Lesson 10.1 / Radians and Degrees

Radius: Segment with one endpoint in the

 center and one endpoint on the circle.

Chord: Segments with two endpoints on the circle

Diameter: Chord that passes through the center.

**Ex1:** Name the circle, a radius, a chord, and a diameter of the circle.



**Ex2:** The diameters of circles A, B, and C are 10 in, 20in, and 14in respectively. Find XB.



**Circumference of a Circle: C = \_\_\_\_\_\_ or C = \_\_\_\_\_\_\_\_\_**

Ex3) a. Find C if r = 10

 b. Find d and r to the nearest hundredth if C = 136.9

Ex4) Find the **exact** circumference of circle P



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**Radians vs. Degrees**

We measure distance using many different units: feet, inches, cm, m, yards, etc.

There are also different units for measuring angles!

We usually use **degrees.** A circle measure \_\_\_\_\_ degrees.

We can also use **radians.** A circle measures \_\_\_\_\_\_ radians.

\_\_\_\_\_\_ degrees = \_\_\_\_\_\_\_\_radians

\_\_\_\_\_\_ degrees = \_\_\_\_\_\_\_\_radians

To **convert to radians from degrees**, multiply by \_\_\_\_\_\_\_\_\_.

**Examples:** Convert to radians.

5) 1o 6) 23o 7)55o 8) 359o

In order to **convert to degrees from radians**, multiply by \_\_\_\_\_\_\_\_\_\_.

**Examples:** Convert to degrees.

1) 3π 2) $\frac{5π}{3}$ 3) - $\frac{π}{5}$ 4) 1.9

**Lesson 10-2:** Measuring Angles and Arcs

Minor arc :

Major arc:

 Central angle: vertex at the center, sides contain two radii

 **Measure of** **central angle = Measure of intercepted arc.**

 Find the **measures** of the arcs:

 $\hat{AB}$= $\hat{BAC}$=

Ex1) If the radius is 5, find the **length** of the arc $\hat{CB}$

1. Find the circumference
2. Find the fraction of the circle that is the arc.

 3. Multiply the fraction times the circumference.

Ex3) If the radius is 6, find the **length** of each arc

 a) $\hat{CB}$ b) $\hat{BAC}$

**10.3: Arcs and Chords**

**Theorem**: Two minor arcs are $≅$ if and only if their corresponding chords are $≅$ Ex1) Find m $\hat{AB}$



Ex2) $Δ$ABC is equilateral. What is m $\hat{AB}$?

**Theorem**: If a diameter (or radius) is perpendicular to a chord, then it bisects the chord and its arc.

Ex3) $\overbar{RS}⊥\overbar{TV}$ VS = 10 and m$\hat{TV}$=110°

 Find: TS =

 TV =

 m$\hat{TU}$=

Ex4) Circle R has a radius of 16cm. Radius $\overbar{RU}$ is perpendicular to chord $\overbar{TV}$, which is 22 cm.

 Find RS.

**Theorem**: Two minor arcs are congruent if and only if they are equidistant from the center.



 Ex5) $\hat{AB}≅\hat{CD}$ and EX = 7. Find FX.

**10.4: Inscribed Angles**

|  |  |
| --- | --- |
| **Central Angles:** | **Inscribed Angles:** |

**Ex:** Find m$DC$ and m$∠ACB$…given m$∠DPC=30$, and mBC = 50

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**Theorem:** If two inscribed angles of a circle (or 2 congruent circles) intercept congruent arcs, then the angles are congruent.

Ex: m$∠BAC=2x+3$

 m$∠BDC=x+9$



**Theorem:** If the inscribed angle of a triangle intercepts a semi-circle, the angle is a right angle.

Ex: Find m$∠ABC$

**Theorem:** If a quadrilateral is inscribed in a circle, then its opposite angles are supplementary.

Ex: Find m$∠ADC$, m$∠BCA$, and m*AC*



Lesson 10.5: Tangents

* $\overleftrightarrow{AC}$ is **tangent** to circle P because it intersects the circle at only \_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_.
* This point (point B) is called the:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Theorem**: If a line is tangent to a circle, then it is perpendicular to the radius drawn to the point of tangency.

**Example 1)** $\overbar{BC}$ is tangent to circle A at point C. Find x.

**Theorem:** If a radius is perpendicular to a line on the circle, then that line is a tangent.

**Example 2)** Is $\overbar{MN}$ tangent to circle L? Justify.

**Theorem:** Two segments from the same exterior point that are tangent are congruent.

10.8: Equations of Circles

**Definition of a circle:** The locus of all points in a plane equidistant from a given point.

**General equation of a circle:**

Where the center is located at \_\_\_\_\_\_\_\_\_\_\_ and the radius is \_\_\_\_\_\_

**Ex 1:** (x – 1 )2 + ( y – 7)2 = 25 Center: \_\_\_\_\_\_\_ Radius: \_\_\_\_\_\_

**Ex2:** (x – 4)2 + ( y + 6)2 = 17 Center: \_\_\_\_\_\_\_ Radius: \_\_\_\_\_\_

**Ex3:** x 2 + y 2 = 36 Center: \_\_\_\_\_\_\_ Radius: \_\_\_\_\_\_

**Ex4:**  Center (0, 4) radius = 9 Equation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Ex 5:**  Center (-3, 7) radius = $\sqrt{15}$ Equation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Ex 6:**  Center (0, 4) Point on the circle: P(1, 2) Equation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Ex 7:** Endpoints of the diameter are (-1, 3) and (-5, 7) Equation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Ex8:** What is the exact circumference of the circle with equation (x – 1 )2 + ( y – 7)2 = 25 ?

**Ex9:** Find the radius of the circle that has the equation (x – 5)2 + ( y – 3)2 = r2 and passes through the point (5, 1)

**Graphing Circles**

1. Locate the center of the circle
2. Use the radius to plot 4 points from the center of the circle
3. Connect the dots into something that looks as “circley” as possible ☺

**Ex10)** Graph (x + 2)2 + ( y – 1)2 = 9 **Ex 11)** Graph x2 + ( y + 1)2 = 16

**Ex12)** Equation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Circles Day #2: Equations of Circles + Completing the Square!

Write the equation of the following circles in standard form:

**Ex1)** x2 + 2x + y2 = 55 + 10y

**Ex2)** 8x + 32y + y2 = –263 – x2