

الف) $\sin 135^\circ = \frac{\sqrt{2}}{2}$ $\cos 135^\circ = -\frac{\sqrt{2}}{2}$ $\Rightarrow (\sin 135^\circ + \cos 135^\circ)(\sin 135^\circ - \cos 135^\circ)$
 $\cos 30^\circ = \frac{\sqrt{3}}{2}$ $\cos 150^\circ = -\frac{\sqrt{3}}{2}$ $= (\frac{\sqrt{2}}{2} - \frac{\sqrt{2}}{2})(\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2}) \Rightarrow \frac{2}{4} - \frac{2}{4} = -\frac{1}{2}$

ب) $1 + \tan^2 45^\circ = (\frac{\sqrt{2}}{2})^2 = \frac{1}{2}$
 $\frac{1 + \tan^2 45^\circ}{\cos^2 45^\circ + \cos^2 45^\circ} = \frac{1+1}{2+1} = \frac{2}{3}$
 $(\frac{\sqrt{2}}{2})^2 = \frac{1}{2}$ $(-\frac{\sqrt{2}}{2})^2 = \frac{1}{2}$

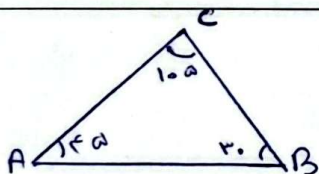
الف) $\Rightarrow AH = \sin 45^\circ \times \sqrt{4} = \sqrt{2} \Rightarrow \frac{AH}{AC} = \frac{1}{\sqrt{2}} \Rightarrow \sin C = \frac{1}{\sqrt{2}} \Rightarrow \hat{C} = 45^\circ$
 $CH = \cos 30^\circ \times 2\sqrt{3} = \frac{\sqrt{3}}{2} \times 2\sqrt{3} = 3$

$\rightarrow AC = 9 \div \cos 30^\circ = 9 \times \frac{2}{\sqrt{3}} = 6\sqrt{3} \Rightarrow AH = \sin 30^\circ \times 6\sqrt{3} = 3\sqrt{3}$
 $\frac{AH}{BH} = \frac{3\sqrt{3}}{3\sqrt{3}} = \frac{1}{1} = \frac{\sqrt{2}}{\sqrt{2}} \Rightarrow \sin \hat{B} = \frac{\sqrt{2}}{\sqrt{2}} \Rightarrow \hat{B} = 45^\circ$

الف) $\tan 45^\circ = \frac{AB}{BD} \Rightarrow BD = \frac{AB}{\tan 45^\circ} \Rightarrow BD = \frac{5\sqrt{3}}{\sqrt{3}} = 5$
 $\tan 30^\circ = \frac{AB}{BC} \Rightarrow BC = \frac{AB}{\tan 30^\circ} \Rightarrow BC = \frac{5\sqrt{3}}{\frac{1}{\sqrt{3}}} \Rightarrow BC = 15$
 $\left\{ \begin{array}{l} BC = BD + CD = 10 \\ CD = 5 \end{array} \right.$

$\rightarrow C = 30^\circ \Rightarrow AC = AB \div \sin 30^\circ \Rightarrow AC = 4 \Rightarrow BC = \frac{4}{\sqrt{3}} \times 2 = \frac{8}{\sqrt{3}}$

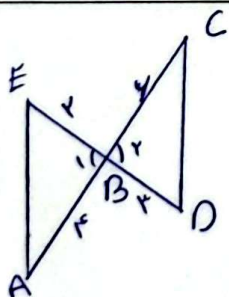
$CD = \sqrt{1^2 + (\frac{8}{\sqrt{3}})^2} = \sqrt{17} \Rightarrow \sin \alpha = \frac{1}{\sqrt{17}} \Rightarrow \sin \alpha = \frac{\sqrt{17}}{17}$



$\frac{AC}{\sin B} = \frac{AB}{\sin C} \Rightarrow \frac{AB}{AC} = \frac{\sin C}{\sin B} = \frac{\frac{\sqrt{4} + \sqrt{2}}{2}}{\frac{1}{\sqrt{2}}} = \frac{\sqrt{4} + \sqrt{2}}{2}$

