

Homework Math 48C Mitchell Schoenbrun (Correction 1)

6.1 P. 440 6, 10, 16, 19, 25, 27, 30, 35, 36, 51, 52, 53, 57, 58, 62, 63, 67, 70, 72, 76, 77

Find the radian measure of the angle with the given degree measure

$$6) -60^\circ \quad -60^\circ \times \frac{\pi}{180^\circ} = -\frac{\pi}{3} \text{ Radians}$$

$$10) 3960^\circ \quad 3960^\circ \times \frac{\pi}{180^\circ} = 22\pi \text{ Radians}$$

Find the degree measure of the angle with the given radian measure

$$16) \frac{11\pi}{3} \quad \frac{11\pi}{3} \times \frac{180^\circ}{\pi} = 660^\circ$$

$$19) 3 \quad 3 \times \frac{180^\circ}{\pi} = \frac{540^\circ}{\pi} \approx 171.9^\circ$$

$$25) -\frac{2\pi}{15} \quad -\frac{2\pi}{15} \times \frac{180^\circ}{\pi} = -24^\circ$$

The measure of an angle in standard position is given. Find two positive angles and two negative angles that are co-terminal.

$$27) 50^\circ \quad \begin{array}{l} 50^\circ + 360^\circ = 410^\circ \quad 50^\circ + 720^\circ = 770^\circ \\ 50^\circ - 360^\circ = -310^\circ \quad 50^\circ - 720^\circ = -670^\circ \end{array}$$

$$30) \frac{11\pi}{6} \quad \begin{array}{l} \frac{11\pi}{6} + 2\pi = \frac{23\pi}{6} \quad \frac{11\pi}{6} + 4\pi = \frac{35\pi}{6} \\ \frac{11\pi}{6} - 2\pi = -\frac{\pi}{6} \quad \frac{11\pi}{6} - 4\pi = -\frac{13\pi}{6} \end{array}$$

The measures of two angles in standard position are given. Determine whether the angles are co-terminal.

$$35) \frac{5\pi}{6}, \frac{17\pi}{6} \quad \frac{5\pi}{6} + 2\pi = \frac{17\pi}{6} \text{ so Yes!}$$

$$36) \frac{32\pi}{3}, \frac{11\pi}{3} \quad \frac{32\pi}{3} - \frac{11\pi}{3} = 7\pi \text{ which is not divisible by } 2\pi \text{ so No!}$$

51) Find the length of the arc s in the figure.

$$\text{First find the angle measure of the arc in the circle: } 360^\circ - 140^\circ = 220^\circ$$

$$\text{The length of the arc can now be found with } r = 5, s = 2\pi r \cdot \frac{220^\circ}{360^\circ} = \frac{55\pi}{9}$$

52) Find the angle θ in the figure.

$$\text{The radian measure is } \theta = \frac{10}{5} = 2 \text{ Radians}$$

53) Find the radius r of the circle in the figure.

$$\text{Since } \frac{s}{r} = 2 \text{ Radians} \rightarrow r = \frac{1}{2}s = 4$$

57) An arc of length 100 m subtends a central angle θ in a circle of radius 50m. Find the measure of θ in degrees and in radians.

$$\theta = \frac{s}{r} = \frac{100m}{50m} = 2 \text{ Radians} \rightarrow 2 \text{ Radians} \times \frac{180^\circ}{\pi} = \frac{360^\circ}{\pi} \approx 114.6^\circ$$

58) A circular arc of length 3 ft. subtends a central angle of 25° . Find the radius of the circle.

First convert to radians. $25^\circ \times \frac{\pi}{180^\circ} = \frac{5\pi}{36} \text{ Radians}$

$$\text{Since } s = r\theta \rightarrow 3 \text{ ft} = r \frac{5\pi}{36} \rightarrow r = 3 \frac{36}{5\pi} \text{ ft} = \frac{108}{5\pi} \text{ ft} \approx 6.88 \text{ ft}$$

62) Find the radius of each circle if the area of the sector is 12.

(a) $\frac{.7}{2\pi} \pi r^2 = 12 \rightarrow r^2 = \frac{24}{.7} \rightarrow r = \sqrt{\frac{24}{.7}} \approx 1.85$

b) $\frac{150^\circ}{360^\circ} \pi r^2 = 12 \rightarrow r^2 = \frac{144}{5\pi} \rightarrow r = \sqrt{\frac{144}{5\pi}} \approx 3.03$

63) Find the area of a sector with central angle 1 rad in a circle of radius 10m.

$$A = \frac{1}{2\pi} \pi r^2 = 50m^2$$

67) The area of a circle is 72 cm^2 . Find the area of a sector of this circle that subtends a central angle of $\frac{\pi}{6}$ rad. $A = 72 \text{ cm}^2 \times \frac{\pi/6}{2\pi} = 6 \text{ cm}^2$

70) **Wheels Revolutions** How many revolutions will a car wheel of diameter 30 in. make as the car travels a distance of one mile.

Circumference of the wheel = $\pi \times 30in = 30\pi in$.

One mile = 5280ft = 5280x12 in.

$$\frac{5280 \times 12in.}{30\pi in.} = \frac{2112}{\pi} in. \approx 672 \text{ Revolutions}$$

72) **Latitudes** Memphis, Tennessee, and New Orleans, Louisiana lie approximately on the same meridian. Memphis has a latitude of 35°N and New Orleans has a latitude of 30°N. Find the distance between these two cities. (The radius of the earth is 3960mi.).

$$35^\circ - 30^\circ = 5^\circ$$

$$D = \frac{5^\circ}{360^\circ} \times 2\pi \times 3960 \text{ mi} = 110\pi \text{ mi.} \approx 346 \text{ mi.}$$

76) **Irrigation** An irrigation system uses a straight sprinkler pipe 300 ft. long that pivots around a central point as shown. Due to an obstacle the pipe is allowed to pivot through 280° only. Find the area irrigated by this system.

$$A = \pi(300 \text{ ft})^2 \times \frac{280^\circ}{360^\circ} = 70000\pi \text{ ft}^2 \approx 219911 \text{ ft}^2$$

77) **Windshield Wipers** The top and bottom ends of a windshield wiper blade are 34 in. and 14 in. respectively, from the pivot point. While in operation the wiper sweeps through 135°. Find the area swept by the blade.

$$A = \left[\pi(34in)^2 - \pi(14in)^2 \right] \times \frac{135^\circ}{360^\circ} = \pi(1156 - 196) \times \frac{3}{8} = 360\pi \approx 1131 \text{ in}^2$$