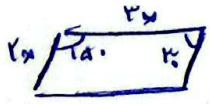
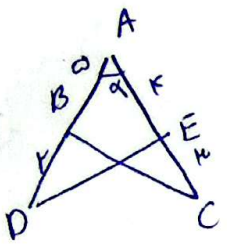
پرسنا جانقربان

①



$\frac{1}{2} \times 3x \times 2x \times \sin 30 = \frac{x^2}{4} = 10 \Rightarrow$

②



$S_{ABE} = S_{AFE} = \frac{1}{2} \times 7 \times 6 \times \sin\alpha - \frac{1}{2} \times 7 \times 4 \times \sin\alpha$

$= \frac{1}{2} \times 7(6-4)\sin\alpha = 7\sin\alpha \Rightarrow$

$\sin\alpha = \frac{3}{5}$

$\tan\alpha = \frac{\sin\alpha}{\cos\alpha} = \frac{\frac{3}{5}}{\frac{4}{5}} = \frac{3}{4}$

$\sin^2\alpha + \cos^2\alpha = 1 \Rightarrow \frac{9}{25} + \cos^2\alpha = 1 \Rightarrow \cos\alpha = \frac{4}{5}$

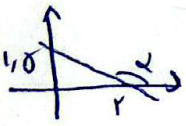
③

$\frac{1}{\sqrt{\cos^2\alpha}} - \tan\alpha = \frac{1}{|\cos\alpha|} - \frac{\sin\alpha}{\cos\alpha} = \frac{1+\sin\alpha}{|\cos\alpha|} \Rightarrow \cos\alpha < 0$

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

④

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



$\tan\alpha = \frac{y}{x} = \frac{-1.5}{2} = -\frac{3}{4} \Rightarrow$

⑤

$\frac{3\cos(1440) - 2\sin(1710)}{\sin(210) - \cos(180)} = \frac{2\cos(2220 - 22) - 2\sin(\pi - 22)}{\sin(\pi + 22) - \cos(\frac{3\pi}{2} + 22)}$

$= \frac{-3\sin 22 - 2\sin 22}{-\sin 22 - \sin 22} = \frac{-5\sin 22}{-2\sin 22} = \frac{5}{2} = 2.5$

$\sin^2\alpha = 4\cos^2\alpha$

$\sin\alpha = 2\cos\alpha$

α در ربع سوم — $\cos\alpha = ?$ — بنابراین $\cos\alpha$ منفی است

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

$\Rightarrow -\frac{\sqrt{5}}{5} = \cos\alpha$

$2mx + (m^2-1)y = 2 \Rightarrow$ شیب $= -\frac{2m}{m^2-1}$

$\tan\alpha \Rightarrow \tan 45^\circ = m \Rightarrow 1 = \frac{-2m}{m^2-1} = \frac{2m}{1-m^2} \Rightarrow 1-m^2 = 2m \Rightarrow m^2+2m-1=0$

$\Rightarrow m = \frac{-2 \pm \sqrt{4+4}}{2} = \frac{-2 \pm 2\sqrt{2}}{2} = -1 \pm \sqrt{2}$

$m_2 - m_1 = 1 - (-2) = 3$

$\tan\left(\frac{3\pi}{4} - \alpha\right) = 2$ — $\frac{3\pi}{4} - \alpha$ زاویه داخل مثلث

$0 < \tan\alpha < +\infty$

$\Rightarrow 0 < \frac{1-m}{2+m}$

	-2		1	
	$-$	$+$	$+$	$-$

$-2 < m \leq 1 \Rightarrow m \in (-2, 1]$

$\tan(210^\circ)\cos(210^\circ) + \tan\left(\frac{615\pi}{12}\right)\sin\left(\frac{48\pi}{12}\right)$

$\frac{615}{12} = 51 + \frac{3}{12}$

$\frac{48}{12} = 4$

$-\sqrt{3} \times -\frac{\sqrt{3}}{2} + -\sqrt{3} \times \frac{\sqrt{3}}{2}$

$= +\frac{3}{2} + -\frac{3}{2} = 0$

$\cos\alpha = \frac{۲}{۳}$ و $\sin\alpha <$ ۰ پس α در ربع چهارم است

$\cos^۲\alpha + \sin^۲\alpha = ۱ \Rightarrow \frac{۴}{۹} + \sin^۲\alpha = ۱ \Rightarrow \sin^۲\alpha = \frac{۵}{۹}$

$\Rightarrow \sin\alpha = -\frac{\sqrt{۵}}{۳}$

$$\frac{\sin(\frac{\pi}{۲}+\alpha) - \sin(\alpha-\pi)}{|\tan^۲\alpha - ۱|} = \frac{\cos\alpha + \sin\alpha}{|\frac{۱}{۴}|} = \frac{\frac{۲}{۳} - \frac{\sqrt{۵}}{۳}}{\frac{۱}{۴}} = \frac{۴(۲-\sqrt{۵})}{۳}$$

$$\tan^۲\alpha - ۱ = \frac{\sin^۲\alpha}{\cos^۲\alpha} - ۱ = \frac{\sin^۲\alpha - \cos^۲\alpha}{\cos^۲\alpha} = \frac{\frac{۵}{۹} - \frac{۴}{۹}}{\frac{۴}{۹}} = \frac{\frac{۱}{۹}}{\frac{۴}{۹}} = \boxed{\frac{۱}{۴}}$$