Distance Around a Plane Figure (Section 13.1 Continued)

The **perimeter** of a simple closed curve is the length of the curve.

**For a Polygon:**

**Examples:**

a. Find the perimeter of a rectangle of length \( l \) and width \( w \).

\[
\text{rectangle}
\]

\( l \)
\( w \)

b. Find the perimeter of a regular \( n \)-gon of side length \( s \).

\[
\text{regular polygons}
\]

4 sides 5 sides 6 sides \( n \) sides

**For a Circle:**

\[
\text{circle}
\]

\( d \)
\( r \)
Activity:
1. Trace your circle onto a piece of patty paper by tracing around the base of your cylinder. Fold the circle in half to find the diameter. Measure the length of the diameter, \( d \), as accurately as possible.
2. Wrap the strip of paper around your cylinder and mark where it meets itself. Measure the length of the paper to your mark. This will be the circumference, \( C \), of your circle.
3. Calculate \( \frac{C}{d} \). Record all of your results in the table below.

<table>
<thead>
<tr>
<th>Object</th>
<th>Diameter</th>
<th>Circumference</th>
<th>( C/d )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foam Cylinder</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tall Cylinder</td>
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<td></td>
<td></td>
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<tr>
<td>Power Solid Cylinder</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium Cylinder</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short Cylinder</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Toothpicks</td>
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<td></td>
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</tr>
<tr>
<td>Fraction Circles</td>
<td></td>
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</tr>
</tbody>
</table>

What do you notice about the values for \( \frac{C}{d} \)?

Formula:

**Examples:** Find the circumference of a circle with
a. radius 5cm.

b. diameter 12cm.

**Arc Length**
Central Angle:

Consider the following arc:

\[ \text{What fraction of the circle is } s? \]

\[ \text{What is the total distance around the circle?} \]

**Formula:**
Examples:
a. Find the length of a $100^\circ$ arc of a circle of radius 5cm.

b. Find the radius of an arc whose central angle is $80^\circ$ and whose arc length is 11.17cm.

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