - 5(10) + (\frac{10}{2})| = |90 - 50 + 5| = |45| = 45$

$360 - 45 = 315$

ب) چون به کمتر از ۱۸۰ برسد

۲- الف) کتبی ساعت شمارگی به ازای و دقیقه شمار روی عدد ۳ قرار دارد.



زاویه = ۱۱

زاویه $|30h - 5m + (\frac{m}{2})|$ $h = 10, m = 10$

زاویه $|30(10) - 5(10) + (\frac{10}{2})| = |300 - 50 + 5| = |255|$

$360 - 255 = 105$

۳- الف) مساحت = $\frac{1}{2} \times r^2 \times \alpha$

$\frac{1}{2} \times \frac{\pi}{9} \times \frac{1}{2} = \frac{\pi}{18}$

ب) محیط = $2\pi r$ = طول کمان + دو شعاع

$2(3) + \frac{\pi}{9} \times 3 = 6 + \frac{\pi}{3} = (\frac{\pi}{3} + 6)$

۴- الف) مساحت = $\frac{1}{2} \times AB \times AC \times \sin C$

$\sin 60 = \frac{\sqrt{3}}{2}$

$\sin 60 \times 10 \times \frac{1}{2} =$

$(\frac{\sqrt{3}}{2}) \times 10 \times (\frac{1}{2}) = \frac{\sqrt{3}}{2} \times 5 = \frac{5\sqrt{3}}{2}$

ب) محیط

$BC^2 = AB^2 + AC^2 - 2(AB)(AC)\cos C = BC^2 = 10^2 + 1^2 - 2(10)(1)\cos 60$

$\cos 60 = \frac{1}{2} \Rightarrow 100 + 1 - 10 = BC^2 = 91 \Rightarrow BC = \sqrt{91}$

$AB + AC + BC = 10 + 1 + \sqrt{91} = 11 + \sqrt{91}$

$A + B + C = 180 \Rightarrow A + 100 = 180 \Rightarrow A = 80$

$\frac{10\sqrt{2}}{\sin B} = \frac{10}{\sin 80}$

$\frac{10\sqrt{2}}{\sin B} = \frac{10}{\sin 80} \Rightarrow \sin B = \frac{10\sqrt{2}}{10} = \sqrt{2}$

$\sin B = \frac{10\sqrt{2}}{10} = \sqrt{2}$

$180 - 80 = 100 \Rightarrow \frac{100}{180} \times \frac{\pi}{180} = C$

$B = 100 \Rightarrow B = \frac{100}{180} \times \pi$

$$\tan(\pi - \alpha) + r \tan(\pi + \alpha) = r \tan \alpha$$

صورت ٤ -

$$\tan(\pi - \alpha) - \tan(\pi + \alpha) = -r \tan \alpha$$

مخرج =

$$= \frac{r \tan \alpha}{-r \tan \alpha} = \frac{r}{-r} = (-1)$$

$$\begin{cases} 90 - 15 = 75 = \tan 75 = \tan(90 - 15) = \cot 15 = \frac{1}{\tan 15} \\ 90 + 15 = 105 = -1 \\ 110 - 15 = 95 = \tan 95 = -\tan 5 \\ 110 + 15 = 125 = \frac{1}{\tan 5} \end{cases}$$

$$\text{صورت} \frac{1}{\tan 15} \times \frac{1}{\tan 15} \times r = \frac{1}{\tan \alpha}$$

$$\text{مخرج} = r \tan \alpha = \frac{1}{\tan 15} = \left(\frac{1}{\tan 15} \right) - (-\tan 15) \times r =$$

$$A = \frac{1}{\tan 15} - r \tan^2 15 - 1 = \frac{-1}{r \tan^2 15 + 1} \Rightarrow \frac{r}{1} = 15$$

$$A = \frac{-1}{r \tan^2 15 + 1}$$

$$\begin{aligned} A &= \sin x + \cos x & \text{مخرج} &= \frac{A}{B} + \frac{B}{A} = r & \frac{A^2 + B^2}{AB} = r & A^2 + B^2 = rAB \\ B &= \sin x - \cos x \end{aligned}$$

$$A^2 = 1 + 2 \sin x \cos x \quad AB = (\sin x + \cos x)(\sin x - \cos x)$$

$$B^2 = 1 - 2 \sin x \cos x$$

$$= \sin^2 x - \cos^2 x \quad r = 2(\sin^2 x - \cos^2 x) = \sin^2 x - \cos^2 x$$

$$\sin^2 x - \cos^2 x = \frac{r}{2}$$

$$\tan^2 x \Rightarrow \sin^2 x - \cos^2 x = \frac{r}{2} \quad \frac{\sin^2 x}{\cos^2 x} - 1 = \frac{r}{2 \cos^2 x}$$

$$\tan^2 x - 1 = \frac{r(1 + \tan^2 x)}{2} \quad r \tan^2 x - r = r + r \tan^2 x \quad \tan^2 x = 1$$

$$\sin^2 x - r(1 - \sin^2 x) + 1$$

$$\Rightarrow \sin^2 x + r(1 - \sin^2 x) - 1 = \sin^2 x + r - r \sin^2 x - 1 =$$

صورت ٩ -
مخرج =

$$r - 1 = r(1 - \sin^2 x) \quad r \sin^2 x = 0 \quad \cos^2 x = 1 - \sin^2 x = \frac{r}{2} \quad \tan^2 x = \frac{1 - \sin^2 x}{\sin^2 x} = \frac{1}{\frac{r}{2}} = \frac{2}{r}$$

$$\cos(2\alpha) = \cos 2\alpha = \frac{1 + \cos 4\alpha}{2} = \sqrt{\frac{1 + \cos 4\alpha}{2}} = \sqrt{\frac{1 + \frac{r}{2}}{2}} = \frac{\sqrt{2 + r}}{2}$$

١٠ - الف

$$\sin(2\alpha) = \sin(90 - 2\alpha) = \cos 2\alpha \Rightarrow \frac{\sqrt{2 + r}}{2}$$

$$\sin 2\alpha = \cos 2\alpha$$