

11

14,5

الكلية

$$\tan \frac{11\pi}{8} + \sin \frac{5\pi}{8} \cos \frac{13\pi}{8}$$

(1,78)

$$= \tan \left(2\pi + \frac{3\pi}{8} \right) + \sin \left(2\pi + \frac{5\pi}{8} \right) \cos \left(2\pi + \frac{5\pi}{8} \right)$$

$$= \frac{\tan \frac{3\pi}{8}}{-1} + \frac{\sin \frac{5\pi}{8}}{\frac{\sqrt{2}}{2}} \frac{\cos \frac{5\pi}{8}}{-\frac{\sqrt{2}}{2}} = -1 + \frac{1}{2} = -\frac{1}{2} \checkmark$$

$$1 + \tan \frac{17\pi}{8} \sin \frac{11\pi}{8} + \cos \frac{10\pi}{8}$$

$$\tan \left(2\pi + \frac{9\pi}{8} \right) \sin \left(2\pi + \frac{5\pi}{8} \right) + \cos \left(2\pi + \frac{5\pi}{8} \right)$$

$$= \frac{\tan \frac{9\pi}{8}}{1} \frac{\sin \frac{5\pi}{8}}{\frac{\sqrt{2}}{2}} + \frac{\cos \frac{5\pi}{8}}{\frac{\sqrt{2}}{2}} = 1 + \left(-\frac{1}{2} \right) = \frac{1}{2}$$

$$\tan 100^\circ = \frac{1}{-1.73} = -\frac{1}{1.73} \quad \tan 300^\circ = \frac{-\sqrt{3}}{1} = -\frac{\sqrt{3}}{1}$$

$$-\frac{\sqrt{3}}{2} \times \left(-\frac{\sqrt{3}}{2} \right) - \frac{1}{2} = 0$$

11

$$\cot x = 8 \Rightarrow \frac{\cos x}{\sin x} = 8 \Rightarrow \cos x = 8 \sin x$$

(2)

$$\cos^2 x + \sin^2 x = 1 \Rightarrow \sin^2 x + \sin^2 x = 1$$

$$\frac{12 \sin x}{\cos x + \sin x} = \frac{11 \sin x}{\sin x} = \frac{11}{1} \checkmark$$

۳) $\sin x = 2 \cos x \Rightarrow \sin^2 x = 2 \cos^2 x$ (۲)

$$\sin^2 x + \cos^2 x = 1 \Rightarrow 2 \cos^2 x + \cos^2 x = 1$$

$$\cos^2 x = \frac{1}{3} \Rightarrow \cos x = \pm \frac{1}{\sqrt{3}}$$

چون در ربع اول $\cos x = -\frac{1}{\sqrt{3}}$ ✓

۴) الف) $\cos\left(\frac{11\pi}{8} + \alpha\right) = -\sin \alpha = -\frac{\sqrt{2}}{2}$ (۲.۵)

ب) $\sin\left(\frac{13\pi}{8} + \alpha\right) = \cos \alpha = \frac{\sqrt{2}}{2}$

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

$$\Rightarrow \frac{2}{4} + \cos^2 \alpha = 1 \Rightarrow \cos^2 \alpha = \frac{2}{4} \Rightarrow \cos \alpha = \pm \frac{\sqrt{2}}{2} \Rightarrow \cos \alpha = \frac{\sqrt{2}}{2}$$
 ✓

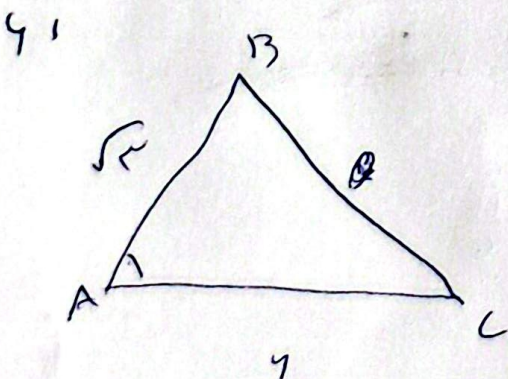
۵) $2 \sin^2 x + \cos^2 x = \frac{3}{2}$ (۲)

