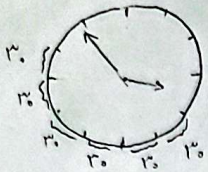


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الف) $4 \times r_0 + r_2 \times 4 + (r_0 - \frac{5r}{r}) = 20V$
 $3r_0 - 20V = 153$ ✓

ب) $|\omega \times \omega \times r - r_0 \times 3| = 20V$ $3r_0 - 20V = 153$ ✓



الف) $2 \times r_0 + r_2 \times 4 + \frac{11}{r} = 11$ ✓

ب) $15 \times 15 \times 11 - 30 \times 11 = 11$ ✓

الف) $2 \times r + \frac{\pi}{r} = 4 + \frac{\pi}{r}$ ✓ $ar = \frac{\pi}{r} \times r = \frac{\pi}{r}$ (ب) $\frac{a}{r} \times r = \frac{\pi}{r} \times 4 = \frac{4\pi}{r}$ (الف) $\frac{4\pi}{r}$ (دقت!)

$BC = \sqrt{a^2 + b^2 - 2ab \cos 40^\circ} = \sqrt{19^2 + 10^2 - 2 \times 19 \times 10 \cos 40^\circ} = \sqrt{19^2 + 10^2 - 380 \cos 40^\circ}$ ✓ $\frac{1}{r} \times \omega \times 17 \sin 40^\circ = 20 \times \frac{\sqrt{r}}{r} = 10\sqrt{r}$ (الف) $\frac{10\sqrt{r}}{r}$ ✓
 $\frac{10}{r} = \frac{10\sqrt{r}}{r} \Rightarrow \sin B = \frac{\sqrt{r}}{r} \Rightarrow B = 45^\circ \Rightarrow C = 105^\circ$ ✓
 $B = 45^\circ \Rightarrow \frac{\pi}{4}$ ✓ $C = 105^\circ \Rightarrow \frac{105}{180} \times \pi = \frac{7\pi}{12}$ ✓ $Rad = \frac{7\pi}{12}$ ✓

$\hat{B} + \hat{C} = 105^\circ \Rightarrow \hat{A} = 75^\circ$ $\frac{10}{r} = \frac{10\sqrt{r}}{r} \Rightarrow \sin B = \frac{\sqrt{r}}{r} \Rightarrow B = 45^\circ \Rightarrow C = 105^\circ$ ✓
 $B = 45^\circ \Rightarrow \frac{\pi}{4}$ ✓ $C = 105^\circ \Rightarrow \frac{105}{180} \times \pi = \frac{7\pi}{12}$ ✓ $Rad = \frac{7\pi}{12}$ ✓

$\frac{\tan(\pi - a) + r \tan(\pi + a)}{\tan(r\pi - a) - \tan(r\pi + a)} = \frac{-\tan a + r \tan a}{-\tan a - \tan a} = \frac{r \tan a}{-r \tan a} = -1$ ✓

$\frac{r \tan 10^\circ + \tan 10^\circ}{r \tan 140^\circ - \tan 140^\circ} = \frac{r \tan(90-10) + \tan(90+10)}{r \tan(110-10) + \tan(170-10)} = \frac{r \cot 10 - \cot 10}{-r \tan 10 - \cot 10} = \frac{\frac{r}{a} - \frac{1}{a}}{-ra - \frac{1}{a}}$ ✓
 $\Rightarrow \frac{1}{a} = -\frac{1}{ra+1}$ ✓

$\frac{\sin x + \cos x}{\sin x - \cos x} + \frac{\sin x - \cos x}{\sin x + \cos x} = r \Rightarrow \frac{r}{\sin^2 x - \cos^2 x} \Rightarrow \frac{r}{r \sin^2 x - 1} = r$ ✓
 $4 \sin^2 x = 2 \Rightarrow 4 \sin^2 x = 2 \Rightarrow \sin^2 x = \frac{1}{2} \Rightarrow \cos^2 x = \frac{1}{2}$ ✓ $\tan^2 x = \frac{1}{1} = 1$ ✓

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

الف) $\cos(4\pi/5)$ $\cos^2 4\pi/5 = \frac{1 + \cos 8\pi/5}{2} = \frac{1 + \frac{\sqrt{r}}{r}}{2} = \frac{r + \sqrt{r}}{2r} \Rightarrow \cos 4\pi/5 = \frac{\sqrt{r + \sqrt{r}}}{\sqrt{2r}}$ ✓ ✓

ب) $\sin(4\pi/5)$ $\sin^2 4\pi/5 = \frac{1 - \cos 8\pi/5}{2} = \frac{1 - \frac{\sqrt{r}}{r}}{2} = \frac{r - \sqrt{r}}{2r} \Rightarrow \sin 4\pi/5 = \frac{\sqrt{r - \sqrt{r}}}{\sqrt{2r}}$ ✓ ✓