10.6 Perimeter of Circles and Lengths of Arcs

**Learning Targets:** The students will learn
- the vocabulary of circles
- how to find the perimeter of a circle
- how to find fractions of the perimeter

A. Perimeter of Circles and Arcs

**Vocabulary**
- diameter and radius
- arcs (minor, major, semicircle)
- central angle (and arc measure)
- Congruent and Concentric Circles

**Arc Measure is in degrees**
**Arc Length is in other units**
(in, cm, ft...)
B. Find the length of the arc subtended by the 40 degree central angle.

\[
\text{Circumference} \quad C = \pi d \quad \text{or} \quad C = 2\pi r
\]

\[
\text{Arc Length} = \text{fraction of the total circumference}
\]

\[
\text{length of } \widehat{AB} = \frac{m\widehat{AB}}{360} \cdot 2\pi
\]

Problems

1. Find the circumference of a circle with a diameter of 12 inches. Leave your answer exact.

\[
C = \pi d \\
C = 12\pi \text{ in.} \\
\text{Approx} \approx 37.7 \text{ in.}
\]

2. Find the length of a semicircle with radius 1.3 m. Leave answer in terms of \(\pi\).

\[
\frac{\pi}{2} \cdot (1.3\pi) \text{ m} = \frac{3.9\pi}{2} \text{ m}
\]

3. Find the length of \(\overline{ADB}\) in circle \(M\) in terms of \(\pi\).

4. Find the length of the radius if the circumference is 16\(\pi\) units.
5. The wheel of an adult's bike has a radius of 14 in. The wheel of a child's bike has a radius of 8 in. To the nearest inch, how much further does the adult wheel travel in FIVE revolutions than the smaller wheel?

Adult C $\to$ $2(14)\pi = 28\pi \rightarrow 140\pi$  \[ \text{5 Rev.} \]
Child C $\to$ $2(8)\pi = 16\pi \rightarrow 80\pi$  

$\approx 189 \text{ in.}$  \[ 60\pi \]

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Homework

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