

Subject

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$$z \cdot \sqrt{3} \cdot \frac{z}{r} = 80 \cdot \sqrt{3} \quad z = 80 \cdot \sqrt{3} \times \frac{r}{\sqrt{3}} = 100 \quad \text{۳- الف}$$

$$(100)^2 - (80 \cdot \sqrt{3})^2 = 10000 - 19200 = 200$$

$$(100 \cdot \sqrt{3})^2 - (80 \cdot \sqrt{3})^2 = 30000 - 19200 = 2200$$

$$\sqrt{2200} = \sqrt{10^2 \times 1.1^2} \Rightarrow 10 \times 1.1 = 11 \quad 10 - 8 = \boxed{2}$$

$$\frac{1}{r} x = 2 \quad x = 2 \quad \frac{\sqrt{3}}{r} x = 2\sqrt{3} \quad \text{ب}$$

$$1 + (2\sqrt{3})^2 = z^2 \Rightarrow 1 + 12 = z^2 \Rightarrow z = \sqrt{13} \quad \sin \alpha = \frac{1}{\sqrt{13}} = \boxed{\frac{\sqrt{13}}{13}}$$

$$x^2 + x^2 = AC^2 \quad 2x^2 = AC^2 \quad AC = \sqrt{2} x \quad \text{۴-}$$

$$100 - 80 = 20 \quad \frac{1}{r} z = x \quad z = rx \quad \frac{\sqrt{3}}{r} z = \frac{\sqrt{3}}{r} \times rx = \sqrt{3} x$$

$$AC = \sqrt{2} x \quad AB = x + \sqrt{3} x \quad \frac{AB}{AC} = \frac{x(1+\sqrt{3})}{\sqrt{2} x} = \frac{1+\sqrt{3}}{\sqrt{2}}$$

$$\frac{ABE}{BCD} = \frac{x \times x \times \frac{1}{r} \times \sin A}{x \times x \times \frac{1}{r} \times \sin B} = \frac{1}{9} \quad \text{۵-}$$

$$3 \times 2 \times \sin 120^\circ \times \frac{1}{r} = 3\sqrt{3} \times 2 = 6\sqrt{3} \quad \text{۶- الف}$$

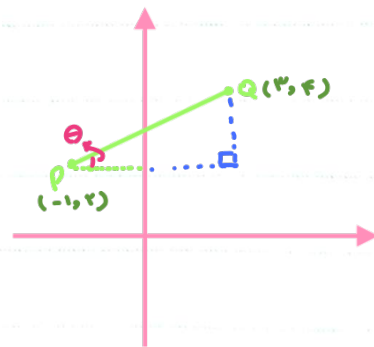
$$r \times \left(\frac{1}{r} \times 2 \times 10 \times \frac{\sqrt{3}}{r} \right) = 3\sqrt{3}$$

ب

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$$m_{PQ} = \frac{r-r}{r-(-1)} = \frac{1}{r} = \tan \theta \rightarrow 1 + \tan^2 \theta = \frac{1}{\cos^2 \theta}$$

$$1 + \frac{1}{r^2} = \frac{1}{\cos^2 \theta} \rightarrow \cos^2 \theta = \frac{r^2}{r^2+1} \xrightarrow{\text{since } \theta \in (0, \frac{\pi}{2})} \cos \theta = \frac{r}{\sqrt{r^2+1}} = \frac{r\sqrt{a}}{a}$$

$$x + \frac{a}{r} = mx + b \Rightarrow m = 1 \quad b = \frac{a}{r}$$

$$mb = \frac{a}{r} \times 1 = \frac{a}{r} \quad r y = r x + a \quad y = \frac{r x + a}{r} \quad y = x + \frac{a}{r}$$

$$f(x) = \cos(\pi + x) + \sin(\frac{\pi}{r} - x) - \tan(\frac{r\pi}{r} + x)$$

$$-\cos x + \cos x \ominus \cot x = \boxed{\cot x}$$

$$\frac{\cos x - \sin x}{-\cos x + \sin x} = -1 \Rightarrow \frac{10\pi}{r} = \frac{r\pi}{r} + \frac{1\pi}{r} =$$

$$r\pi = r\pi + \pi \Rightarrow 4\pi = 0 + 4\pi$$

الف) $(\sin 135^\circ + \sin 225^\circ)(\cos 135^\circ - \cos 150^\circ)$

$$+\frac{\sqrt{2}}{2} - \frac{\sqrt{3}}{2} = \frac{\sqrt{2}-\sqrt{3}}{2} \quad \text{و} \quad +\frac{\sqrt{2}}{2} - -\frac{\sqrt{3}}{2} = \frac{\sqrt{2}+\sqrt{3}}{2}$$

$$(\sqrt{2}-\sqrt{3})(\sqrt{2}+\sqrt{3}) = \frac{2-3}{4} = -\frac{1}{4} \quad \checkmark$$