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

$$\Rightarrow \sin^2 x = \frac{1}{2}$$

$$\Rightarrow \cos^2 x = \frac{1}{2}$$

$$\Rightarrow \tan^2 x = \frac{\sin^2 x}{\cos^2 x} = \frac{\frac{1}{2}}{\frac{1}{2}} = 1 \checkmark$$



۷) $S_{\Delta} = 2 \times \sqrt{2} \times \sin \hat{A} \times \frac{1}{2} = 4\sqrt{2}$ (۲)

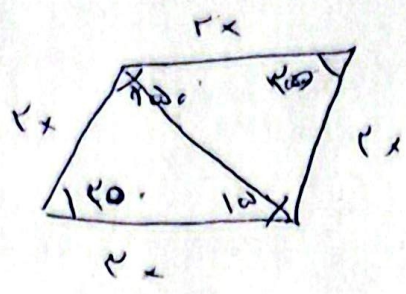
$$= 2\sqrt{2} \times \sin \hat{A} = 4\sqrt{2}$$

$$\Rightarrow \sin \hat{A} = \frac{4\sqrt{2}}{2\sqrt{2}} = 2$$

$\frac{4\sqrt{2}}{2\sqrt{2}} = 2 \checkmark$

$110^\circ, 90^\circ$

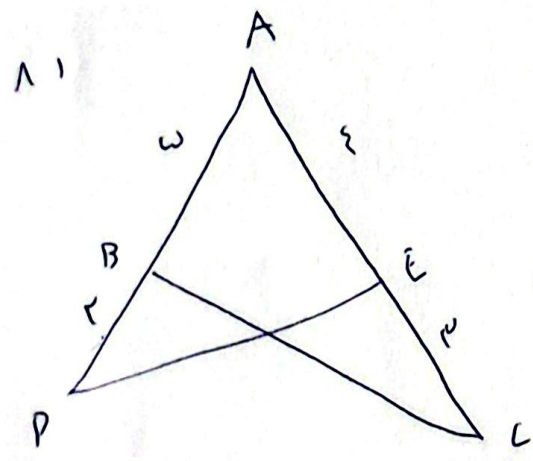
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(2)

مساحة المثلث $S_{\Delta} = (r \times r \times \frac{1}{2} \times \sin 120) r = \frac{r^2 \times \frac{\sqrt{3}}{2} \times r}{2}$
 $= r^2 \times \frac{\sqrt{3}}{4}$
 $\Rightarrow r = \frac{\omega \times 4}{\sqrt{3}} = 1.8$
 $\Rightarrow r = \sqrt{3}$

مساحة $= \frac{1}{2} \times r \times r \times \sin 120 = \frac{1}{2} \times \sqrt{3} \times \sqrt{3} \times \frac{\sqrt{3}}{2} = \frac{3\sqrt{3}}{4}$ ✓



$S_{ABC} = \frac{1}{2} \times a \times b \times \sin A = \frac{1}{2} \times a \times b \times \sin A$

(1, 2)

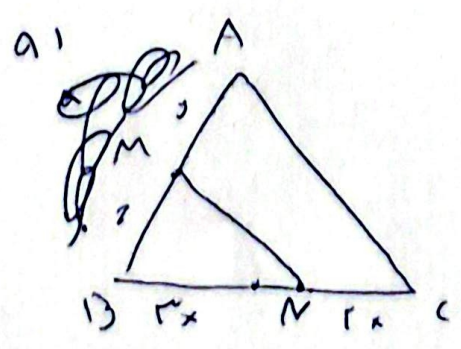
$S_{ADE} = \frac{1}{2} \times d \times e \times \sin A = \frac{1}{4} S_{ABC}$

$S_{ABC} - S_{ADE} = L \times \omega = \frac{3}{4} S_{ABC}$

$\tan A = \frac{\sqrt{3}}{3} \quad \hat{A} = 30^\circ \quad \Rightarrow \sin \hat{A} = \frac{1}{2}$ ✓

