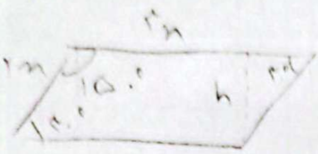
محمدامین جعفری — تکلیف ۲۶ — یازدهم پسر B

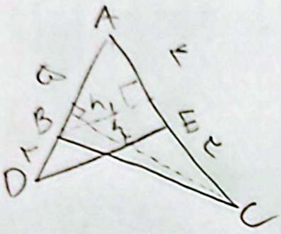
۱



$S = 3x \times h = 3x \times 2x \times \sin 150^\circ = 6x^2 \times \frac{1}{2} = 3x^2 = 54$

$\Rightarrow x^2 = 18 \Rightarrow x = \sqrt{18} = 3\sqrt{2}$

۲



$S_{ABC} - S_{ADE} = \frac{1}{2} \times 7 \times h_1 - \frac{1}{2} \times 7 \times h_2 = 3/5(h_2 - h_1)$

$= 1/75 \Rightarrow h_2 - h_1 = \frac{1}{2}$

$h_1 = \sin \hat{A} \times 5$, $h_2 = \sin \hat{A} \times 7$ $\Rightarrow h_2 - h_1 = \sin \hat{A}(7 - 5) = 2\sin \hat{A} = \frac{1}{2}$

$\Rightarrow \sin \hat{A} = \frac{1}{4}$ $\quad \cos \hat{A} = \sqrt{1 - \sin^2 \hat{A}} = \sqrt{\frac{16-1}{16}} = \frac{\sqrt{15}}{4}$ ⟶ چون حاده است مثبت است $\Rightarrow \tan \hat{A} = \frac{\frac{1}{4}}{\frac{\sqrt{15}}{4}} = \frac{1}{\sqrt{15}}$

۳

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

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

$\cos \alpha < 0$

$\Rightarrow$ ناحیه سوم

۴

$\frac{(0, 1/5)}{(2, 0)} \longrightarrow \tan \alpha = \frac{\Delta y}{\Delta x} = \frac{1/5 - 0}{0 - 2} = -\frac{3}{4}$

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

۵

$= \frac{3\cos(270^\circ - 23^\circ) - 2\sin(180^\circ - 23^\circ)}{\sin(180^\circ + 23^\circ) - \cos(270^\circ + 23^\circ)} = \frac{-3\sin 23^\circ - 2\sin 23^\circ}{-\sin 23^\circ - \sin 23^\circ} = \frac{-5\sin 23^\circ}{-2\sin 23^\circ}$

$= \frac{5}{2}$

۶

$\sin\alpha = \sqrt{1-\cos^2\alpha} = \sqrt{1-\frac{4}{9}} = \sqrt{\frac{5}{9}} = \frac{\sqrt{5}}{3} \xrightarrow[\sin\alpha<0]{\text{ربع چهارم}} -\frac{\sqrt{5}}{3}$

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

۷

$\Rightarrow \sin^2\alpha + \cos^2\alpha = 4\cos^2\alpha + \cos^2\alpha = 5\cos^2\alpha = 1 \Rightarrow \cos\alpha = \frac{1}{5} \xrightarrow{\text{ربع سوم}} -\frac{1}{5}$

۸

$\Rightarrow (m^2-1)y = -2mx + 3 \Rightarrow y = \frac{-2m}{m^2-1}x + \frac{3}{m^2-1} \qquad \tan 60^\circ = \sqrt{3}$

$\Rightarrow \frac{-2m}{m^2-1} = \sqrt{3} \Rightarrow \sqrt{3}m^2 + 2m - \sqrt{3} = 0 \Rightarrow m = \frac{-2 \pm \sqrt{4-4(-\sqrt{3})(\sqrt{3})}}{2\sqrt{3}} = \frac{-2 \pm 4}{2\sqrt{3}} = \begin{cases} -\sqrt{3} \\ \frac{1}{\sqrt{3}} \end{cases}$

$\Rightarrow \frac{1}{\sqrt{3}} - (-\sqrt{3}) = \frac{\sqrt{3}+3\sqrt{3}}{3} = \frac{4}{3}\sqrt{3}$

۹

$\Rightarrow 0 < \frac{\pi}{2} - x < \frac{\pi}{2} \Rightarrow \tan\left(\frac{\pi}{2} - x\right) > 0 \Rightarrow \frac{1-m}{2+m} > 0 \Rightarrow$ (−2, 1: $-\ +\ -$)

$\Rightarrow m \in (-2, 1)$

۱۰

عبارت $= \tan 300^\circ \cos 210^\circ + \tan 120^\circ \sin 120^\circ = -\sqrt{3} \times -\frac{\sqrt{3}}{2} + -\sqrt{3} \times \frac{-\sqrt{3}}{2}$

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