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الف) $\frac{\pi}{180} \times 77 = \frac{\pi}{20}$

ب) $125 \times \frac{\pi}{180} = \frac{125\pi}{180} = \frac{25\pi}{36}$

ج) $\frac{5\pi}{12} \times \frac{180}{\pi} = \frac{900}{12} = 75^\circ$

د) $\frac{4\pi}{9} \times \frac{180}{\pi} = \frac{720}{9} = 80^\circ$

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$\frac{125a}{9} \times \frac{9}{10} = 125a^\circ$

$\frac{a\pi}{8} \times \frac{180}{\pi} = \frac{180a}{8} = 225a^\circ$

$125a^\circ + 225a^\circ + 10a^\circ = 180^\circ$

$40a = 180^\circ$ $a = 4^\circ$

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$\cos 60^\circ = \frac{1}{2}$ $\cos 30^\circ = \frac{\sqrt{3}}{2}$ $\tan 45^\circ = \frac{\sqrt{2}}{\sqrt{2}} = 1$ $\cot 45^\circ = 1$ $\sin 60^\circ = \frac{\sqrt{3}}{2}$ ~~cos~~ $\sin 30^\circ = \frac{1}{2}$

$\underbrace{\left(\frac{1}{2} \times \frac{\sqrt{3}}{2}\right) - \left(\frac{\sqrt{3}}{2} \times \frac{1}{2}\right)}_{0} - 1 + 2 = -1 + 2 = \boxed{1}$

$\tan 30^\circ = \frac{1}{\sqrt{3}}$ $\tan 45 = 1$ $\tan 60 = \sqrt{3}$ $\cot 30^\circ = \sqrt{3}$ $\cot 60^\circ = \frac{1}{\sqrt{3}}$

ب) $= \frac{\left(\frac{1}{\sqrt{3}}\right)^2 + (1)^2 + \left(\sqrt{3}\right)^2}{\sqrt{3} - \frac{1}{\sqrt{3}}} = \frac{\frac{1}{3} + 1 + 3}{\frac{2}{\sqrt{3}}} = \frac{13}{3} \times \frac{\sqrt{3}}{2} = \frac{13\sqrt{3}}{6}$

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$\sin 30^\circ = \frac{1}{2}$ $\cos 60^\circ = \frac{1}{2}$ $\cos 30^\circ = \frac{\sqrt{3}}{2}$ $\sin 60^\circ = \frac{\sqrt{3}}{2}$ حاده یعنی در ناحیه اول

$\left(-\frac{1}{2} \times \frac{1}{2}\right) + \left(\frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2}\right) = -\frac{1}{4} + \frac{3}{4} = \frac{2}{4} = \frac{1}{2} = \sin^2\theta$ $\sin\theta = \sqrt{\frac{2}{2}}$

$\sin^2\theta + \cos^2\theta = 1 \longrightarrow \cos\theta = \frac{\sqrt{2}}{2}$

$\tan\theta = \frac{\sin\theta}{\cos\theta} = \frac{\frac{\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}} = \boxed{1}$

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$\tan\theta = \frac{2\tan 30^\circ (1 - \tan^2 30^\circ)}{(1 - \cot^2 60^\circ)^2} = \frac{2 \times \left(\frac{1}{\sqrt{3}}\right) \times \left(\frac{2}{3}\right)}{\frac{4}{9}} = \frac{\frac{4}{3\sqrt{3}}}{\frac{4}{9}}$

$1 - \tan^2 30^\circ = 1 - \frac{1}{3} = \frac{2}{3}$

$(1 - \cot^2 60^\circ)^2 = \left(\frac{2}{3}\right)^2 = \frac{4}{9}$

$= \sqrt{3} \Rightarrow \theta = 60^\circ$

$\theta = 60 \times \frac{\pi}{180} = \frac{60\pi}{180} = \frac{\pi}{3} \Rightarrow$ θ به رادیان

$\frac{\sin\theta}{\cos\theta} = 5$ $\quad \sin\theta = 5x$ $\quad \cos\theta = x$

$$\frac{3\sin\theta - \cos\theta}{\sin\theta - 2\cos\theta} = \frac{3(5x) - x}{5x - 2x} = \frac{14x}{3x} = 14$$

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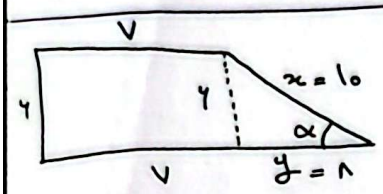

$\sin = \frac{\text{مقابل}}{\text{وتر}} = \frac{4}{x} \Rightarrow x = 10$

$10^2 = 4^2 + x^2 \Rightarrow y^2 = 64 \Rightarrow y = 8$

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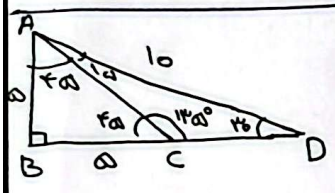
$V + 8 + 10 + V + 4 = 38 \longrightarrow P$



$2\alpha + 1\alpha = 90° \quad A$ $\quad 90° + 90° = 180°$ $\quad 180° - 150° = 30° = D$

$\sin 30° = \frac{\text{مقابل}}{\text{وتر}} \Rightarrow \frac{1}{2} = \frac{AB}{10}$

$AB = 5$ $\quad AB = BC \Rightarrow BC = 5$

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$AD^2 = AB^2 + BD^2 = 100$

$100 = 25 + 75$

$CD = \sqrt{75} - 5$

الف) ناحیه سوم

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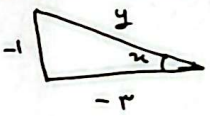
ب) ناحیه دوم

$\tan x = \frac{1}{3} = \frac{\text{مقابل}}{\text{مجاور}} = \frac{-1}{-3}$



$y = \sqrt{(-1)^2 + (-3)^2} = \sqrt{10}$

$\sin = \frac{\text{مقابل}}{\text{وتر}} = \frac{-1}{\sqrt{10}}$

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