

$$\begin{aligned} \text{الف)} \quad \sin 135^\circ &= \left(\frac{\pi}{4} + 90^\circ \right) \Rightarrow \cos 45^\circ = \frac{\sqrt{2}}{2} \\ \sin 300^\circ &= \left(\frac{3\pi}{2} + 30^\circ \right) \Rightarrow -\cos 30^\circ = -\frac{\sqrt{3}}{2} \\ \cos 315^\circ &= \left(\frac{3\pi}{4} + 45^\circ \right) \Rightarrow \sin 45^\circ = \frac{\sqrt{2}}{2} \\ \cos 150^\circ &= \left(\pi - 30^\circ \right) \Rightarrow -\cos 30^\circ = -\frac{\sqrt{3}}{2} \end{aligned} \quad \left. \begin{aligned} & \left(\frac{\sqrt{2}}{2} - \frac{\sqrt{3}}{2} \right) \left(\frac{\sqrt{2}}{2} + \frac{\sqrt{3}}{2} \right) \\ &= \frac{1}{2} - \frac{3}{2} = -\frac{1}{2} \end{aligned} \right\}$$

$$\begin{aligned} \text{ب)} \quad 3 + \tan^2 45^\circ &= 1 \\ 4 \cos^2 30^\circ &= 4 \times \frac{3}{4} = 3 \\ 2 \cos^2 225^\circ &= \frac{2}{4} \times 2 = 1 \end{aligned} \quad \left. \begin{aligned} & \frac{1+1}{3+1} = \frac{1}{2} \end{aligned} \right\}$$

الف) $\overline{AD} = 50 \cdot \sqrt{3} \times \frac{2}{\sqrt{3}} = 100$ $\overline{BD} = 50$

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$$\frac{50 \cdot \sqrt{3}}{50 + n} = \tan 30^\circ = \frac{1}{\sqrt{3}} \Rightarrow 150 = 50 + n \Rightarrow n = 100$$

ب) $\hat{A} = 40^\circ$ $\tan 40^\circ = \sqrt{3} \Rightarrow \frac{BC}{AB=2} \Rightarrow BC = 2\sqrt{3}$

$AB = 2$ $DC = 1 + 12 \Rightarrow DC = \sqrt{13} \Rightarrow \sin \alpha = \frac{1}{\sqrt{13}}$

الف) $\frac{\sqrt{2}}{2} \times \sqrt{2} = AH = \sqrt{2}$ $\alpha = 30^\circ \Rightarrow \frac{AC}{AH} = \frac{2}{1}$

$\cos 30^\circ \Rightarrow \frac{\sqrt{3}}{2}$

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ب) $AC = \frac{2}{\sqrt{3}} \times 9 = 6\sqrt{3}$ $AH = 3\sqrt{3}$

$\sin \hat{B} = \frac{AH}{AB} = \frac{3\sqrt{3}}{3\sqrt{9}} = \frac{\sqrt{2}}{2} \Rightarrow \hat{B} = 45^\circ$

الف) $-\frac{\sin \hat{B}}{AC} = \frac{\sin \hat{C}}{AB}$ $\frac{AB}{AC} = \frac{\sin \hat{C}}{\sin \hat{B}} = \frac{\sin \hat{C}}{\frac{1}{2}} \Rightarrow \sin \hat{C} = \sin(40^\circ + 45^\circ)$

$\Rightarrow \sin \hat{C} = \frac{\sin 40^\circ \cos 45^\circ + \cos 40^\circ \sin 45^\circ}{\frac{\sqrt{2}}{2}} \Rightarrow \frac{\sin \hat{C}}{\sin \hat{B}} = \frac{\sqrt{2} + \sqrt{2}}{\frac{1}{2}} = \frac{\sqrt{2} + \sqrt{2}}{2}$

$\frac{\frac{1}{2} \sin \hat{B} \times \cancel{EB} \times \cancel{AB}}{\frac{1}{2} \sin \hat{B} \times \cancel{BE} \times \cancel{BD}} = \boxed{\frac{4}{9}}$

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$$\text{الف) } 4 \times 3 \times \sin 120^\circ = \frac{4}{r} \times 3 \times \frac{\sqrt{3}}{2} = 4\sqrt{3}$$

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$$\text{ب) } \frac{3 \times \frac{4}{r} \times \frac{\sqrt{3}}{2}}{\frac{4}{r}} = 3\sqrt{3}$$

$$\tan \theta = \frac{y_2 - y_1}{x_2 - x_1} = \frac{1}{r}$$

-V

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

$$b = \frac{a}{r} \quad m = \tan 30^\circ = \frac{1}{\sqrt{3}}$$

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$$y = rx + a \Rightarrow y = x + \frac{a}{r}$$

$$y = -\frac{a}{r} + \frac{a}{r} = 0 \quad mb = \sqrt{3} \times \frac{a}{r} = \frac{a\sqrt{3}}{r}$$

$$f(x) = -\cancel{\cos x} + \cancel{\cos x} + \cot x = \cot x$$

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$$f\left(\frac{a\pi}{3}\right) = \cot 150^\circ = -\sqrt{3}$$

$$\frac{\sin\left(\frac{1}{r}\pi + x\right) + \cos\left(\frac{r}{r}\pi x - x\right)}{\cos(\pi + x) - \sin(r\pi - x)} = \frac{\cos x - \sin x}{-\cos x + \sin x} = -1$$

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