/ /

به نام خدا　　　　　　　　سارینا طالبی

۱) الف) $27^\circ = (x)\,rad$

$\frac{3}{20}\;\;\frac{27^\circ}{180^\circ} = \frac{\square}{\pi}$

$x = \frac{3\pi}{20}\,rad$

منظورم این است که برحسب رادیان است.

ب) $125^\circ = (x)\,rad$

$\frac{25}{36}\;\;\frac{125^\circ}{180^\circ} = \frac{\square}{\pi}$

$x = \frac{25\pi}{36}\,rad$

ج) $\frac{5\pi}{12}\,rad = (x)^\circ$

$\frac{\frac{5\pi}{12}}{\pi} = \frac{\boxed{90}}{180} \rightarrow 90^\circ$

د) $\frac{4\pi}{9}\,rad = (x)^\circ$

$\frac{\frac{4\pi}{9}}{\pi} = \frac{\boxed{80}}{180} \rightarrow 80^\circ$

$\frac{4\times 180}{9} = 80$

۲) $10a$

$\frac{\frac{125a}{9}}{200} = \frac{\square}{180}$　　$\frac{125a \times 180}{\pi \times 200} = 12/5a$

$\frac{\frac{a\pi}{8}}{\pi} = \frac{\square}{180}$　　$\frac{a\times 180}{8} = a\times 22/5$

$12/5a + 22/5a + 10/0a = 45/0a$

$45a = 180$

$a = 4^\circ$

۳) الف) $\cos 60^\circ \cos 30^\circ - \sin 60^\circ \sin 30^\circ - \tan^2 45^\circ + 2\cot 45^\circ = \tan 45^\circ = 1$

$\sin 30^\circ \times \cos 30^\circ$　　$\cos 30^\circ \times \sin 30^\circ$

$\tan 45^\circ = \cot 45^\circ = 1$

ب) $\frac{\tan^2 30^\circ + \tan^2 45^\circ + \tan^2 60^\circ}{\cot 30^\circ - \cot 60^\circ} = \frac{\frac{1}{3}+1+3}{\sqrt{3}-\frac{1}{\sqrt{3}}} = \frac{\frac{13}{3}}{\frac{3-1}{\sqrt{3}}} = \frac{13\sqrt{3}}{6}$

$\tan 30^\circ = \cot 60^\circ = \frac{1}{\sqrt{3}}$

$\tan 60^\circ = \cot 30^\circ = \sqrt{3}$

$\tan 45^\circ = 1$

۴) $-\sin 30° \cos 60° + \cos 30° \sin 60° = \sin^2\theta$

$-1 \times \frac{1}{2} \times \frac{1}{2} + \frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2} = \sin^2\theta$

$\frac{-1}{4} + \frac{3}{4} = \frac{1}{2} = \sin^2\theta$

$\frac{1}{2} = \sin^2\theta \xrightarrow{\text{معکوس}} 2 = \frac{1}{\sin^2\theta} = 1 + \cot^2\theta \longrightarrow \cot^2\theta = 1$

$\cot\theta = \pm 1 \xrightarrow{\text{زاویه حاده}} 45°$

که در این حالت برابر و هم علامت با تانژانت θ است — $\tan\theta = \pm 1$

جواب = $\tan\theta = 1$

۵) $\frac{2\tan 30°(1-\tan^2 30°)}{(1-\cot^2 60°)^2} = \tan\theta$

$\cot^2 60° = \tan^2 30°$ → $(1-\tan^2 30°)$

$\frac{2\tan 30°}{1-\tan^2 30°} = \frac{2 \times \frac{1}{\sqrt{3}}}{1-\frac{1}{3}} = \frac{\frac{2}{\sqrt{3}}}{\frac{2}{3}} = \frac{3 \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}} = \frac{3\sqrt{3}}{3} = \sqrt{3}$

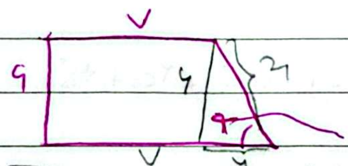
$\frac{60°}{180°} = \frac{1}{\pi} \to \frac{\pi}{3} \longleftarrow 60° = \theta \longleftarrow \tan\theta \Leftarrow$ (زاویه حاده)

۶) $\tan\theta = 5$ $\qquad \frac{3\sin\theta - \cos\theta}{\sin\theta - 4\cos\theta}$

$\frac{\sin\theta}{\cos\theta} = 5 \qquad 5\cos\theta = \sin\theta$

$\frac{15\cos\theta - \cos\theta}{\cos\theta} = \frac{14\cos\theta}{\cos\theta} = 14$

۷) $\sin\alpha = \frac{6}{10}$



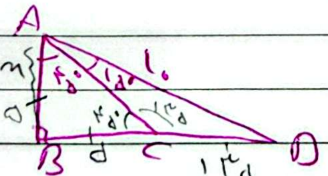
$6+7+7+8+10 = 38$ (محیط)

$\sin\alpha = \frac{6}{10} = \frac{6}{x}$ $\quad x = 10$

$36 + y^2 = 100$

$y^2 = 64 \quad y = 8$ (اندازه)

۸) $DC = ?$



$\hat{A} = 60°$

$\sin 30° = \frac{1}{2}$

$x = 5 \leftarrow \frac{x}{10}$

$\hat{D} = 30°$

$25 + (BD)^2 = 100$

$(BD)^2 = 75$

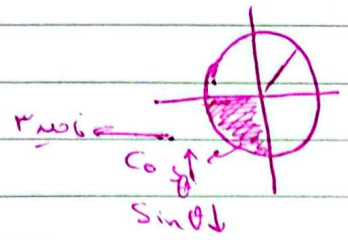
$BD = 5\sqrt{3}$

$5 + CD = 5\sqrt{3}$

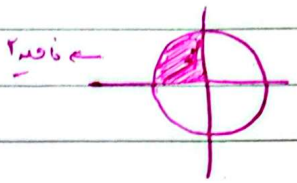
$CD = 5\sqrt{3} - 5$

$CD = 5(\sqrt{3}-1)$

۹) الف)



ب)



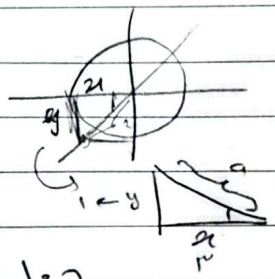
۱۰) $\tan\alpha = \frac{1}{3}$

ناحیه ۳ ← tan و cot ⊕

$\sin\alpha$ ؟ ← منفی

$\tan\alpha = \frac{\sin\alpha}{\cos\alpha} = \frac{1}{3}$

$\frac{y}{x} = \frac{1}{3}$



$1^2 + 9 = 10$ ← $\sqrt{10} = a$

$\sin\alpha = \frac{y}{a} = \frac{1}{\sqrt{10}}$