5.1 Angles and Their Measurements

1. Let R_{PQ} be a ray as drawn, horizontally.

   Draw a second ray R_{PM} such that the angle $\angle QPM$ has:

   (a) 60°
   (b) 120°
   (c) 135°
   (d) 160°
   (e) 210°
   (f) 225°
   (g) 240°
   (h) 270°

2. Let D be a disc centered at P with radius 3. In each one of the above cases find the area of the sector in the disc cut out by the two rays.

3. What is the area of the region lying between two circles having the same center, of radii 3 and 4, and bounded by angles of:

   (a) 60° and 70°
   (b) 110∘ and 270°
   (c) 65° and 120°
   (d) 240° and 310°

4. What is the length of the arc s of a circle of the given radius r intercepted by the given angle of measure θ radians.

   (a) $r = 3$ and $\theta = \pi/3$ radians
   (b) $r = 5$ and $\theta = \pi/4$ radians

5. Give the following values of angle in radians, as a fractional multiple of π.

   (a) 15°
   (b) 75°
   (c) 105°
   (d) 120°
   (e) 135°
   (f) 150°
   (g) 165°
   (h) 20°
   (i) 40°
   (j) 140°
   (k) 310°

6. Find the measure in degrees (between 0° and 360°) for the following angles given in radians.

   (a) $-\frac{\pi}{4}$
   (b) $\frac{8\pi}{9}$
   (c) $\frac{5\pi}{9}$
   (d) $\frac{7\pi}{4}$
   (e) $\frac{14\pi}{3}$
   (f) $\frac{22\pi}{3}$
   (g) $-\frac{\pi}{3}$