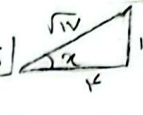


الف) $\tan \frac{11\pi}{4} + \sin \frac{15\pi}{4} \cos \frac{11\pi}{4} = \tan(\pi - \frac{\pi}{4}) + \sin(\pi - \frac{\pi}{4}) \cos(\pi - \frac{\pi}{4})$
 $= -\tan \frac{\pi}{4} - (\sin \frac{\pi}{4}) \times (-\cos \frac{\pi}{4}) = -\tan \frac{\pi}{4} + \sin \frac{\pi}{4} \cos \frac{\pi}{4} = -1 + \frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{2} = -1 + \frac{2}{4} = -\frac{2}{4} = -\frac{1}{2}$

ب) $\tan \frac{13\pi}{4} \sin \frac{11\pi}{4} + \cos \frac{10\pi}{4} = \tan(\pi - \frac{\pi}{4}) \sin(\pi - \frac{\pi}{4}) + \cos(\pi - \frac{\pi}{4})$
 $= -\tan \frac{\pi}{4} \times \sin \frac{\pi}{4} - \cos \frac{\pi}{4} = -\tan \frac{\pi}{4} \times \sin \frac{\pi}{4} - \cos \frac{\pi}{4} = -\frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{2} - \frac{1}{2} = -\frac{2}{4} - \frac{2}{4} = -\frac{4}{4} = -1$

$x \frac{(3x^2 - 1)}{(x^2 + 1)} = \frac{11}{13}$

$\cot x = \frac{\cos x}{\sin x} = \frac{f(x)}{g(x)}$

$\frac{3x^2 - 1}{x^2 + 1} = \frac{11}{13}$  $\cot \alpha = \frac{12}{5}$

$\sin \alpha = r \cos \alpha \Rightarrow \frac{\sin \alpha}{\cos \alpha} = r = \tan \alpha$

$\cos \alpha = \frac{1}{\sqrt{10}} \Rightarrow \cos \alpha = -\frac{1}{\sqrt{10}}$

$\sin \alpha = r \cos \alpha$

$\sin^2 \alpha + \cos^2 \alpha = 1$

$f \cos^2 \alpha + \cos^2 \alpha = 1 \Rightarrow \cos^2 \alpha = \frac{1}{10}$

$\Rightarrow \cos \alpha = \pm \frac{1}{\sqrt{10}} \Rightarrow \cos \alpha = -\frac{1}{\sqrt{10}}$

الف) $\cos(\frac{11\pi}{4} + \alpha) = \cos(\pi - \frac{\pi}{4} + \alpha) = -\cos(\frac{\pi}{4} + \alpha)$

$= -(\cos \alpha \cos \frac{\pi}{4} - \sin \alpha \sin \frac{\pi}{4}) = -(\frac{\sqrt{2}}{2} \cos \alpha - \frac{\sqrt{2}}{2} \sin \alpha) = -\frac{\sqrt{2}}{2} (\cos \alpha - \sin \alpha) = -\frac{\sqrt{2}}{2} (\frac{1}{\sqrt{10}} - \frac{3}{\sqrt{10}}) = -\frac{\sqrt{2}}{2} \times \frac{2}{\sqrt{10}} = -\frac{\sqrt{2}}{\sqrt{10}} = -\frac{1}{\sqrt{5}}$

ب) $\sin(\frac{13\pi}{4} + \alpha) = \sin(\pi - \frac{\pi}{4} + \alpha) = \sin(\frac{\pi}{4} + \alpha)$

$= (\sin \alpha \cos \frac{\pi}{4} + \cos \alpha \sin \frac{\pi}{4}) = (\frac{\sqrt{2}}{2} \sin \alpha + \frac{\sqrt{2}}{2} \cos \alpha) = \frac{\sqrt{2}}{2} (\sin \alpha + \cos \alpha) = \frac{\sqrt{2}}{2} (\frac{3}{\sqrt{10}} + \frac{1}{\sqrt{10}}) = \frac{\sqrt{2}}{2} \times \frac{4}{\sqrt{10}} = \frac{2\sqrt{2}}{\sqrt{10}} = \frac{2}{\sqrt{5}}$

