

الف) $(\sin 15^\circ + \sin 45^\circ)(\cos 15^\circ - \cos 45^\circ) =$

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



ب) $\frac{1 + r \tan \theta}{\cos^2 \theta + r \cos^2 \theta} = \frac{r}{r+1} = \boxed{\frac{1}{r}}$

الف) $\triangle ABC$ with $\angle B = 45^\circ$, $AB = \sqrt{4}$, $BC = \sqrt{2}$, $AC = \sqrt{2}$. H is the foot of the altitude from A to BC . $HC = 3$.

$$\frac{AH}{\sqrt{4}} = \frac{\sqrt{2}}{2} \rightarrow AH = \frac{\sqrt{2}}{2} \rightarrow \frac{1}{2} + HC^2 = 12 \rightarrow HC^2 = 9 \rightarrow HC = 3$$

$$\frac{\sqrt{2} \times \sqrt{2}}{2 \times 2} = \frac{\sqrt{2}}{2} = \sin \hat{B}$$

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$$\frac{9}{AC} = \frac{\sqrt{2}}{r} \rightarrow 12 = AC \sqrt{2} \rightarrow AC = \frac{12\sqrt{2}}{\sqrt{2}} \Rightarrow \frac{r\sqrt{4}}{1/2} = \frac{4\sqrt{2}}{\sin \hat{B}}$$

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$$\frac{\sqrt{3}}{BD} = \frac{5 \cdot \sqrt{3}}{BD} \rightarrow BD = 5, \frac{\sqrt{3}}{13} = \frac{5 \cdot \sqrt{3}}{BC} \rightarrow BC = 15$$

ب) $\triangle ABC$ with $\angle B = 45^\circ$, $AB = \sqrt{4}$, $BC = \sqrt{2}$, $AC = \sqrt{2}$. H is the foot of the altitude from A to BC . $HC = 3$.

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

$$\frac{BC}{r} = \sqrt{13} \rightarrow BC = r\sqrt{13}, \frac{1}{1+13} = \frac{DC^2}{r^2} \rightarrow DC = \sqrt{13}$$

$\triangle ABC$ with $\angle B = 45^\circ$, $AB = \sqrt{4}$, $BC = \sqrt{2}$, $AC = \sqrt{2}$. H is the foot of the altitude from A to BC . $HC = 3$.

$$\frac{AB}{AC} = \frac{\sqrt{2}n+n}{\sqrt{2}n} = \frac{\sqrt{2}n+n}{\sqrt{2}n} \times \frac{1}{\sqrt{2}n} = \frac{n(\sqrt{2}+1)}{\sqrt{2}n} = \frac{\sqrt{2}+1}{\sqrt{2}}$$

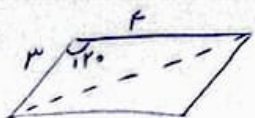
$$\frac{(\sqrt{2}+1)(\sqrt{2})}{2} = \text{ناتمام}$$

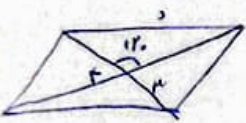
$$\frac{n}{2} + \frac{n}{2} = AC^2 \rightarrow AC = \frac{n}{\sqrt{2}} = \frac{\sqrt{2}n}{2}$$

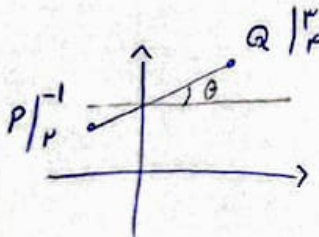
$\triangle ABE$ and $\triangle BCD$ with $\angle B = 45^\circ$, $AB = \sqrt{4}$, $BC = \sqrt{2}$, $AC = \sqrt{2}$. H is the foot of the altitude from A to BC . $HC = 3$.

$$\frac{S_{\triangle ABE}}{S_{\triangle BCD}} = \frac{\frac{1}{2} \times \sin \alpha \times \frac{4}{9}}{\frac{1}{2} \times \sin \alpha \times \frac{1}{9}} = \frac{4}{9}$$

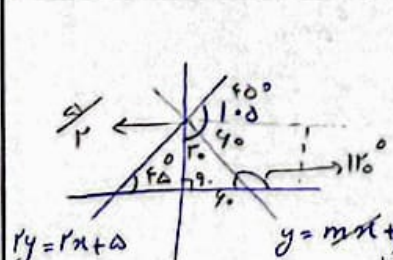
$$\frac{4}{9} = \frac{1}{9} = \frac{CD}{EA}$$

الف) 
$$S = \frac{1}{r} \times \sin 110^\circ \times r \times \ell = 4 \times \frac{\sqrt{r}}{r} = 4\sqrt{r} \times r = \boxed{4\sqrt{r}}$$

ب) 
$$S = \frac{1}{r} \times \frac{\sin 110^\circ}{\sqrt{r}} \times r \times \ell = 4 \times \frac{\sqrt{r}}{r} = \boxed{4\sqrt{r}}$$


$$\cos \theta = \frac{r}{\sqrt{\Delta}} = \frac{r\sqrt{\Delta}}{\Delta}$$

$$a = \frac{\Delta y}{\Delta x} \rightarrow \frac{r}{r} = \frac{1}{r} = \tan \theta \rightarrow \tan \theta = \frac{\Delta}{\ell} = \frac{1}{\cos \theta} \rightarrow \ell = \frac{1}{\cos^2 \theta} \rightarrow \cos^2 \theta = \frac{\ell}{\theta}$$


$$mb = -\sqrt{r} \times \frac{\Delta}{r} = \boxed{-\frac{\Delta\sqrt{r}}{r}}$$

$$y = mx + b$$

$$y = x + \frac{\Delta}{r}$$

$$x = 0 \rightarrow y = \frac{\Delta}{r}$$

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



if $\rightarrow f(m) = \frac{\cos(\pi + m)}{-\cos m} + \frac{\sin(\frac{\pi}{r} - m)}{+\cos m} - \tan(\frac{r\pi}{r} + m) = \cot m$

$$f(\frac{\Delta\pi}{4}) = f(10^\circ) = \cot 10^\circ \rightarrow -\sqrt{r}$$

$$f(\frac{r\pi}{r} + \frac{\pi}{4})$$

$$\frac{\sin(\frac{10\pi}{r} + m) + \cos(\frac{10\pi}{r} - m)}{\cos(\frac{r\pi}{r} + m) - \sin(\frac{4\pi}{r} - m)} = \frac{-(-\cos m + \sin m) + \cos m - \sin m}{-\cos m + \sin m} = -1$$