Lesson 10.1 / Radians and Degrees

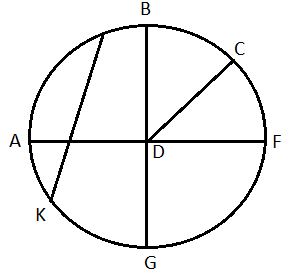
Radius: Segment with one endpoint in the

center and one endpoint on the circle.

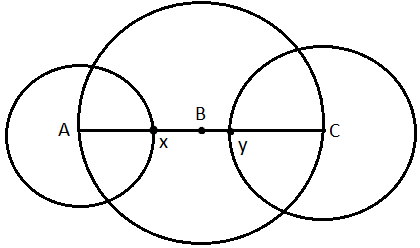
Chord: Segments with two endpoints on the circle

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.

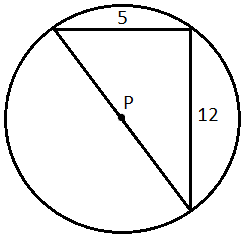


**Circumference of a Circle: C = \_\_\_\_\_\_ or C = \_\_\_\_\_\_\_\_\_**

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



\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**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 \_\_\_\_\_\_\_\_\_.

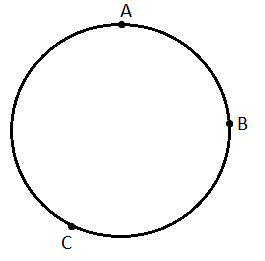
**Examples:** Convert to radians.

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

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

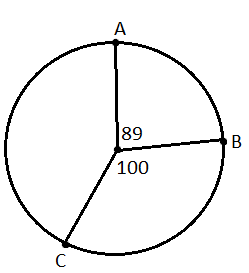
**Examples:** Convert to degrees.

1) 3π 2) 3) - 4) 1.9

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

Minor arc :

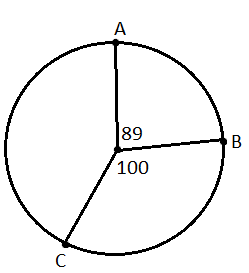
Major arc:

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

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

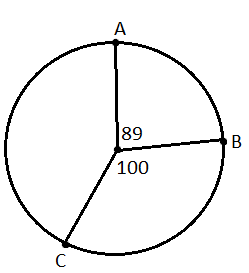
Find the **measures** of the arcs:

= =

Ex1) If the radius is 5, find the **length** of the arc

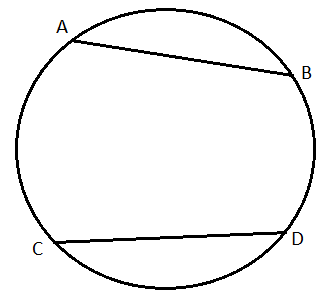
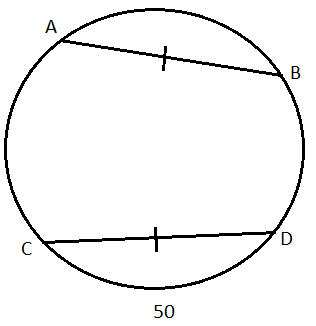
1. Find the circumference
2. Find the fraction of the circle that is the arc.

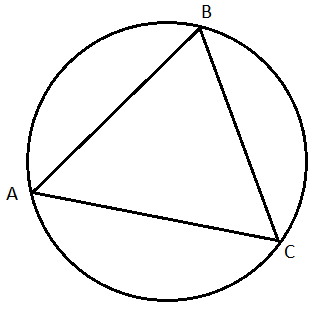
3. Multiply the fraction times the circumference.