$\cos \hat{A} = \frac{2}{3} \quad \cos^2 \hat{A} + \sin^2 \hat{A} = 1$
 $\cos^2 \hat{A} = \frac{4}{9}$
 $\Rightarrow \cos \hat{A} = \frac{2}{3}$

$\Rightarrow \tan \hat{A} = \frac{\frac{1}{2}}{\frac{2}{3}} = \frac{3}{4}$



$\frac{S_{ABC}}{S_{BMN}} = \frac{\frac{1}{2} \times (y+z) \times \sin B}{\frac{1}{2} \times y \times z \times \sin B} = \frac{y+z}{yz}$ ✓

(1)

$\Rightarrow yz = y \Rightarrow z = 1 \Rightarrow BM = AM$

$\Rightarrow \frac{BM}{AM} = 1$

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$$\frac{|\sin \alpha|}{\cos \alpha} = \frac{-1}{\cos \alpha} = \frac{-1}{\frac{\cos \alpha}{\sin \alpha}} = \frac{-\sin \alpha}{\cos \alpha} \Rightarrow \sin \alpha < 0$$

(2)

$$\frac{1}{\sqrt{\cos \alpha}} - \tan \alpha = \frac{1}{|\cos \alpha|} - \frac{\sin \alpha}{\cos \alpha} = \frac{1 + \sin \alpha}{|\cos \alpha|}$$

$$\Rightarrow |\cos \alpha| = -\cos \alpha$$

$$\Rightarrow \cos \alpha < 0 \Rightarrow \text{انتهای ثان در ربع دوم}$$

✓

الف) $\cos \alpha = 1 - \sin^2 \alpha \rightarrow \cos \alpha = \frac{9}{10} \xrightarrow{\text{بجواب}} \cos \alpha = -\frac{\sqrt{19}}{10}$ ✓

$$\cos\left(\frac{11\pi}{f} + \alpha\right) = \cos\left(\pi + \left(-\frac{\pi}{f} + \alpha\right)\right) = -\cos\left(\alpha - \frac{\pi}{f}\right)$$

$$= -\left(\cos \alpha \cos \frac{\pi}{f} + \sin \alpha \sin \frac{\pi}{f}\right) = -\left(-\frac{\sqrt{19}}{10} \times \frac{\sqrt{f}}{f} + \frac{\sqrt{f}}{10} \times \frac{\sqrt{f}}{f}\right) = \frac{f}{20}$$

ب) $1 + \frac{\tan^2 \alpha}{\frac{1}{f^2}} = \frac{1}{\cos^2 \alpha} \xrightarrow{\text{بجواب}} \cos \alpha = \frac{\sqrt{f}}{10} \xrightarrow{\sin^2 \alpha + \cos^2 \alpha = 1} \sin \alpha = \frac{\sqrt{f}}{10}$

$$\sin\left(\frac{13\pi}{f} + \alpha\right) = \sin\left(\pi + \frac{\pi}{f} + \alpha\right) = -\sin\left(\frac{\pi}{f} + \alpha\right) \xrightarrow{\text{بجواب}} -\frac{f}{20}$$

$$S_{ABC}^{\Delta} = \frac{1}{f} AB \times \Delta n \times \sin \hat{B}$$

$$\rightarrow \frac{S_{ABC}^{\Delta}}{S_{BMN}^{\Delta}} = \frac{\Delta n \times AB}{r_n \times BM} = 3$$

$$S_{BMN}^{\Delta} = \frac{1}{f} BM \times r_n \times \sin \hat{B}$$

$$\frac{BM}{AB} = \frac{\Delta}{9} \rightarrow \frac{\overbrace{BM}^{\Delta n}}{\underbrace{AM + BM}_{r_n}} = \frac{\Delta}{9} \rightarrow \frac{BM}{AM} = \boxed{\frac{\Delta}{f}}$$