

الف) $\rightarrow \sin 135^\circ = \sin 45^\circ = \frac{\sqrt{2}}{2}$

$\sin 135^\circ = \sin 45^\circ = \frac{\sqrt{2}}{2}$

$\cos 135^\circ = \cos 45^\circ = \frac{\sqrt{2}}{2}, \cos 135^\circ = -\cos 45^\circ = -\frac{\sqrt{2}}{2}$

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

ب) $\rightarrow \tan 110^\circ = \tan 70^\circ = \frac{\sqrt{3}}{2}$

$\cos 110^\circ = \cos 70^\circ = \frac{\sqrt{3}}{2}$

$\cos 110^\circ = -\cos 70^\circ = -\frac{\sqrt{3}}{2}$

$\frac{1 + 3 \left(\frac{\sqrt{3}}{2} \right)^2}{2 \left(\frac{\sqrt{3}}{2} \right)^2 + 2 \left(-\frac{\sqrt{3}}{2} \right)^2} = \frac{1}{2}$

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

$CH = \cos 45^\circ \times \sqrt{2} \times \frac{\sqrt{2}}{2} \times \sqrt{2} = \sqrt{2}$

$AC = 9 \div \cos 30^\circ = 9 \times \frac{2}{\sqrt{3}} = 6\sqrt{3} \Rightarrow AH = \sin 30^\circ \times 6\sqrt{3} = 3\sqrt{3}$

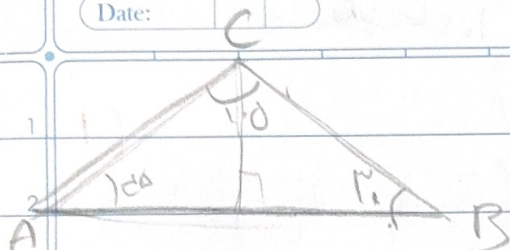
$\frac{AH}{AB} = \frac{3\sqrt{3}}{6\sqrt{3}} = \frac{1}{2} = \frac{\sqrt{2}}{2} \Rightarrow \sin B = \frac{\sqrt{2}}{2} \Rightarrow B = 45^\circ$

$BD = \frac{20}{\sqrt{2}} = \tan 40^\circ = \frac{20}{\sqrt{2}}$

$\frac{20 + x}{20\sqrt{2}} = \tan 40^\circ \Rightarrow 20 + x = 20\sqrt{2} \tan 40^\circ \Rightarrow x = 100$

3) الف) $C = 30^\circ \Rightarrow AC = AB \div \sin 30^\circ = 4 \Rightarrow BC = \sqrt{4^2 - 2^2} = 2\sqrt{3}$

$CD = \sqrt{1^2 + (2\sqrt{3})^2} = \sqrt{13} \Rightarrow \sin \alpha = \frac{1}{\sqrt{13}} \Rightarrow \alpha = \sin^{-1} \left(\frac{1}{\sqrt{13}} \right)$



$$\frac{AB}{AC} = \frac{1}{\sqrt{4+\sqrt{3}}} = \frac{\sqrt{4-\sqrt{3}}}{1}$$

150

$$\frac{AC}{\sin B} = \frac{BC}{\sin A} = \frac{AB}{\sin C} \Rightarrow \frac{AC}{\frac{1}{\sqrt{3}}} = \frac{BC}{\frac{\sqrt{4+\sqrt{3}}}{\sqrt{3}}}$$

$$\sin 100^\circ = \sin(40^\circ + 60^\circ) = \sin 40^\circ \cos 60^\circ + \cos 40^\circ \sin 60^\circ = \frac{\sqrt{4+\sqrt{3}}}{2}$$

$$\hat{B}_1 = \hat{B}_2 \Rightarrow \frac{S_{ABE}}{S_{BCD}} = \frac{1 \times 1 \times \sin \hat{B}_1}{1 \times 1 \times \sin \hat{B}_2} = \frac{1}{9}$$

120

$$\sin \hat{B}_1 = \sin \hat{B}_2$$

$$S = \frac{1}{2} ab \sin A = \frac{1}{2} \times 1 \times 1 \times \sin 120^\circ = \frac{\sqrt{3}}{4}$$

140

$$S = \frac{1}{2} \times a \times b \times \sin A = \frac{1}{2} \times 1 \times 1 \times \sin 120^\circ = \frac{\sqrt{3}}{4}$$

$$\tan \theta = \frac{\Delta y}{\Delta x} = \frac{1}{\sqrt{3}} = \frac{1}{\sqrt{3}}$$

160

$$\cos \theta = \frac{1}{\sqrt{3}} = \frac{1}{\sqrt{3}}$$

$$y = x + \frac{1}{\sqrt{3}} \Rightarrow \tan \alpha = \frac{1}{\sqrt{3}} \Rightarrow \alpha = 30^\circ \Rightarrow \beta = 40^\circ - 30^\circ = 10^\circ$$

$$b = \frac{1}{\sqrt{3}} \times 1 \Rightarrow mb = \sqrt{3} \times \frac{1}{\sqrt{3}} = 1$$

$$\left. \begin{aligned} \cos(x+n) &= \cos n \\ \sin\left(\frac{\pi}{4} - n\right) &= \cos n \\ \tan\left(\frac{\pi}{4} + n\right) &= \cot n \end{aligned} \right\} \begin{aligned} &= -\cos n + \cos n + \cot n = \\ f(n) &= +\cot n \Rightarrow \\ f\left(\frac{\pi}{4}\right) &= \cot\left(\frac{\pi}{4}\right) = \cot 45^\circ = 1 \end{aligned}$$

$$\left. \begin{aligned} \sin\left(\frac{11\pi}{4} + n\right) &= \sin\left(\frac{\pi}{4} + n\right) = \cos n \\ \cos\left(\frac{11\pi}{4} - n\right) &= \cos\left(\frac{3\pi}{4} - n\right) = -\sin n \\ \cos\left(\frac{7\pi}{4} + n\right) &= \cos\left(\frac{3\pi}{4} + n\right) = -\cos n \\ \sin\left(\frac{7\pi}{4} - n\right) &= \sin\left(\frac{3\pi}{4} - n\right) = -\sin n \end{aligned} \right\} \begin{aligned} &= \frac{\cos n - \sin n}{-\cos n + \sin n} = -1 \end{aligned}$$