یازدهم دختر A — شماره تکلیف ۲۸ — کیمیا رحیمی

(1)

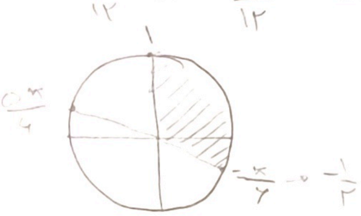
$\frac{1}{|\cos a|} - \frac{\sin a}{\cos a} = \frac{1-\sin a}{|\cos a|} \rightarrow \frac{-\sin a}{\cos a} = \frac{1-\sin a-1}{|\cos a|} = \frac{-\sin a}{|\cos a|} \rightarrow \cos a > 0$ → ربع اول یا چهارم (I)

$\cot a = \frac{\cos a}{|\sin a|} \xrightarrow{\cos a>0} \cot > 0 \rightarrow$ ربع اول یا سوم (II)   I و II → ربع اول

(2)

$\sin 2x = \frac{m-1}{4}$

$-\frac{\pi}{12} < x < \frac{5\pi}{12} \xrightarrow{\times 2} -\frac{\pi}{6} < 2x < \frac{5\pi}{6}$



$-\frac{1}{2} < \frac{m-1}{4} \leq 1 \xrightarrow{\times 4} -2 < m-1 \leq 4 \xrightarrow{+1}$

$\boxed{-1 < m \leq 5}$

(3)

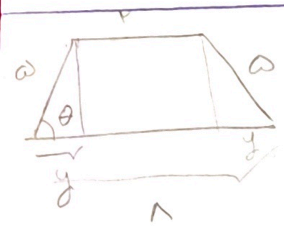
$\tan x + \cot x = -3 \longrightarrow \frac{1}{\sin x \cdot \cos x} = -3 \rightarrow \sin x \cdot \cos x = -\frac{1}{3}$

$3\pi < 4x < 4\pi \rightarrow \frac{3\pi}{4} < x < \pi$

$(\sin x + \cos x)^2 = \sin^2 x + \cos^2 x + 2\sin x \cos x = 1 + 2(-\frac{1}{3}) = 1 - \frac{2}{3} = \frac{1}{3}$

$\frac{1}{(\sin x + \cos x)(\sin^2 x + \cos^2 x - \sin x \cdot \cos x)} = \frac{1}{-\sqrt{\frac{1}{3}}(1+\frac{1}{3})} = \frac{\frac{\sqrt{3}}{3}}{\frac{1}{3}(\frac{4}{3})} = \frac{\sqrt{3}}{\frac{4}{3}} = -\frac{3\sqrt{3}}{4}$

(4)



$\cos\theta = 0.6 \rightarrow \cos\theta = \frac{y}{5} = \frac{6}{10} \rightarrow y = 3$

$x \rightarrow \boxed{4}$

$S_{\text{ذوزنقه}} = \frac{(8+2)\times 4}{2} = \boxed{20}$

(5)

$\tan(285)\tan(-165) - \sin(105)\cos(255) =$

$\tan(270+15)\tan(-180+15) - \sin(15)\cos(270-15) = -\cot 15 \tan 15 + \sin 15 \sin 15$

$-1 + \sin^2 15 = K\cos^2 15$

$-1 + \sin^2 15 = K - K\sin^2 15 \longrightarrow K = -1$

(6)

$A = \sqrt{3}\cos 21 \times \sin(270 - 27) - \sqrt{2}\sin 135 \cos(180 - 27)$

$A = -\sqrt{3} \times \frac{\sqrt{3}}{2} \times -\cos 27 - \sqrt{2} \times \frac{\sqrt{2}}{2} \times -\cos 27 = +\frac{3}{2}\cos 27 + \cos 27 = \cos 27\left(+\frac{3}{2}+1\right)$

$\frac{\cos 27\left(-\frac{1}{2}\right)}{\cos 27} = \boxed{+\frac{5}{2}}$

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(7)

$f(x) = 16\cos^2(3x)\cos^2(6x)\cos^2(12x)\cos^2(24x)$

$f\left(\frac{\pi}{36}\right) = 16\cos^2\left(\frac{\pi}{12}\right)\cos^2\left(\frac{\pi}{6}\right)\cos^2\left(\frac{\pi}{3}\right)\cos^2\left(\frac{2\pi}{3}\right) = 16\cos^2(15) \times \frac{3}{4} \times \frac{1}{4} \times \frac{1}{4} = \frac{9+3\sqrt{3}}{16}$

$\frac{2+\sqrt{3}}{4}$

$\cos^2 15 = \frac{1+\cos 30}{2} = \frac{2+\sqrt{3}}{4}$

$\frac{16\left(1+\cos\frac{\pi}{6}\right)}{2}$

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(8)

$\frac{1-\sin x}{1+\sin x} = 4 \longrightarrow 1 - \sin x = 4 + 4\sin x \rightarrow -3 = 5\sin x \rightarrow -\frac{3}{5} = \sin x$

$\sin x = -\frac{3}{5}$ $\quad \cos^2\frac{x}{2} = \frac{1+\cos x}{2} = \frac{1-\frac{3}{5}}{2} = \frac{\frac{2}{5}}{2} = \frac{1}{10} \Rightarrow \cos\frac{x}{2} = \pm\sqrt{\frac{1}{10}}$

$\cos x = -\frac{4}{5}$ $\quad \sin^2\frac{x}{2} = \frac{1-\cos x}{2} = \frac{1+\frac{4}{5}}{2} = \frac{\frac{9}{5}}{2} = \frac{9}{10} \Rightarrow \sin\frac{x}{2} = \pm\sqrt{\frac{9}{10}}$

$\tan\frac{x}{2} = \frac{\sqrt{\frac{9}{10}}}{\sqrt{\frac{1}{10}}} = \sqrt{\frac{9}{1}} = -3$

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(9)

$\frac{\sin\theta}{1-\cos\theta} + \frac{1+\cos\theta}{\sin\theta} = \frac{1}{\tan\frac{\theta}{2}} + \frac{1}{\tan\frac{\theta}{2}} = \frac{2}{\tan\frac{\theta}{2}}$

$\frac{2}{\tan\frac{\theta}{2}} = k\cot\frac{\theta}{2} = \frac{k}{\tan\frac{\theta}{2}} \Rightarrow k = 2$

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(10)

$\cos\left(\frac{11\pi}{4} + a\right) = -\sin a$

$\cos 135 \cos a - \sin 135 \sin a = -\frac{\sqrt{2}}{2} \times \frac{4\sqrt{2}}{2} - \frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{10} = \frac{14}{20} - \frac{2}{20} = \frac{12}{20} = 0.6$