Course: 7th Grade Math

**Student Objective**
(Obj. 4b) TSW… find the circumference and area of circles.

**Lesson**
8-5  Textbook Pages: 394-397

**Homework**
Perimeter / Area Half Sheet  (5 problems)

**Last Night’s Homework**
Area Worksheet (Berg created, 8 problems)

**Bellwork**
Get green quick notes and calculator. Work perimeter/area study guide problem #'s 1, 2, 5, 6, 7, 8

**Prior Knowledge**
- Review answers to the bellwork. Review last night's homework.
- Earlier in the week, we learned how to find the Perimeter of the different kinds of shapes. The perimeter is the distance around a figure.
- We also, learned how to calculate the Area of different shapes: Parallelograms, Trapezoids and Triangles!
- Does anyone remember a Real Life situation where you would use or see “perimeter” or “area”? Wait for student response. Hint…. I showed you a PowerPoint called “Areas of Disaster”. Does that ring a bell?
  Students will say..... Tornado disaster area, Rope off an area of a crime scene, Oil spill, Hurricane Katrina ..... 

**Anticipatory Set**
- Now, there is one more shape we need to talk about… Circles!
- Play X-Files audio.
- Show “Crop Circles” PowerPoint. Crop Circles… Are they Real or a Hoax?

**Teacher Input**
- Pass out student notes.
- Pass out green quick notes (area formula sheets).
- Define radius, diameter, and pi.
- Explain how to find the circumference of a circle using a formula. $C = \pi d$
- Have students work two you-try problems (independently).
- Explain how to find the area of a circle using a formula. $A = \pi r^2$
- Have students work two you-try problems (independently).
- Classwork: “Crop Circle Math”. (Kagan RallyRobin)
  TSW find the circumference and area of a real life crop circle.

**Extra Practice:**
FSP Pages 36, 44 (circled only)
Students may begin their study guide for test.

**Assessment**
Observation and questioning. Major text next class.

**Closure**
1) What formula do you use to find the circumference of a circle? $C = \pi d$
2) How do you find the circumference of a circle if they give you a radius instead of the diameter?
   First find the diameter: $2 \times r$, then $C = \pi d$
3) What formula do you use to find the area of a circle? $A = \pi r^2$
4) How do you find the area of a circle if you are given the diameter instead of the radius?
   First find the radius: $r = d \div 2$, then $A = \pi r^2$
New Vocabulary

Radius - Is the distance from the center of the circle to the outer edge.
Diameter - Is the distance from one side of the circle to the other.
Pi - Is a number used when working with circles. (Also known as 3.14)
The symbol for pi is $\pi$.

Finding the Circumference

The distance around a circle is call it’s Circumference (C).
Pi is a number used when working with circles. Also know as $\pi = 3.14$.

\[ C = \pi d \]
\[ C = \frac{3.14 \times 14}{3.14 \times 14} \]

Finding the Area

The Area (A) is the amount of space inside a circle.

\[ A = \pi r^2 \]
\[ A = \frac{3.14 \times 8^2}{3.14 \times 8^2} \]
Crop Circle Math!

Top circle: 15 ft diameter
Bottom circle: 17 ft diameter
Left circle: 16 ft diameter
Right circle: 14 ft diameter
Center circle: 64 ft diameter

Circumference is the distance around a circle. Find the circumference of each circle below.

\[ C = \pi d \]

Top circle \[ C = \underline{\quad} \text{ ft} \]
Bottom circle \[ C = \underline{\quad} \text{ ft} \]
Left circle \[ C = \underline{\quad} \text{ ft} \]
Right circle \[ C = \underline{\quad} \text{ ft} \]
Center circle \[ C = \underline{\quad} \text{ ft} \]

Area is the amount of space inside the circle. Find the area of each circle below.

\[ A = \pi r^2 \]

Top circle \[ r = \underline{\quad} \quad A = \underline{\quad} \text{ ft}^2 \]
Bottom circle \[ r = \underline{\quad} \quad A = \underline{\quad} \text{ ft}^2 \]
Left circle \[ r = \underline{\quad} \quad A = \underline{\quad} \text{ ft}^2 \]
Right circle \[ r = \underline{\quad} \quad A = \underline{\quad} \text{ ft}^2 \]
Center circle \[ r = \underline{\quad} \quad A = \underline{\quad} \text{ ft}^2 \]
Crop Circle Math!

