

$$\text{الف) } (\sin 135^\circ + \sin 225^\circ)(\cos 315^\circ - \cos 15^\circ) = \left(\frac{\sqrt{2}}{2} - \frac{\sqrt{3}}{2}\right)\left(\frac{\sqrt{2}}{2} + \frac{\sqrt{3}}{2}\right) = \frac{2}{4} - \frac{3}{4} = -\frac{1}{4}$$

$$\text{ب) } \frac{1 + 3 + \tan^2 10^\circ}{\frac{4 \cos^2 220^\circ + 2 \cos^2 220^\circ}{\frac{4}{2} \times \frac{3}{4} + 2 \times \frac{1}{2}}} \rightarrow \frac{1 + 3 \times \frac{1}{3}}{3 + 1} = \frac{1}{2}$$

$$\text{الف) } \frac{b}{\sin B} = \frac{c}{\sin C} \Rightarrow \frac{2\sqrt{3}}{\frac{\sqrt{2}}{2}} = \frac{\sqrt{6}}{\sin C} \Rightarrow \sin \hat{C} = \frac{1}{2} \Rightarrow \hat{C} = \begin{matrix} 30^\circ \checkmark \\ 150^\circ \times \end{matrix}$$

$$\frac{HC}{AC} = \cos 30^\circ \Rightarrow AC \times \cos 30^\circ = HC \Rightarrow HC = 2\sqrt{3} \times \frac{\sqrt{3}}{2} = 3$$

$$\text{ب) } HC = AC \times \cos 30^\circ \Rightarrow 9 = AC \times \frac{\sqrt{3}}{2} \Rightarrow AC = 6\sqrt{3}$$

$$\frac{b}{\sin B} = \frac{c}{\sin C} \Rightarrow \frac{6\sqrt{3}}{\sin B} = \frac{3\sqrt{6}}{\frac{1}{2}} \Rightarrow \sin \hat{B} = \frac{\sqrt{2}}{2} \Rightarrow \hat{B} = \begin{matrix} 45^\circ \checkmark \\ 135^\circ \times \end{matrix}$$

$$\text{الف) } \left. \begin{aligned} \frac{CB}{AB} &= \cot \hat{C} \Rightarrow \frac{CB}{50\sqrt{3}} = \sqrt{3} \Rightarrow CB = 150 \\ \frac{BD}{AB} &= \cot \hat{D} \Rightarrow \frac{BD}{50\sqrt{3}} = \frac{\sqrt{3}}{3} \Rightarrow BD = 50 \end{aligned} \right\} \begin{aligned} x &= BC - BD = 150 - 50 \\ &= 100 \end{aligned}$$

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

$$CD^2 = DB^2 + BC^2 \Rightarrow CD^2 = 1 + 12 \Rightarrow CD = \begin{matrix} +\sqrt{13} \checkmark \\ -\sqrt{13} \times \end{matrix}$$

$$\sin \alpha = \frac{BD}{CD} = \frac{1}{\sqrt{13}} = \frac{\sqrt{13}}{13}$$

$$\hat{B} = 180 - (90 + 100) = 90$$

$$\frac{AB}{\sin C} = \frac{AC}{\sin B} \Rightarrow \frac{AB}{\sin C} = \frac{AC}{\sin B} = \frac{\frac{\sqrt{2}\sqrt{2}}{2}}{\frac{1}{2}} = \frac{\sqrt{2} + \sqrt{2}}{2}$$

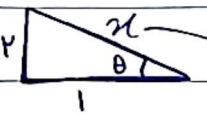
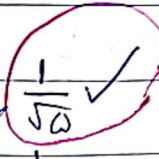
$$\frac{\sin 10^\circ}{\sin (40^\circ + 90^\circ)} = \frac{\frac{\sqrt{3}}{2} \times \frac{\sqrt{2}}{2} + \frac{1}{2} \times \frac{\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}} = \frac{\sqrt{2} + \sqrt{2}}{2}$$

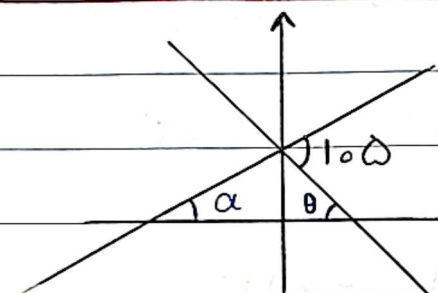
$$\frac{S_{\triangle BE}}{S_{\triangle CD}} = \frac{\frac{1}{2} \times 2 \times 4 \times \sin \hat{B}_1}{\frac{1}{2} \times 3 \times 4 \times \sin \hat{B}_2} \xrightarrow{\hat{B}_1 = \hat{B}_2} \frac{\frac{1}{2} \times 2 \times 4}{\frac{1}{2} \times 3 \times 4} = \frac{4}{9}$$

الف) $f_x^3 x \sin 120^\circ = \frac{1}{4} x^3 \times \frac{\sqrt{3}}{4} = 4\sqrt{3}$ -4

ب) $\frac{1}{x} x^3 \times \frac{1}{4} x \sin 120^\circ = \frac{1}{4} x \frac{\sqrt{3}}{4} = 3\sqrt{3}$

شیب خط = $\frac{\Delta y}{\Delta x} = \frac{4-2}{3-(-1)} = \frac{2}{4} = \frac{1}{2}$ -5

$\tan \theta = \frac{1}{2} \Rightarrow$  $\Rightarrow \cos \theta = \frac{2}{\sqrt{5}}$  $\frac{1}{\sqrt{5}}$ ✓



$2y = 2m + 0 \Rightarrow y = m + 2, 0$

$\tan \alpha = 1 \Rightarrow \alpha = 45^\circ$ ✓

$\alpha = 45^\circ \Rightarrow \theta = 45^\circ$

$y = mx + b \Rightarrow m = \tan(110^\circ - \theta) = \tan 65^\circ = \sqrt{3}$

$2y = 2m + 0$

$y = mx + b$

چون هر دو خط در یک نقطه محور را قطع کردند پس عرض از مبدأ برابر دارند در نتیجه $b = 2, 0$ $mb = -\sqrt{3} \times \frac{0}{2} = \frac{-0\sqrt{3}}{2}$ $\leftarrow$

$f(x) = \cos(\pi + x) + \sin(\frac{\pi}{2} - x) - \tan(\frac{3\pi}{2} + x) \Rightarrow$ -9

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

$f(\frac{5\pi}{4}) = \cot \frac{5\pi}{4} = -\sqrt{3}$

$\frac{\sin(\frac{14\pi}{3} + x) + \cos(\frac{10\pi}{3} - x)}{\cos(3\pi + x) - \sin(4\pi - x)} = \frac{\sin(\frac{\pi}{3} + x) + \cos(\frac{\pi}{3} - x)}{\cos(\pi + x) - \sin(2\pi - x)}$ -10 20

$= \frac{\cos x + (-\sin x)}{-\cos x + \sin x} = \frac{\cos x - \sin x}{\sin x - \cos x} = -1$