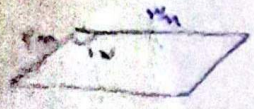
(۱)



$\Rightarrow 2mn \times 2mn \times \sin 120^\circ = 6m^2 \times \frac{1}{2} = 24 \Rightarrow x^2 = 12 \Rightarrow x = 2\sqrt{12}$

$\Rightarrow 2m + 2m + 2m + 2x = 10m \Rightarrow 10 \times \sqrt{12} = 10\sqrt{12} = \boxed{20\sqrt{2}}$

(۲)

$\cdot 5 \times 7 \times \frac{1}{2} \times \sin A - 7 \times 4 \times \frac{1}{2} \times \sin A = 1/75 \longrightarrow \frac{1}{2} \times \sin A (35 - 28) = 1/75$

$\Rightarrow \sin A (7) = 3/5 \Rightarrow \sin A = \frac{1}{4}$

$\Rightarrow A = 10^\circ \text{ یا } 30^\circ$

$\Rightarrow A < 90^\circ \Rightarrow \boxed{A = 30^\circ} \Rightarrow \boxed{\tan\alpha = \frac{\sqrt{3}}{3}}$

(۳)

$\frac{|\sin\alpha|}{\cos\alpha} = -\frac{1}{\cot 2\alpha} \Rightarrow \frac{\cos\alpha}{|\sin\alpha|} = -\cot 2\alpha \Rightarrow$ سمت راست یا چهارم

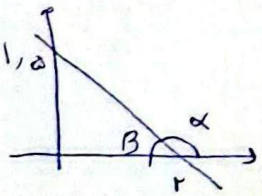
$\frac{1}{\sqrt{\cos^2\alpha}} - \tan\alpha = \frac{1+\sin\alpha}{|\cos\alpha|} \Rightarrow$

$\frac{1}{|\cos\alpha|} - \tan\alpha = \frac{1}{|\cos\alpha|} + \frac{\sin\alpha}{|\cos\alpha|}$ ← دوم یا سوم

$\boxed{\text{سوم}}$

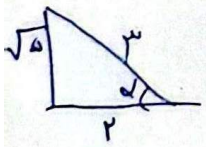
(۴)

$\tan\left(\frac{\pi}{2} - \alpha\right) = \cot(\alpha) = \cot(180^\circ - \beta) = -\cot(\beta) = \boxed{-\frac{2}{1/5}}$



(۵)

$\frac{4\cos(270^\circ - 22^\circ) - 2\sin(180^\circ - 22^\circ)}{\sin(180^\circ + 22^\circ) - \cos(270^\circ + 22^\circ)} = \frac{-3\sin(22^\circ) - 2\sin(22^\circ)}{-\sin(22^\circ) - \sin(22^\circ)} = -\frac{5}{-2} = \frac{5}{2} = \boxed{2/5}$



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

$\tan\alpha = -\frac{\sqrt{5}}{2}$

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

$= \frac{\frac{2-\sqrt{5}}{3}}{\frac{1}{4}} = \boxed{\frac{4(2-\sqrt{5})}{3}}$

(۷

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

$\Rightarrow 4+1 = \frac{1}{\cos^2\alpha} \Rightarrow \cos\alpha = \frac{1}{\sqrt{5}}$ می‌شود $\boxed{-\frac{1}{\sqrt{5}}}$ (۵)

(۸

$2mx + (m^2-1)y = 3 \rightarrow y = \frac{3}{m^2-1} - \frac{2m}{m^2-1}x$

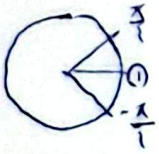
$\Rightarrow \frac{-2m}{m^2-1} = \tan 60 \Rightarrow \frac{-2m}{m^2-1} = \sqrt{3} \Rightarrow -2m = \sqrt{3}m^2 - \sqrt{3}$

$\Rightarrow \sqrt{3}m^2 + 2m - \sqrt{3} = 0 \rightarrow \frac{\sqrt{\Delta}}{|a|} = \boxed{\frac{4}{\sqrt{3}}}$ (۵)

(۹

$\tan\left(\frac{\pi}{4} - x\right) = \frac{1-\tan x}{1+\tan x} \leq \frac{1-m}{2+m} \Rightarrow 2 - 2\tan x + m - m\tan x \leq 1 + \tan x - m - m\tan x$

$\Rightarrow 2m \leq 2\tan x - 1 \Rightarrow m \leq \frac{2\tan x - 1}{2}$



(۶

$\Rightarrow -1 < \tan x < 1 \Rightarrow -2 < 2\tan x < 2 \Rightarrow -4 < 2\tan x - 1 < 2$

$\Rightarrow \boxed{-2 < \frac{2\tan x - 1}{2} < 1}$

(۱۰

$\tan 300 = \tan(2\pi - 60) = -\tan(60) = -\sqrt{3}$

$\cos 210 = \cos(\pi + 30) = -\cos 30 = -\frac{\sqrt{3}}{2}$

$\tan 240 = \tan(2\pi - 60) = -\tan 60 = -\sqrt{3}$

$\sin 420 = \sin(2\pi + 120) = \sin 120 = \frac{\sqrt{3}}{2}$

$(-\sqrt{3})\left(-\frac{\sqrt{3}}{2}\right) + (-\sqrt{3})\left(\frac{\sqrt{3}}{2}\right)$ (۵)

$= \boxed{0}$