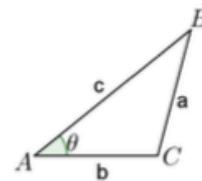1. Find the area of the triangle ABC shown to the right, with the following data:

    a. $\theta = \frac{\pi}{6}, b = 3$, and $c = 6$.

    $$\frac{1}{2}\left(b \cdot c \cdot \sin\left(\frac{\pi}{6}\right)\right) = \frac{1}{2}\left(18 \cdot \frac{1}{2}\right) = \frac{9}{2}$$

    The area is $\frac{9}{2}$ square units.

    b. $\theta = \frac{\pi}{3}, b = 4$, and $c = 8$.

    $$\frac{1}{2}\left(b \cdot c \cdot \sin\left(\frac{\pi}{3}\right)\right) = \frac{1}{2}\left(32 \cdot \frac{\sqrt{3}}{2}\right) = 8\sqrt{3}$$

    The area is $8\sqrt{3}$ square units.

    c. $\theta = \frac{\pi}{4}, b = 5$, and $c = 10$.

    $$\frac{1}{2}\left(b \cdot c \cdot \sin\left(\frac{\pi}{4}\right)\right) = \frac{1}{2}\left(50 \cdot \frac{\sqrt{2}}{2}\right) = \frac{25\sqrt{2}}{2}$$
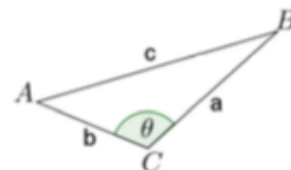
    The area is $\frac{25\sqrt{2}}{2}$ square units.

2. Find the area of the triangle ABC shown to the right, with the following data:

    a. $\theta = \frac{3\pi}{4}, a = 6$, and $b = 4$.

    $$\frac{1}{2}\left(a \cdot b \cdot \sin\left(\frac{\pi}{4}\right)\right) = \frac{1}{2}\left(24 \cdot \frac{\sqrt{2}}{2}\right) = 6\sqrt{2}$$

    The area is $6\sqrt{2}$ square units.

    b. $\theta = \frac{5\pi}{6}, a = 4$, and $b = 3$.

    $$\frac{1}{2}\left(a \cdot b \cdot \sin\left(\frac{\pi}{6}\right)\right) = \frac{1}{2}\left(12 \cdot \frac{1}{2}\right) = 3$$
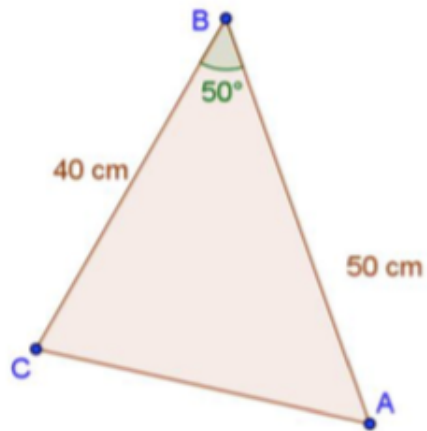
    The area is 3 square units.

6.6 PS Ans

3. Find the area of each triangle shown below. State the area to the nearest tenth of a square centimeter.

a.
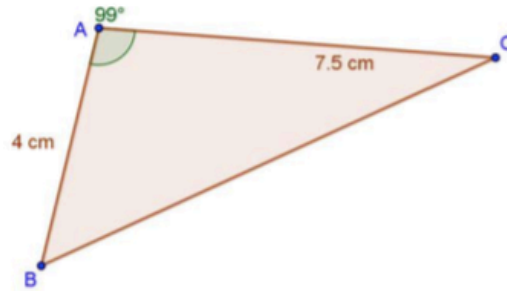
$$A = \frac{1}{2} \cdot 4 \cdot 7.5 \cdot \sin(99°) \approx 14.8$$

The area is approximately 14.8 sq. cm.

b.

$$A = \frac{1}{2} \cdot 40 \cdot 50 \cdot \sin(50°) \approx 766.0$$

The area is approximately 766 sq. cm.

4. The diameter of the circle O in the figure shown to the right is $EB = 10$.
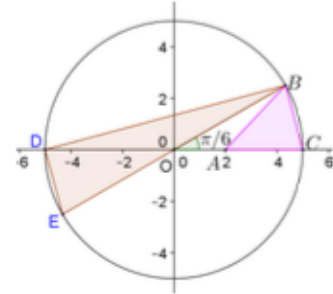
   a. Find the area of the triangle OBA.

   $$\frac{1}{2}\left(2 \cdot 5 \cdot \sin\left(\frac{\pi}{6}\right)\right) = \frac{1}{2}\left(2 \cdot 5 \cdot \frac{1}{2}\right) = \frac{5}{2}$$

   The area is $\frac{5}{2}$ square units.

   b. Find the area of the triangle ABC.

   $$\frac{1}{2}(bh) = \frac{1}{2}\left(3 \cdot \frac{5}{2}\right) = \frac{15}{4}$$

   The area is $\frac{15}{4}$ square units.

   c. Find the area of the triangle DBO.

   $$\frac{1}{2}(bh) = \frac{1}{2}\left(5 \cdot \frac{5}{2}\right) = \frac{25}{4}$$

   The area is $\frac{25}{4}$ square units.

   d. Find the area of the triangle DBE.

   The area of triangle DBE is the sum of the areas of triangles DBO, OBA, and ABC.

   $$\frac{25}{4} + \frac{15}{4} + \frac{5}{2} = \frac{50}{4}$$

   The area of triangle DBE is $\frac{50}{4}$ square units.