

تکلیف ۲۰
دفعه ۱
نام و نام خانوادگی

بنام خدا

۲۰

نام و نام خانوادگی

سوال ۱) (الف) $(\sin 120^\circ + \sin 30^\circ)(\cos 120^\circ - \cos 120^\circ)$

$$\left(\frac{\sqrt{3}}{2} + \frac{-\sqrt{3}}{2}\right)\left(\frac{\sqrt{3}}{2} - \frac{-\sqrt{3}}{2}\right) = \left(\frac{\sqrt{3}}{2} - \frac{\sqrt{3}}{2}\right)\left(\frac{\sqrt{3}}{2} + \frac{\sqrt{3}}{2}\right) = \left(\frac{\sqrt{3}}{2}\right)^2 - \left(\frac{\sqrt{3}}{2}\right)^2 = 0$$

$$\rightarrow \frac{1 + \tan^2 \theta}{\cos^2 \theta} = \frac{1 + \tan^2 \theta}{\cos^2 \theta} = \frac{1 + \frac{1}{9}}{\frac{1}{9}} = \frac{10}{9} \quad \left/ \quad \frac{1}{\cos^2 \theta} - \frac{1}{\cos^2 \theta} = \frac{-1}{\cos^2 \theta} = \frac{-1}{\frac{1}{9}} = -9 \right.$$

$$\tan \theta = \frac{\sin \theta}{\cos \theta} = \frac{-\frac{1}{2}}{\frac{\sqrt{3}}{2}} = -\frac{1}{\sqrt{3}} \Rightarrow \tan^2 \theta = \frac{1}{9}$$

$$\cos \theta = \frac{\sqrt{3}}{2} \Rightarrow \cos^2 \theta = \frac{3}{4} \quad \cos \theta = -\frac{\sqrt{3}}{2} \Rightarrow \cos^2 \theta = \frac{3}{4}$$

سوال ۲)

الف) $AH = \frac{\sqrt{3}}{2} \times \sqrt{4} = \sin 60^\circ \times \sqrt{4} = \frac{\sqrt{3}}{2} \times 2 = \sqrt{3}$

$$AH^2 + HC^2 = AC^2 \Rightarrow 3 + HC^2 = 4 \Rightarrow HC^2 = 1 \Rightarrow HC = 1$$

$$\rightarrow AH = \frac{AC}{2} = AC \times \sin 60^\circ$$

$$HC = \frac{AC \times \sqrt{3}}{2} = AC \times \cos 60^\circ = \frac{\sqrt{3}}{2} AC = 1 \Rightarrow AC = \frac{2}{\sqrt{3}}$$

$$AH = \frac{1}{\frac{2}{\sqrt{3}}} = \frac{1 \times \sqrt{3}}{2} = \frac{\sqrt{3}}{2}$$

$$\sin \hat{B} = \frac{AH}{AB} = \frac{\frac{\sqrt{3}}{2}}{\sqrt{4}} = \frac{\sqrt{3}}{2} = \frac{\sqrt{3}}{2} \Rightarrow \hat{B} = 60^\circ$$

Arman

الف) $AD \times \sin \gamma_0 = AB \Rightarrow AD \times \frac{\sqrt{10}}{10} = 20 \times \frac{\sqrt{10}}{10} \Rightarrow AD = 20$ (مسألة ٣)

$$AC = x \sin \mu_0 = AB \Rightarrow AC \times \frac{1}{r} = \omega_0 \sqrt{\mu} \Rightarrow AC = 100 \sqrt{\mu}$$

$$BD = AD \times \cos \phi_0 = 100 \times \frac{1}{2} = 50$$

$$AB^T + BC^T = AC^T \Rightarrow (a \circ \sqrt{r})^T + BC^T = (1 \circ \sqrt{r})^T \Rightarrow r_x a \circ^T + BC^T = r_x 1 \circ^T$$

$$\Rightarrow BC^T = P(I_{n \times n} - \omega_0 \omega_0^T) = P(\omega_0 \omega_0^T) \left(\frac{P^T}{P} - I \right) \Rightarrow BC = P \times \omega_0 = \gamma \omega_0$$

$$BC = BD + x \Rightarrow 100 = 20 + x \Rightarrow DC = x = 100$$

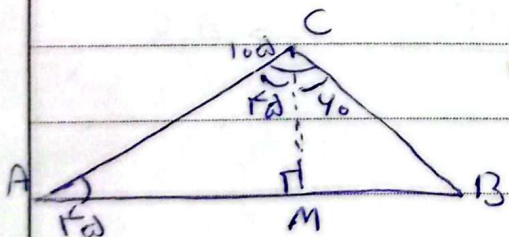
∴) $BC = AC \times \sin \theta = AC \times \frac{\sqrt{r}}{r} \Rightarrow BC = r \times \frac{\sqrt{r}}{r} = \sqrt{r}$

$$BA = AC \times \cos \gamma \Rightarrow AC \times \frac{1}{p} = r \Rightarrow AC = r$$

