

# SET 1: Basic Mathematics

## Tutorial 9

1. Find the complement and the supplement of  $54.27^\circ$ . [Ans.  $35.73^\circ$ ,  $125.73^\circ$ ]

2. Convert each of the following to radians:

(a)  $150^\circ$  [Ans.  $\frac{5}{6}\pi$  radians]      (b)  $210^\circ$  [Ans.  $\frac{7}{6}\pi$  radians]

3. Convert each of the following to degrees:

(a)  $\frac{7}{3}\pi$  [Ans.  $420^\circ$ ]      (b)  $\frac{8}{9}\pi$  [Ans.  $160^\circ$ ]

4. Find the complement and the supplement of  $\frac{3}{7}\pi$ . [Ans.  $\frac{\pi}{14}$ ,  $\frac{4}{7}\pi$ ]

5. Find the length of an arc of a circle of radius 22 cm associated with an angle of  $\frac{3}{11}\pi$ . [Ans.  $6\pi$ ]

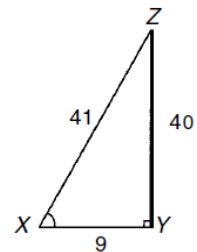
6. Find the area of a sector with a central angle of  $180^\circ$  and a radius of 20 m. [Ans.  $628\text{ m}^2$ ]

7. Find the area of a sector with a central angle of 2.54 radians and a radius of 30m. [Ans.  $1143\text{ m}^2$ ]

8. In the right-angled triangle shown below, find the six trigonometric function values for the angles:

(a) X [Ans.  $\sin X = \frac{40}{41}$ ,  $\cos X = \frac{9}{41}$ ,  $\tan X = \frac{40}{9}$ ,  $\sec X = \frac{41}{9}$ ,  $\csc X = \frac{41}{40}$ ,  $\cot X = \frac{9}{40}$ ]

(b) Z [Ans.  $\sin Z = \frac{9}{41}$ ,  $\cos Z = \frac{40}{41}$ ,  $\tan Z = \frac{9}{40}$ ,  $\sec Z = \frac{41}{40}$ ,  $\csc Z = \frac{41}{9}$ ,  $\cot Z = \frac{40}{9}$ ]

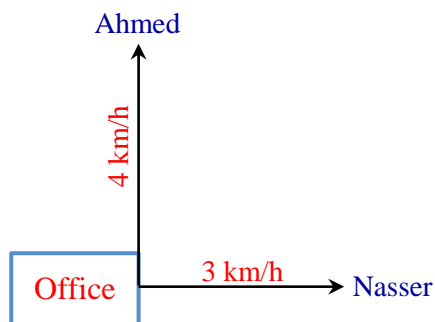


9. Given that  $\sin \alpha = \frac{7}{\sqrt{85}}$ ,  $\cos \alpha = \frac{6}{\sqrt{85}}$ , and  $\tan \alpha = \frac{7}{6}$ , find  $\csc \alpha$ ,  $\sec \alpha$ , and  $\cot \alpha$ .

[Ans.  $\csc \alpha = \frac{\sqrt{85}}{7}$ ,  $\sec \alpha = \frac{\sqrt{85}}{6}$ , and  $\cot \alpha = \frac{6}{7}$ .]

10. Ahmed and Nasser leave their job at the same time. Ahmed walks due north at an average speed of 4 km/h and Nasser due east at an average speed of 3 km/h. Calculate their distance apart after one hour.

[Ans. 5 km]



11. Khalid is standing on the top of a 2.4 m height staircase and his eyes level is 1 m above the top of this staircase. He is looking at his toy on the ground which is 6.8 m away from his eyes. Find the angle of depression from where he is looking at his toy. [Ans.  $30^\circ$ ]