Top circle: 15 ft diameter
Bottom circle: 17 ft diameter
Left circle: 16 ft diameter
Right circle: 14 ft diameter
Center circle: 64 ft diameter

Circumference is the distance around a circle. Find the circumference of each circle below.

\[ C = \pi d \]

- Top circle: \( C = 47.1 \text{ ft} \) \[ 3.14 \times 15 \]
- Bottom circle: \( C = 53.38 \text{ ft} \) \[ 3.14 \times 17 \]
- Left circle: \( C = 50.24 \text{ ft} \) \[ 3.14 \times 16 \]
- Right circle: \( C = 43.96 \text{ ft} \) \[ 3.14 \times 14 \]
- Center circle: \( C = 200.96 \text{ ft} \) \[ 3.14 \times 64 \]

Area is the amount of space inside the circle. Find the area of each circle below.

\[ A = \pi r^2 \]

- Top circle: \( r = 7.5 \) \( A = 176.625 \text{ ft}^2 \) \[ 3.14 \times 7.5^2 \]
- Bottom circle: \( r = 8.5 \) \( A = 226.865 \text{ ft}^2 \) \[ 3.14 \times 8.5^2 \]
- Left circle: \( r = 8 \) \( A = 200.96 \text{ ft}^2 \) \[ 3.14 \times 8^2 \]
- Right circle: \( r = 7 \) \( A = 153.86 \text{ ft}^2 \) \[ 3.14 \times 7^2 \]
- Center circle: \( r = 32 \) \( A = 3,215.36 \text{ ft}^2 \) \[ 3.14 \times 32^2 \]
Circumference of a Circle

Circumference \((C)\) is the distance around a circle. There are two formulas you can use to find circumference. Each formula uses \(\pi\). Let \(\pi = 3.14\).

\[
\begin{align*}
C &= \pi \cdot d \\
C &= 3.14 \cdot 6 \\
C &= 18.84 \text{ m} \\
\hline
C &= \pi \cdot d \\
C &= 3.14 \cdot 7.5 \\
C &= 23.55 \text{ mm} 
\end{align*}
\]

Find the circumference of each circle. Round to the nearest tenth. You may use a calculator.

1. \(r = 6 \text{ cm}\)
   \[
   C = _____
   \]

2. \(d = 9 \text{ m}\)
   \[
   C = _____
   \]

3. \(r = 2.5 \text{ in.}\)
   \[
   C = _____
   \]

4. \(d = 25 \text{ mm}\)
   \[
   C = _____
   \]

5. \(r = 1.5 \text{ mi.}\)
   \[
   C = _____
   \]

6. \(d = 50.5 \text{ m}\)
   \[
   C = _____
   \]
Circumference of a Circle

Circumference (C) is the distance around a circle. There are two formulas you can use to find circumference. Each formula uses π. Let π = 3.14.

<table>
<thead>
<tr>
<th>d = 3.2</th>
<th>C = \pi \cdot d</th>
</tr>
</thead>
<tbody>
<tr>
<td>r = 3 m</td>
<td>C = 3.14 \cdot d</td>
</tr>
<tr>
<td></td>
<td>C = 18.84 m</td>
</tr>
</tbody>
</table>

Find the circumference of each circle. Round to the nearest tenth. You may use a calculator.

1. r = 5 cm
   - C = 31.4 m

2. r = 2.5 in.
   - C = 15.7 in

3. d = 25 mm
   - C = 78.5 mm

FS-10218 Introduction to Geometry
Area of Circles

To find the area of a circle, use the formula \( \pi r^2 \). Work with a calculator or on scratch paper. Round your answers to the nearest tenth. Write your answers in square units.

