Geometry Chapter 11 Test Review

**Standards/Goals:**
- **G.C.4(+) / D.3.a.** I can identify and define line segments associated with circles such as radii, diameters, chords, secants, and tangents.
- **D.3.b.** I can determine the measures of central and inscribed angles and their intercepted arcs.
- **G.C.2. / D.3.c.** I can find segment lengths, angle measures, and intercepted arc measures formed by chords, secants, and tangents intersecting inside and outside circles.
- **G.C.3. / D.3.d.** I can solve problems using inscribed and circumscribed polygons.
- **F.1.d.** I can find arc lengths and circumferences of circles from given information.
- **G.GPE.1 / G.1.d.** I can write equations for circles in standard form and solve problems using equations and graphs.
- **G.C.1.** I can understand the idea that all circles are similar to one another.
- **G.C.5.** I can find the area and circumference of a circle.
- **D.1.e.** I can locate, describe, and draw a locus in a plane or space.

**IMPORTANT VOCABULARY**

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Circle</td>
<td>The set of all points in a plane that are a given distance from a given point, the center.</td>
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<tr>
<td>Radius</td>
<td>The distance from the center to any point on the circle.</td>
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<tr>
<td>Tangent</td>
<td>A line that touches the circle at exactly one point.</td>
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<tr>
<td>Secant</td>
<td>A line that intersects the circle at two points.</td>
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<td>Chord</td>
<td>A line segment with both endpoints on the circle.</td>
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<tr>
<td>Diameter</td>
<td>The distance across the circle through its center.</td>
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<tr>
<td>Circumference</td>
<td>The distance around the circle.</td>
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<tr>
<td>Central angle</td>
<td>An angle whose vertex is at the center of the circle.</td>
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<tr>
<td>Major arc</td>
<td>A part of the circle between two points on the circle.</td>
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<tr>
<td>Minor arc</td>
<td>A part of the circle between two points on the circle, excluding the major arc.</td>
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<tr>
<td>Arc addition postulate</td>
<td>A postulate stating that the sum of the measures of two arcs is equal to the measure of the arc formed by joining their endpoints.</td>
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<tr>
<td>Inscribed angle</td>
<td>An angle formed by two chords intersecting inside a circle.</td>
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<tr>
<td>Inscribed polygon</td>
<td>A polygon drawn inside a circle with all its vertices on the circle.</td>
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<tr>
<td>Concentric circles</td>
<td>Circles that have the same center.</td>
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<tr>
<td>Locus</td>
<td>The set of all points that satisfy a certain condition.</td>
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<tr>
<td>'completing the square'</td>
<td>An algebraic method used to solve quadratic equations.</td>
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<tr>
<td>Standard form of a circle</td>
<td>The equation of a circle in the form (x-h)^2 + (y-k)^2 = r^2.</td>
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**Review of Circumference:** If the circumference of a circle is $16\pi$ inches, what is the radius?

**Review of Central Angles & Arcs:** *Find the following:*

1. $m\angle AED$
2. $m\angle DEC$
3. Measure of arc BC
4. Measure of arc BAC
5. Measure of arc DA
6. Measure of arc ADC

If $BE = 4.5$ in, find the **length** of:

7. Arc AB
8. Arc AD
9. Arc BC
If circle P has a **diameter** of 20 cm and MN = SR = 14 cm, find the following.

#10. PQ

#11. MX

#12. TQ

#13. PX

**Review of Inscribed Polygons:** Find the following:

#1. \( m \angle XWZ \)

#2. Measure of arc XQ

#3. \( m \angle XZW \)

#4. Measure of arc WZQ

**Review of Tangents:**

#1. Assume that segments that appear to be **tangents** are in fact tangents. Suppose that AB is a diameter. Suppose that \( r = 12 \) and PT = 16. Find BP.
2. Find the **perimeter** of each polygon for the given information. Assume that segments that appear to be tangents are in fact tangents. (CD = 52, CU = 18, TB = 12)

**ERROR ANALYSIS:**
For each exercise, identify the error(s) in planning the solution or solving the problem. Then write the correct solution.

1. What is \( x \), the radius of \( \odot O \)?

\[
PQ^2 + QO^2 = PO^2
\]
\[
x^2 + 8^2 = (4 + x)^2
\]
\[
x^2 + 64 = 16 + 4x + x^2
\]
\[
64 = 16 + 4x
\]
\[
48 = 4x
\]
\[
12 = x
\]

2. \( \odot O \) is inscribed in polygon \( ABCD \). What is the perimeter of polygon \( ABCD \)?

\( AD = 0.9 + 1.9 = 2.8 \)
\( AB = 1.9 + 1.3 = 3.2 \)

\[
p = 2(2.8) + 2(3.2)
\]
\[
= 5.6 + 6.4
\]
\[
= 12.0
\]

The perimeter is 12.0 cm.
Find the value of the variable(s) in each problem:

NOTE: If a segment looks like a tangent, assume that it is a tangent.

#1. 

#2. 

#3. 

#4. 

#5. 

#6. 

#7. 

#8. 

