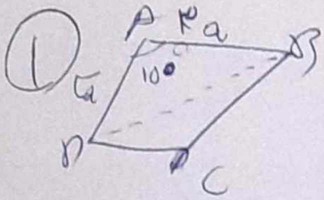
امیرحسین بیگلربیگی صالحی — یازدهم ریاضی B

① 

$S_{ABCD} = 2S_{ABD} = 2 \times \frac{1}{2} \times AD \times AB \times \sin\hat{A}$

$= 2 \times \frac{1}{2} \times 2a \times 3a \times \frac{1}{2} = 3a^2 = 54 \to a = 3\sqrt{2}$

محیط متوازی‌الاضلاع $= 2(AB + AD) = 2 \times 5a = 10a = 30\sqrt{2}$

②

$S_{A\hat{B}C} = \frac{1}{2} AC \times AB \times \sin\hat{A} = \frac{1}{2} \times 5 \times 7 \times \sin\hat{A} = \frac{35}{2}\sin\hat{A}$

$S_{A\hat{D}E} = \frac{1}{2} AE \times AD \times \sin\hat{A} = \frac{1}{2} \times 4 \times 7 \times \sin\hat{A} = \frac{28}{2}\sin\hat{A}$

$\to S_{ABC} - S_{ADE} = \frac{7}{2}\sin A = 1.75 \to \sin A = \frac{1}{2} \to A = 30^\circ$ قق ، $A = 150^\circ$ غق

$\to \tan A = \tan 30^\circ = \frac{\sqrt{3}}{3}$

③

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

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

$\to \frac{|\sin\alpha|}{\cos\alpha} = -\tan\alpha = -\frac{\sin\alpha}{\cos\alpha} \to \sin\alpha < 0$

$\Big\} \to$ α در ناحیه ۳

④

$\left.\begin{array}{l}\tan B = \frac{1.5}{2} = \frac{3}{4} \\ B = 180 - \alpha\end{array}\right\} \to \tan(180 - \alpha) = \frac{3}{4} \to \tan\alpha = -\frac{3}{4}$

$\to \tan(\frac{3\pi}{2} - \alpha) = \cot\alpha = \frac{1}{\tan\alpha} = -\frac{4}{3}$

⑤

$\frac{3\cos(270 - 32) - 2\sin(180 - 32)}{\sin(180 + 32) - \cos(270 + 32)} = \frac{3\cos(\frac{3\pi}{2} - 32) - 2\sin 32}{-\sin 32 - \sin 32} = \frac{-3\sin 32 - 2\sin 32}{-\sin 32 - \sin 32} = \frac{5}{2}$

⑥

$\frac{\sin(\frac{\pi}{2} + \alpha) - \sin(\alpha - \pi)}{|\tan^2\alpha - 1|} = \frac{\cos\alpha + \sin\alpha}{|\tan^2\alpha - 1|} = \frac{\frac{2}{3} - \frac{\sqrt{5}}{3}}{\frac{1}{4}} = \frac{8 - 4\sqrt{5}}{3}$

$\cos\alpha = \frac{2}{3} \to \sin^2\alpha = 1 - \frac{4}{9} = \frac{5}{9} \to \sin\alpha = \pm\frac{\sqrt{5}}{3}$ (قق / غق) $\to \tan\alpha = -\frac{\sqrt{5}}{2}$

⑦

$\sin\alpha = 2\cos\alpha \to \tan\alpha = 2 \to 1 + \tan^2\alpha = \frac{1}{\cos^2\alpha} = 5 \to \cos^2\alpha = \frac{1}{5} \to \cos\alpha = \pm\frac{\sqrt{5}}{5}$ (قق / غق)

(۸) $۲mx + (m^{۲}-1)y = ۳ \rightarrow y = \frac{-۲m}{m^{۲}-1}x + \frac{۳}{m^{۲}-1}$

$\tan ۶۰ = \sqrt{۳} = \frac{-۲m}{m^{۲}-1} \rightarrow \sqrt{۳}m^{۲} + ۲m - \sqrt{۳} = 0 \rightarrow$ اختلاف مقادیر $m = \frac{\sqrt{\Delta}}{|a|} = \frac{۴}{\sqrt{۳}} = \frac{۴\sqrt{۳}}{۳}$

(۹) $\tan(\frac{\pi}{۴} - x) = \frac{\tan\frac{\pi}{۴} - \tan x}{1 + \tan\frac{\pi}{۴} \times \tan x} = \frac{1 - \tan x}{1 + \tan x} = \frac{1-m}{۲+m}$

$\rightarrow \frac{1 - \tan x + 1 + \tan x}{1 + \tan x} = \frac{1 - m + ۲ + m}{۲+m} \rightarrow \frac{1 + \tan x}{۲} = \frac{۲+m}{۳}$

$\rightarrow \tan x = \frac{۲m+1}{۳}$
$-\frac{\pi}{۴} < x < \frac{\pi}{۴}$

$\rightarrow -1 < \frac{۲m+1}{۳} < 1 \rightarrow -۳ < ۲m+1 < ۳$

$\rightarrow -۲ < m < 1$

(۱۰) $\tan(۳۰۰)\cos(۲۱۰) + \cancel{\tan(۴۸۰)\sin(۸۴۰)} = -\sqrt{۳}(-\frac{\sqrt{۳}}{۲}) + (-\sqrt{۳})(\frac{\sqrt{۳}}{۲})$

$\tan(۱۲۰)\ \sin(۱۲۰)$

$= \frac{۳}{۲} - \frac{۳}{۲} = 0$