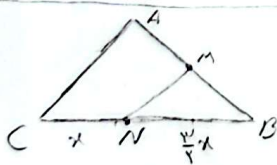
$r \sin^2 \alpha + \cos^2 \alpha = \frac{1}{5} \Rightarrow \sin^2 \alpha + 12 \frac{1}{5} \Rightarrow \sin^2 \alpha = \frac{1}{5} \Rightarrow \cos^2 \alpha = \frac{4}{5}$

$\tan^2 \alpha = \frac{\sin^2 \alpha}{\cos^2 \alpha} = \frac{1}{4} \Rightarrow \tan \alpha = \frac{1}{2}$

$S_{ABC} = \frac{1}{2} \times \frac{1}{2} \times \sqrt{5} \times \sin \alpha = \frac{1}{4} \Rightarrow \sin \alpha = \frac{1}{\sqrt{5}} = \frac{\sqrt{5}}{5} \Rightarrow \sin \alpha = \frac{\sqrt{5}}{5}$

$\frac{y}{x} = \frac{1}{2} \Rightarrow y = \frac{x}{2}$ $S = \frac{1}{2} \times x \times y \times \sin 120^\circ = \frac{1}{2} \times x \times \frac{x}{2} \times \frac{\sqrt{3}}{2} = \frac{\sqrt{3}}{8} x^2 = \frac{1}{4} \Rightarrow x^2 = \frac{2}{\sqrt{3}} \Rightarrow x = \sqrt{\frac{2}{\sqrt{3}}}$

$S_{ABC} - S_{ADE} = \frac{1}{2} \times 4 \times \sqrt{5} \times \sin \hat{A} - \frac{1}{2} \times 1 \times \sqrt{5} \times \sin \hat{A} = \frac{3}{2} \sqrt{5} \Rightarrow \sin \hat{A} = \frac{1}{\sqrt{5}} \Rightarrow \sin \hat{A} = \frac{\sqrt{5}}{5}$
 $\tan \hat{A} = \frac{1}{2} \Rightarrow \frac{1}{\sqrt{5}} = \frac{1}{2} \Rightarrow \frac{\sqrt{5}}{5} = \frac{1}{2}$



$\frac{S_{ABC}}{S_{AMN}} = \frac{\frac{1}{2} \times \sin \hat{A} \times \overline{AB} \times \overline{CB}}{\frac{1}{2} \times \sin \hat{A} \times \overline{AM} \times \overline{AN}} = \frac{\overline{AB} \times \overline{CB}}{\overline{AM} \times \overline{AN}} = \frac{\overline{BA} \times \frac{5}{4} \overline{NC}}{\overline{BM} \times \frac{1}{4} \overline{NC}} = \frac{\overline{BA}}{\overline{BM}} = 9 \Rightarrow \overline{BA} = 9 \overline{BM}$
 $\overline{BC} = \overline{NC} + \overline{BN} = \frac{5}{4} \overline{NC} \Rightarrow \overline{BN} = \frac{1}{4} \overline{NC}$
 $\overline{BA} = \overline{BM} + \overline{MA} \Rightarrow \overline{BA} = \frac{1}{9} \overline{BA} + \overline{MA} \Rightarrow \overline{MA} = \frac{8}{9} \overline{BA}$

$\frac{1}{\sqrt{\cos^2 \alpha}} - \tan \alpha = \frac{1 + \sin \alpha}{|\cos \alpha|} \Rightarrow -\frac{\sin \alpha}{\cos \alpha} = \frac{\sin \alpha}{|\cos \alpha|}$
 $\frac{|\sin \alpha|}{\cos \alpha} = -\frac{1}{\cot \alpha}$

نوع علامت
 ۱) $\cos \alpha > 0, \sin \alpha > 0$
 ۲) $\cos \alpha < 0, \sin \alpha > 0$