$\sin C = \sin(105^\circ) = \sin(45^\circ + 60^\circ) = \sin 45^\circ \times \cos 60^\circ + \sin 60^\circ \times \cos 45^\circ$
 $\Rightarrow \frac{\sqrt{2}}{2} \times \frac{1}{2} + \frac{\sqrt{3}}{2} \times \frac{1}{2} = \frac{\sqrt{2}}{4} + \frac{\sqrt{3}}{4} = \frac{\sqrt{2} + \sqrt{3}}{4}$

$\sin B = \sin(45^\circ) = \frac{1}{\sqrt{2}}$

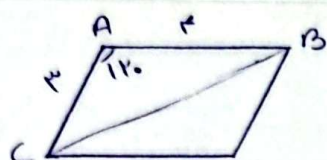


$B_1 = B_2 \Rightarrow \sin B_1 = \sin B_2$ ①

$S_{ABE} = \frac{1}{2} \times AB \times BE \times \sin B_1 = \frac{1}{2} \times 4 \times 3 \times \sin B_1 = 6 \sin B_1$

$S_{BDC} = \frac{1}{2} \times BD \times BC \times \sin B_2 = \frac{1}{2} \times 3 \times 4 \times \sin B_2 = 6 \sin B_2$

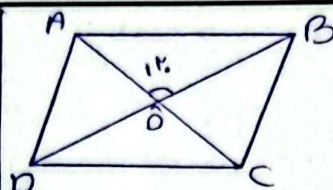
$\frac{S_{ABE}}{S_{BDC}} = \frac{6 \sin B_1}{6 \sin B_2} \xrightarrow{①} \frac{4}{3}$



(الف)

$$S = \left(\frac{1}{2} \times AB \times AC \times \sin A \right)$$

$$= 2 \left(\frac{1}{2} \times 4 \times 3 \times \frac{\sqrt{3}}{2} \right) = \underline{4\sqrt{3}}$$



$$AC = 3$$

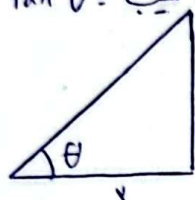
$$BD = 4$$

(ب)

$$S_{ABCD} = \frac{1}{2} \times AC \times BD \times \sin 90^\circ$$

$$= \frac{1}{2} \times 3 \times 4 \times \frac{\sqrt{3}}{2} = \underline{3\sqrt{3}}$$

$$\tan \theta = \frac{y}{x} = \frac{\Delta y}{\Delta x} = \frac{f-2}{3-(-1)} = \frac{1}{4}$$



$$r = \sqrt{1^2 + 4^2} = \sqrt{17} \rightarrow \cos \theta = \frac{4}{\sqrt{17}} = \underline{\frac{4\sqrt{17}}{17}}$$

خطهای یک عرض از برای یک خط

$b = \frac{d}{4}$

$120^\circ - 10^\circ = 110^\circ$
 $110^\circ - 40^\circ = 70^\circ$
 $90^\circ - 30^\circ = 60^\circ$
 $110^\circ - 40^\circ = 70^\circ$

$y = mx + b$
 $m = \tan 120^\circ = -\sqrt{3}$
 $b = \frac{d}{4}$
 $mb = \frac{d}{4} \times -\sqrt{3} = \underline{\frac{-d\sqrt{3}}{4}}$

$\tan \theta = 1 \rightarrow \theta = 45^\circ$

$$\left. \begin{aligned} \cos(x+\pi) &= -\cos x \\ \sin\left(\frac{x}{4} - \pi\right) &= -\sin x \\ \tan\left(\frac{3x}{4} + \pi\right) &= \tan x \end{aligned} \right\} \rightarrow f(x) = -\cos x + \cos x + \cot x \Rightarrow f(x) = \cot x$$

$$\cos \rightarrow \cot\left(\frac{d\pi}{4}\right) = \cot(120^\circ) = \underline{-\frac{1}{\sqrt{3}}}$$

$$\left. \begin{aligned} \sin\left(\frac{17\pi}{4} + x\right) &= \sin x \\ \cos\left(\frac{13\pi}{4} - x\right) &= \sin x \\ \cos(3\pi + x) &= -\cos x \\ \sin(4\pi - x) &= -\sin x \end{aligned} \right\} \rightarrow \frac{\cos x + (-\sin x)}{-\cos x - (-\sin x)} = \frac{\cos x - \sin x}{-\cos x + \sin x} = \underline{-1}$$