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

a) b)

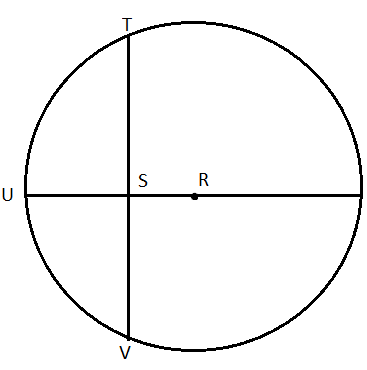
**10.3: Arcs and Chords**

**Theorem**: Two minor arcs are if and only if their corresponding chords are Ex1) Find m



Ex2) ABC is equilateral. What is m ?

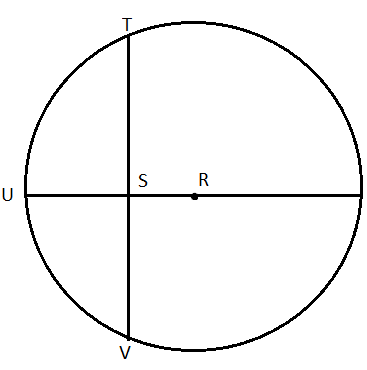
**Theorem**: If a diameter (or radius) is perpendicular to a chord, then it bisects the chord and its arc.

Ex3) VS = 10 and m=110°

Find: TS =

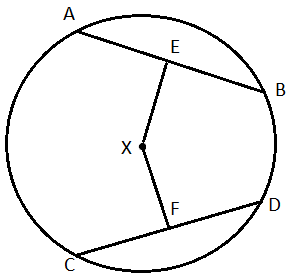
TV =

m=

Ex4) Circle R has a radius of 16cm. Radius is perpendicular to chord , which is 22 cm.

Find RS.

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

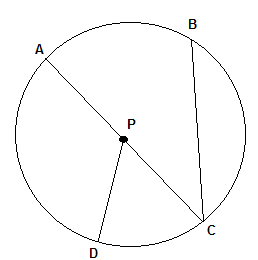


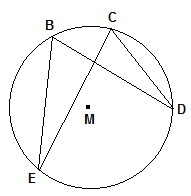
Ex5) and EX = 7. Find FX.

**10.4: Inscribed Angles**

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

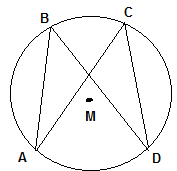
**Ex:** Find m and m…given m, and mBC = 50

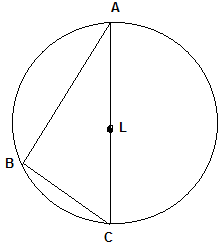
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**Theorem:** If two inscribed angles of a circle (or 2 congruent circles) intercept congruent arcs, then the angles are congruent.

Ex: m

m

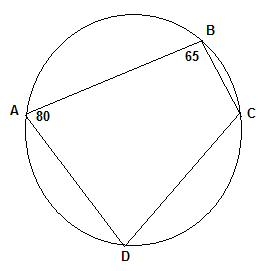


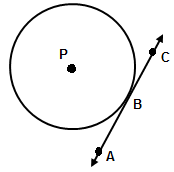
**Theorem:** If the inscribed angle of a triangle intercepts a semi-circle, the angle is a right angle.

Ex: Find m

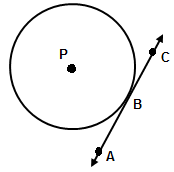
**Theorem:** If a quadrilateral is inscribed in a circle, then its opposite angles are supplementary.