- \( r = 2 \text{ mm} \)
  - \( A = \pi r^2 \)
  - \( A = 3.14 \cdot (2)^2 \)
  - \( A = 3.14 \cdot 4 \)
  - \( A = 12.56 \text{ mm}^2 \)

**A.**

1. \( 10 \text{ cm} \)
   - \( A = \) ____________
2. \( 4.5 \text{ mm} \)
   - \( A = \) ____________
3. \( 10.3 \text{ yd.} \)
   - \( A = \) ____________

**B.**

1. \( 1.5 \text{ m} \)
   - \( A = \) ____________
2. \( 4.1 \text{ ft.} \)
   - \( A = \) ____________
3. \( 14.5 \text{ in.} \)
   - \( A = \) ____________

**C.**

1. \( 12.3 \text{ dm} \)
   - \( A = \) ____________
2. \( 9 \text{ mm} \)
   - \( A = \) ____________
3. \( 0.8 \text{ cm} \)
   - \( A = \) ____________
Area of Circles

To find the area of a circle, use the formula $\pi r^2$. Work with a calculator or on scratch paper. Round your answers to the nearest tenth. Write your answers in square units.

A.

\[
\text{A} = \pi r^2
\]

\[
A = 3.14 \cdot (2)^2
\]

\[
A = 3.14 \cdot 4
\]

\[
A = 12.56 \text{ mm}^2
\]

\[
\text{A} = 314 \text{ cm}^2
\]

\[
\text{A} = 63.6 \text{ mm}^2
\]

\[
\text{A} = 333.1 \text{ yd}^2
\]

B.

\[
\text{A} = 7.1 \text{ m}^2
\]

\[
\text{A} = 52.8 \text{ ft}^2
\]

\[
\text{A} = 660.2 \text{ in}^2
\]

C.

\[
\text{A} = 475.1 \text{ dm}^2
\]

\[
\text{A} = 254.3 \text{ mm}^2
\]

\[
\text{A} = 2 \text{ dm}^2
\]
1) What is the perimeter of the following regular hexagon?

\[ P = \text{________ } \text{in} \]

2) What is the perimeter & area of this shape?

\[ P = \text{________ } \text{in} \]
\[ A = \text{________ } \text{in}^2 \]

3) James is building a circular deck that is 10 ft. in diameter. What is the area of the deck. \( \text{_____} \text{ft}^2 \)

4) Jimmy races around a track that is 100 m in diameter.

What is the distance he travels in 1 rotation \textit{around} the track? \( \text{_______} \text{m} \)

Be careful! Does the word \textit{around} pertain to area or circumference?

5) Find the area of the shaded region of this irregular figure. \( \rightarrow \)

\[ \text{Hint: } \text{Find the area of the triangle: } \text{A} = \text{_______} \]
\[ \text{Subtract the area of the rectangle: } \text{A} = \text{_______} \]

\[ \text{Area of the shaded region} = \text{_______} \text{ft}^2 \]
<table>
<thead>
<tr>
<th>Area Formulas</th>
<th>Circles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parallelogram  $A = b \times h$</td>
<td>Circumference $C = \pi d$</td>
</tr>
<tr>
<td>Rhombus       $A = b \times h$</td>
<td>Area $A = \pi r^2$</td>
</tr>
<tr>
<td>Rectangle     $A = b \times h$</td>
<td></td>
</tr>
<tr>
<td>Square        $A = b \times h$</td>
<td></td>
</tr>
<tr>
<td>Triangle      $A = \frac{1}{2} \times b \times h$</td>
<td></td>
</tr>
<tr>
<td>Trapezoid     $A = \frac{1}{2} \times (b_1 + b_2) \times h$</td>
<td></td>
</tr>
</tbody>
</table>
1) What is the perimeter of the following regular hexagon?

\[ P = 36 \text{ in} \]

2) What is the perimeter & area of this shape?

\[ P = 82 \text{ in}, \quad A = 336 \text{ in}^2 \]

3) James is building a circular deck that is 10 feet in diameter. What is the area of the deck? 78.5 ft²

4) Jimmy races around a track that is 100 m in diameter. What is the distance he travels in 1 rotation around the track? 314 m

Be careful! Does the word \textit{around} pertain to area or circumference?

5) Find the area of the shaded region of this irregular figure. \rightarrow

\textbf{Hint:} Find the area of the triangle: \[ A = 63 \]

Subtract the area of the rectangle: \[ A = 19.5 \]

Area of the shaded region = 43.5 ft²