1- الف) $27^\circ = (x) Rad \Rightarrow \frac{27^\circ}{180^\circ} = \frac{Rad}{\pi} \Rightarrow \frac{3\pi}{20}$ ب) $125^\circ = (x) Rad \Rightarrow \frac{125}{180} = \frac{Rad}{\pi} \Rightarrow \frac{25\pi}{36}$

ج) $\frac{5\pi}{12} Rad = (x)^\circ \Rightarrow \frac{x}{180^\circ} = \frac{\frac{5\pi}{12}}{\pi} \Rightarrow \frac{x}{180} = \frac{5}{12} \Rightarrow x = 75^\circ$ د) $\frac{4\pi}{9} Rad = (x)^\circ \Rightarrow \frac{x}{180} = \frac{4}{9} \Rightarrow x = 80^\circ$

2- مرزاد $= 0/9^\circ \Rightarrow \frac{125a}{9}$ grad $= \frac{125a}{9}$ grad $\times 0/9 = 12/5a$

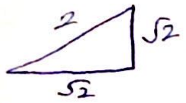
$\frac{a\pi}{8}$ اول $= \frac{a\pi}{8} \times \frac{180}{\pi} \Rightarrow \frac{180a}{8} = 22/5a$ $180 = 22/5a + 12/5a + 10a \Rightarrow 180 = 45a$

$\Rightarrow a = 4$

3- الف) $\cos 60^\circ \cos 30^\circ - \sin 60^\circ \sin 30^\circ - \tan 45 + 2\cot 45 = \frac{\sqrt{3}}{4} - \frac{\sqrt{3}}{4} - 1 + 2 = 1$

ب) $\frac{\tan^2 30^\circ + \tan^2 45^\circ + \tan^2 60^\circ}{\cot 30^\circ - \cot 60^\circ} = \frac{\frac{1}{3} + 1 + 3}{\sqrt{3} - \frac{\sqrt{3}}{3}} = \frac{\frac{1+12}{3}}{\frac{2\sqrt{3}}{3}} = \frac{13}{2\sqrt{3}}$

4- $\sin^2\theta = -\frac{1}{2} \times \frac{1}{2} + \frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2} = -\frac{1}{4} + \frac{3}{4} = \frac{2}{4} \Rightarrow \sin\theta = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2} \Rightarrow \theta = 45^\circ$



$\Rightarrow \tan\theta = \frac{\frac{\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}} = 1$

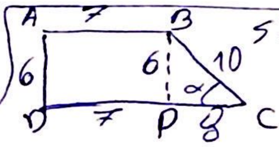
5- $\tan\theta = \frac{2\tan 30^\circ (1 - \tan^2 30^\circ)}{(1 - \cot^2 60^\circ)^2} = \frac{2 \times \frac{\sqrt{3}}{3} \times \frac{2}{3}}{(\frac{2}{3})^2} = \frac{\frac{4\sqrt{3}}{3}}{\frac{4}{3} \cdot 3} = \frac{\sqrt{3}}{3} \Rightarrow \theta = 30^\circ$

$\frac{30}{180} = \frac{Rad}{\pi} \Rightarrow Rad = \frac{\pi}{6}$

6- $\tan\theta = 5 \Rightarrow \frac{\sin\theta}{\cos\theta} = 5 \Rightarrow \sin\theta = 5, \cos\theta = 1$

$\frac{3\sin\theta - \cos\theta}{\sin\theta - 4\cos\theta} = \frac{3 \times 5 - 1}{5 - 4} = 14$

7-

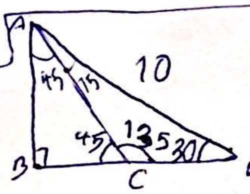


$\sin\alpha = \frac{6}{10} \Rightarrow BC = \frac{6}{\frac{6}{10}} = 10$

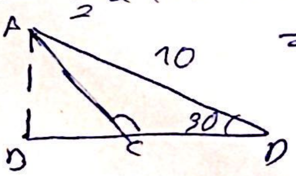
$CP^2 = 10^2 - 6^2 = 8^2 \Rightarrow CP = 8$

$AB + \underset{(7+8)}{DC} + BC + AD = 7 + 15 + 10 + 6 = 38$

8-



$\Rightarrow$



$BC = \frac{\sqrt{2}}{2} \times 10 = 5\sqrt{2} \Rightarrow CD = BD - BC = 5 - 5\sqrt{2}$

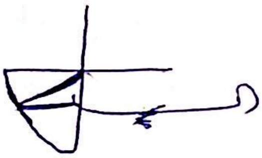
$\Rightarrow CD = 5 - 5\sqrt{2}$

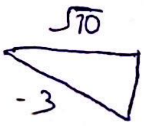
$\Rightarrow BD = \cos 30 \times 10 = 5$

9- الف) ناحیه یک مثلثاتی ← ناحیه دوم مثلثاتی

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

$\Rightarrow \frac{\sin x}{\cos x} = \frac{1}{3}$





$\Rightarrow \sin x = -\frac{1}{\sqrt{10}}$

چون در ناحیه سوم $\rightarrow \sin, \cos < 0 \Rightarrow \sin = -1, \cos = -3$

وتر$^2 = \sin^2 + \cos^2 \Rightarrow \sqrt{\text{وتر}^2} = 10 \Rightarrow$ وتر $= 10$