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$$BD^r + BC^r - DC^r \Rightarrow 1 + \frac{1}{(\sqrt{2})^r} = DC^r \Rightarrow DC = \sqrt{10}$$

$$\sin \alpha = \frac{DB}{DC} = \frac{1}{\sqrt{1^2}} = \frac{\sqrt{1^2}}{1^2}$$



$\sin 60^\circ \leftarrow$
 $CM = AM = \frac{\sqrt{P}}{P} AC \Rightarrow AC = \frac{CM \times \sqrt{P}}{\frac{\sqrt{P}}{P}} = \frac{\sqrt{P} CM}{1}$

$$\frac{CM}{AM} = \tan 45^\circ = 1 \Rightarrow MA = CM$$

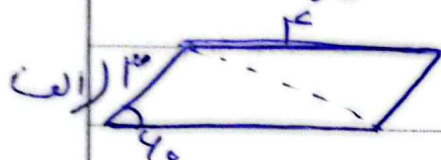
$$\frac{MB}{CM} = \tan \phi_0 = \frac{\sin \phi_0}{\cos \phi_0} = \frac{\frac{\sqrt{P}}{P}}{\frac{1}{P}} = \sqrt{P} \Rightarrow CM \times \sqrt{P} = MB \quad \left. \begin{array}{l} CM + \sqrt{P} CM = \\ (1 + \sqrt{P}) CM \end{array} \right\}$$

$$\frac{AB}{AC} = \frac{(1+\sqrt{r}) \times CM}{\sqrt{r} CM} = \frac{1+\sqrt{r}}{\sqrt{r}} = \frac{\sqrt{r} + \sqrt{r}}{r}$$

(a) سوال

$$\frac{AB}{BC} = \frac{EB}{BD} = \frac{EA}{CD} = \frac{r}{4} = \frac{1}{r} \Rightarrow \frac{S_{\triangle ABE}}{S_{\triangle BCD}} = \frac{r}{9}$$

$$\left. \begin{array}{l} \hat{B}_1 = \hat{B}_r = \hat{B} \\ \frac{EB}{BD} = \frac{BA}{BC} = r \end{array} \right\} \Rightarrow \triangle ABE \sim \triangle BCD$$



$$S_{\square} = \frac{1}{2} ab \sin \gamma_0 = r \times r \times \frac{\sqrt{r}}{r} = 4\sqrt{r}$$

$$\rightarrow r \times r \times \frac{1}{r} \times \sin \frac{\pi}{4} = 4\sqrt{r}$$

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

$$1 + \tan^2 \theta = \frac{1}{\cos^2 \theta}$$

(v) سوال

$$1 + \frac{1}{r} = \frac{1}{\cos^2 \theta} \Rightarrow \cos^2 \theta = \frac{r}{r+1} \Rightarrow \cos \theta = \frac{r}{\sqrt{r+1}}$$

$$0 < \theta < 90^\circ \Rightarrow \cos \theta > 0$$

$$r y = r x + a \Rightarrow r y = 0 + a \Rightarrow y = r, a$$

(vi) سوال

$$\left. \begin{array}{l} \text{Line } y = mx + b \text{ passes through } (r, a) \\ r y = r x + a \Rightarrow y = x + r, a \end{array} \right\} \Rightarrow b m = r, a \times 1 \Rightarrow b = r, a$$

$$m = 1$$

$$f(n) = -\cos(n) + \cos(n) - (\cot(n)) =$$

(vii) سوال

$$-\cancel{\cos(n)} + \cancel{\cos n} + \cot n$$

$$f(n) = \cot n \Rightarrow f\left(\frac{\pi}{4}\right) = \cot\left(\frac{\pi}{4}\right) = \cot(45^\circ) = \frac{\cos 45^\circ}{\sin 45^\circ}$$

Arman

$$\frac{-\frac{\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}} = -1$$

$$\frac{\cos(n) + (-\sin(n))}{-\cos(n) - (-\sin(n))} = \frac{\cos(n) - \sin n}{-\cos n + \sin n} = \text{سوال 10} = \textcircled{-1}$$