#9.
Review of Locus:

Sample Multiple Choice Question:

#1. Which point lies on the locus of points equidistant from (4, 5) and (-7, 5)
   a. (-1.5, 5)
   b. (2, 3)
   c. (0, -1.5)
   d. (-1.5, 0)

#2. Suppose that a circle’s diameter has the end points at (-8, 10) and (14, -24).
   a. What is the equation of the circle in standard form?
   b. What is the equation in standard form of the perpendicular bisector?
ERROR ANALYSIS:

3. What is the missing length to the nearest tenth?

a. 

\[
(9.6)^2 + x^2 = (12)^2 \\
92.16 + x^2 = 144 \\
x^2 = 51.84 \\
x = 7.2
\]

b. 

\[
x^2 + 3^2 = 8^2 \\
x^2 + 9 = 64 \\
x^2 = 55 \\
x \approx 7.4
\]

Review of Graphs of Circles:

Find the radius and center of each circle based on the equation:

#1. \((x+2)^2 + (y+8)^2 = 25\) \hspace{1cm} #2. \(x^2 + (y-5)^2 = 100\)

#3. Find the equation of a circle whose centered at (-3, 7) and the passing through the origin.

#4. Find the center and radius of the circle.

\[x^2 + y^2 - 6x - 2y + 4 = 0\]
ERROR ANALYSIS:

For each exercise, identify the error(s) in planning the solution or solving the problem. Then write the correct solution.

1. What is the value of each variable?
   a. \[ y^\circ \]
      \[ x^\circ = 63 \quad y^\circ = 22 \]
   b. \[ x^\circ \]
      \[ x = \frac{1}{2}(32 + 24) = 28 \]

2. In the diagram, \( \overline{AB} \perp \overline{BC} \).
   What are \( m\overline{AC} \) and \( m\overline{AB} \)?
   \[ m\overline{AC} = 90 \]
   \[ m\overline{AB} = 360 - (90 + 106) \]
   \[ = 164 \]

3. What is the value of the variable? If the answer is not a whole number, round to the nearest tenth.
   a. \[ x^\circ \]
      \[ x = \frac{1}{2}(100) \]
      \[ = 50 \]
   b. \[ x \]
      \[ x^2 = 9(4) = 36 \]
      \[ x = 6 \]
ERROR ANALYSIS:

For each exercise, identify the error(s) in planning the solution or solving the problem. Then write the correct solution.

1. What is the standard equation for the circle?
   
   Center: $(2, -1)$
   
   Radius: 2
   
   Equation: $(x - 2)^2 + (y + 1)^2 = 4$

2. What is the standard equation of the circle with center $(-4, -3)$ that passes through the point $(0, 0)$?
   
   Radius: $\sqrt{(-4 - 0)^2 + (-3 - 0)^2} = \sqrt{16 + 9} = 5$
   
   Equation: $(x - 4)^2 + (y + 3)^2 = 5^2$

3. What is a sketch of each locus whose points in a plane satisfy these conditions?
   
   a. equidistant from the endpoints of $AB$, where $AB = 5$ cm
   
   b. equidistant from two perpendicular lines
# KEY FORMULAS FOR CHAPTER 11 TEST:

## Equations of a Line

<table>
<thead>
<tr>
<th>Form</th>
<th>Equation</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Form</td>
<td>$Ax + By = C$</td>
<td>$A$, $B$, and $C$ are constants with $A$ and $B$ not both equal to zero.</td>
</tr>
<tr>
<td>Slope-Intercept Form</td>
<td>$y = mx + b$</td>
<td>$(x_1, y_1)$ is a point.</td>
</tr>
<tr>
<td>Point-Slope Form</td>
<td>$y - y_1 = m(x - x_1)$</td>
<td>$m = \text{slope}$, $b = \text{y-intercept}$</td>
</tr>
</tbody>
</table>

## Coordinate Geometry

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<thead>
<tr>
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<tbody>
<tr>
<td>Slope</td>
<td>$m = \frac{y_2 - y_1}{x_2 - x_1}$</td>
<td>$(x_1, y_1)$ and $(x_2, y_2)$ are 2 points.</td>
</tr>
<tr>
<td>Midpoint</td>
<td>$M = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$</td>
<td>$M = \text{midpoint}$</td>
</tr>
<tr>
<td>Distance</td>
<td>$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$</td>
<td>$d = \text{distance}$</td>
</tr>
</tbody>
</table>

## Circles

<table>
<thead>
<tr>
<th>Form</th>
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<tbody>
<tr>
<td>Equation of a Circle</td>
<td>$(x - h)^2 + (y - k)^2 = r^2$</td>
<td>center $(h, k)$</td>
</tr>
<tr>
<td>Area Formula</td>
<td>$A = \pi r^2$</td>
<td>$r = \text{radius}$</td>
</tr>
<tr>
<td>Circumference Formula</td>
<td>$C = \pi d = 2\pi r$</td>
<td>$C = \text{circumference}$</td>
</tr>
<tr>
<td>Area of a Sector</td>
<td>$A = \frac{\theta}{360} \pi r^2$</td>
<td>$\theta = \text{central angle}$, $d = \text{diameter}$, $\pi \approx 3.14$</td>
</tr>
</tbody>
</table>