

الف) $27^\circ = (x) \text{ rad}$ $\frac{D}{180} = \frac{\text{Rad}}{x}$ $x = \frac{27x}{180} = \frac{3x}{20}$
 ب) $12^\circ = (x) \text{ rad}$ $\frac{D}{180} = \frac{\text{Rad}}{x}$ $x = \frac{12x}{180} = \frac{2x}{30}$
 ج) $\frac{2x}{11} \text{ rad} = (x)^\circ$ $D = \frac{\text{Rad} \times 180}{x}$ $x = \frac{\frac{2x}{11} \times 180}{x} = 27^\circ$
 د) $\frac{2x}{9} \text{ rad} = (x)^\circ$ $D = \frac{\text{Rad} \times 180}{x}$ $x = \frac{\frac{2x}{9} \times 180}{x} = 40^\circ$

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$\frac{12a}{9} G = x^\circ$ $\frac{D}{180} = \frac{G}{x} = \frac{\text{Rad}}{x}$ $x = \frac{12a \times 180}{9 \times 10} = 24a$
 $\frac{a\pi}{1} \text{ Rad} = x^\circ$ $x = \frac{\frac{a\pi}{1} \times 180}{\pi} = 18a$
 $24a + 18a + 12a = 180$ $54a = 180$ $a = 3^\circ$

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الف) $\cos 40^\circ \cos 30^\circ - \sin 40^\circ \sin 30^\circ - \tan 18^\circ + 2 \cot 18^\circ = \left(\frac{1}{2} \times \frac{\sqrt{3}}{2}\right) - \left(\frac{\sqrt{3}}{2} \times \frac{1}{2}\right) - 1 + 2 = 1$

ب) $\frac{\tan^2 30^\circ + \tan^2 18^\circ + \tan^2 40^\circ}{\cot 30^\circ - \cot 40^\circ} = \frac{\left(\frac{\sqrt{3}}{3}\right)^2 + 1 + (\sqrt{3})^2}{\sqrt{3} - \frac{\sqrt{3}}{3}} = \frac{\frac{3}{9} + 1 + 3}{\frac{2\sqrt{3}}{3}} = \frac{\frac{39}{9}}{\frac{2\sqrt{3}}{3}} = \frac{39}{6\sqrt{3}} = \frac{13\sqrt{3}}{11}$

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$-\sin 30^\circ \cos 40^\circ + \cos 30^\circ \sin 40^\circ = \sin^2 \theta$
 $-\frac{1}{2} \times \frac{1}{2} + \frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2} = \sin^2 \theta$
 $-\frac{1}{4} + \frac{3}{4} = \sin^2 \theta$
 $\frac{2}{4} = \sin^2 \theta$
 $\frac{\sqrt{2}}{2} = \sin \theta$



$\tan \theta = ?$

$\sin^2 \theta = \frac{1}{2} \Rightarrow \sin \theta = \pm \frac{\sqrt{2}}{2} \Rightarrow \theta < 90^\circ \Rightarrow \frac{\sqrt{2}}{2}$

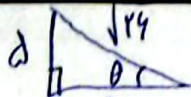
$\tan \theta = \frac{\sqrt{2}}{\sqrt{2}} = 1$

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$\frac{2 \tan 30^\circ (1 - \tan^2 30^\circ)}{(1 - \cot^2 40^\circ)^2} = \tan \theta$ $\frac{2 \times \frac{\sqrt{3}}{3} \left(1 - \left(\frac{\sqrt{3}}{3}\right)^2\right)}{\left(1 - \left(\frac{\sqrt{3}}{3}\right)^2\right)^2} = \frac{\frac{2\sqrt{3}}{3} - \frac{2\sqrt{3}}{9}}{1 + \frac{1}{9} - \frac{1}{3}} = \frac{\frac{4\sqrt{3}}{9}}{\frac{5}{9}} = \frac{4\sqrt{3}}{5}$
 $\theta < 90^\circ \Rightarrow \theta = 40^\circ = \frac{\pi}{5}$ $\tan \theta = \sqrt{3}$

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$$\tan \theta = d$$

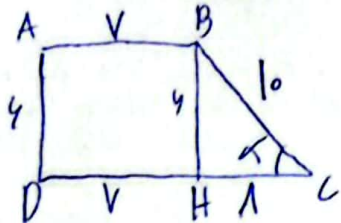


$$\sin \theta = \frac{d}{\sqrt{1+d^2}}$$

$$\cos \theta = \frac{1}{\sqrt{1+d^2}} \Rightarrow + \frac{1}{\sqrt{1+d^2}} - \frac{1}{\sqrt{1+d^2}}$$

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

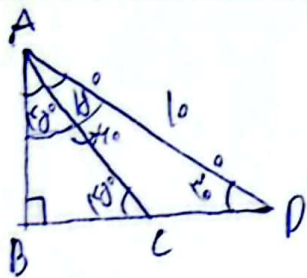
$$\frac{1 \times \frac{-d}{\sqrt{1+d^2}} + \frac{1}{\sqrt{1+d^2}}}{-\frac{d}{\sqrt{1+d^2}} + \frac{1}{\sqrt{1+d^2}}} = \frac{\frac{-1d+1}{\sqrt{1+d^2}}}{\frac{-d+1}{\sqrt{1+d^2}}} = \frac{-1d+1}{-d+1} = 1$$



$$\sin \alpha = \frac{BH}{BC} = \frac{4}{10} = \frac{4}{BC} \Rightarrow BC = 10$$

$$CH = \sqrt{10^2 - 4^2} = \sqrt{84} = 1$$

$$AP = 4 + 10 + 4 + 1 = 19$$



$$DC = ?$$

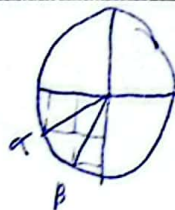
$$BD = \frac{\sqrt{2}}{2} \times 10 = 5\sqrt{2}$$

$$AB = \frac{1}{\sqrt{2}} \times 10 = 5 = BC$$

$$DC = BD - BC = 5\sqrt{2} - 5 = 5(\sqrt{2} - 1)$$

اخرى (الف)

اخرى (ب)

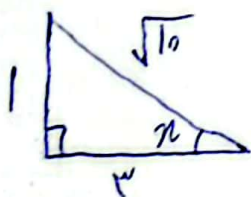


$$\beta > \alpha$$

$$\cos \beta > \cos \alpha, \sin \beta < \sin \alpha$$

$$\beta > \alpha$$

$$\cos \beta < \cos \alpha, \sin \beta < \sin \alpha$$



$$\sin n < 0, \cos n < 0$$

$$\sin n = -\frac{1}{\sqrt{10}} = -\frac{\sqrt{10}}{10}$$