

## Solutions: 6.3 (odd-numbered problems)

---

19.  $\sin \frac{2\pi}{3} = \frac{\sqrt{3}}{2}$ .

21.  $\sin \frac{3\pi}{2} = -1$

31. Quadrant III

41. Since  $\sin^2 \theta + \cos^2 \theta = 1$ , then

$$\cos \theta = \pm \sqrt{1 - \sin^2 \theta} = \pm \frac{4}{5}$$

Since we are in quadrant II, then cosine is negative, so in fact  $\cos \theta = -\frac{4}{5}$ . Then we know the rest:

$$\tan \theta = -\frac{3}{4}, \quad \csc \theta = \frac{5}{3}, \quad \sec \theta = -\frac{5}{4}, \quad \cot \theta = -\frac{4}{3}$$

43. Since  $1 + \tan^2 \theta = \sec^2 \theta$ , then

$$\sec^2 \theta = \frac{1}{\cos^2 \theta} = 1 + \left(-\frac{3}{4}\right)^2 = \frac{25}{16}$$

and so

$$\cos^2 \theta = \frac{16}{25}$$

and since  $\cos \theta > 0$ , then  $\cos \theta = \frac{4}{5}$ . Then  $\sin \theta = \tan \theta \cos \theta = -\frac{3}{4} \cdot \frac{4}{5} = -\frac{3}{5}$ . And so now:

$$\csc \theta = -\frac{5}{3}, \quad \sec \theta = \frac{5}{4}, \quad \cot \theta = -\frac{4}{3}$$

47. Since  $\cos \theta$  and  $\tan \theta$  are both negative, then  $\sin \theta$  is positive. Since  $\sin^2 \theta + \cos^2 \theta = 1$ , then

$$\sin \theta = \sqrt{1 - \cos^2 \theta} = \sqrt{1 - \left(-\frac{2}{7}\right)^2} = \sqrt{\frac{45}{49}} = \frac{\sqrt{45}}{7}$$

And so

$$\tan \theta = -\frac{\sqrt{45}}{2}, \quad \sec \theta = -\frac{7}{2}, \quad \csc \theta = \frac{7}{\sqrt{45}}, \quad \cot \theta = -\frac{2}{\sqrt{45}}$$

51. By the formula,

$$\text{area} = \frac{1}{2}(10)(22)(\sin 10) \approx 19.1013$$