ب) $\frac{1 + 3 \tan^2 110^\circ}{5 \cos^2 220^\circ + \cos^2 228^\circ} \Rightarrow 1 + 3 \times \frac{1}{3} = 2$

$$\left(\frac{\sqrt{3}}{2}\right)^2 = \frac{3}{4} \quad 4 \times \frac{3}{4} = 3 \quad \Rightarrow \left(\frac{\sqrt{3}}{2}\right)^2 = \frac{3}{4} \quad 2 \times \frac{3}{4} = 1 \quad \left. \vphantom{\left(\frac{\sqrt{3}}{2}\right)^2} \right\} \frac{1}{2}$$

الف ۲- $x^2 + x^2 = 4 \Rightarrow 2x^2 = 4 \Rightarrow x^2 = 2 \Rightarrow x = \sqrt{2}$

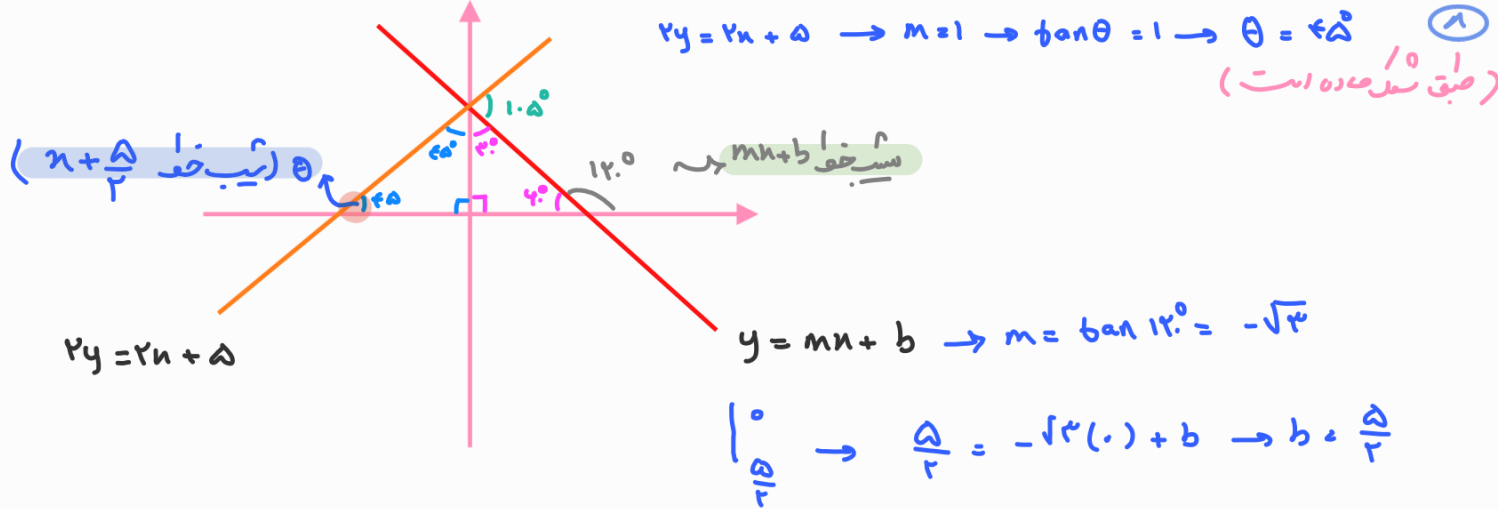
$$(AH)^2 + (HC)^2 = (AC)^2 \Rightarrow (AC)^2 - (AH)^2 = (HC)^2$$

۱۵ $(2\sqrt{3})^2 - \sqrt{3}^2 = 12 - 3 = 9 \Rightarrow (HC)^2 = 9 \Rightarrow HC = 3$

$$\frac{\sqrt{3}}{2}x = 9 \quad x = 9 \times \frac{2}{\sqrt{3}} \quad x = \frac{18}{\sqrt{3}} = 6\sqrt{3} \quad \text{ب)}$$

$$4\sqrt{3} \times \frac{1}{2} = 2\sqrt{3} \quad (3\sqrt{4})^2 - (3\sqrt{3})^2 = 36 - 27 = 9 \Rightarrow \sqrt{27} = 3\sqrt{3}$$

۲۰ $B = 40^\circ$



$$mb = -\sqrt{3} \times \frac{a}{r} = -\frac{a\sqrt{3}}{r}$$

④

$$\underbrace{(\pi + \pi)}_{-C \cdot \sin} + \underbrace{\sin\left(\frac{\pi}{r} - \pi\right)}_{C \sin} - \tan\left(\frac{\pi}{r} + \pi\right)_{\cot \pi}$$

$$f_n = \cot \pi \rightarrow f\left(\frac{\omega \pi}{4}\right) = \cot\left(\frac{\omega \pi}{4}\right) = -\sqrt{3}$$