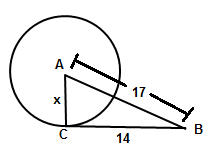
Ex: Find m, m, and m*AC*



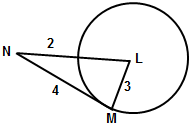
Lesson 10.5: Tangents

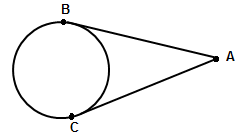
* is **tangent** to circle P because it intersects the circle at only \_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_.
* This point (point B) is called the:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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

**Example 1)** 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 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 = Equation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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

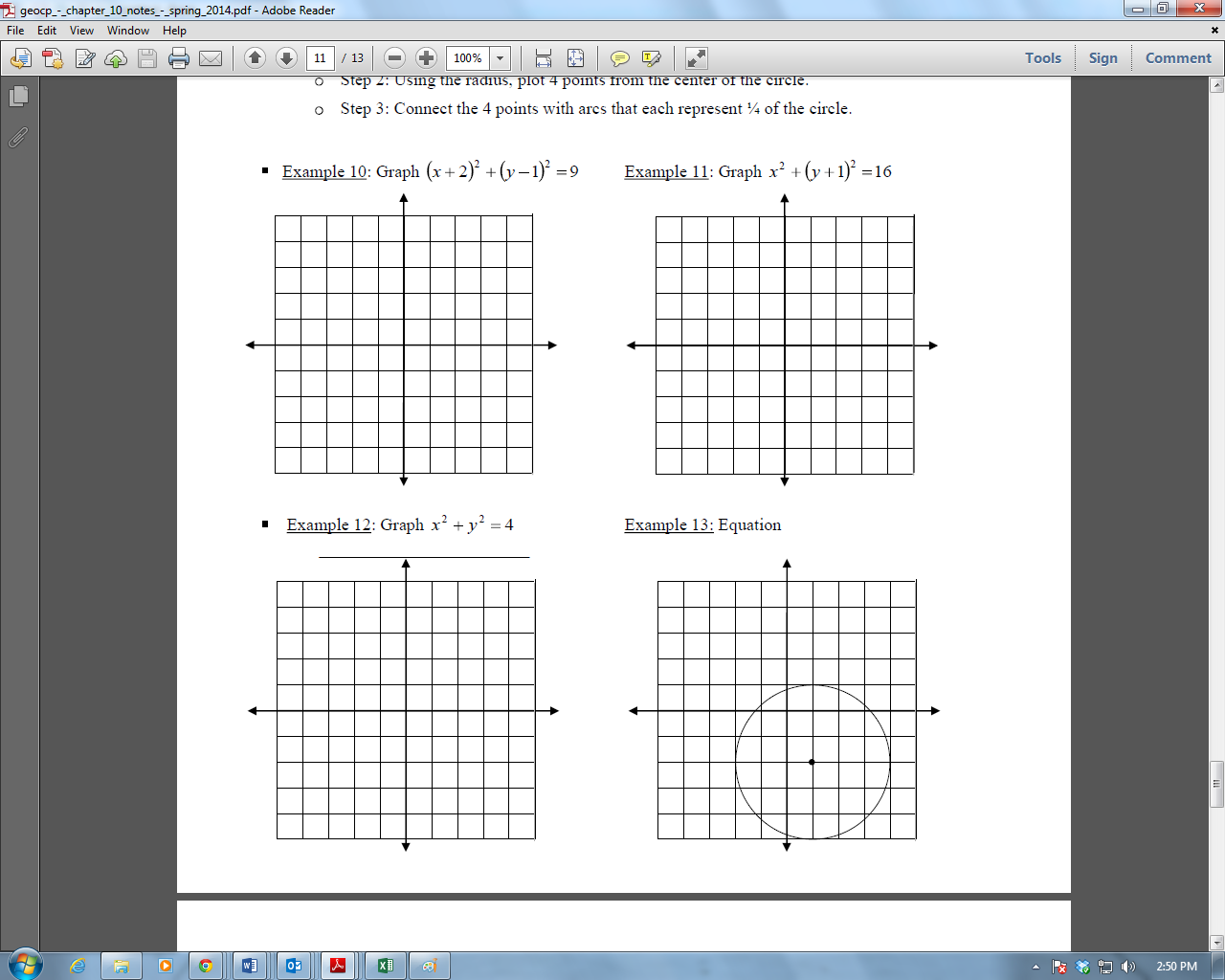
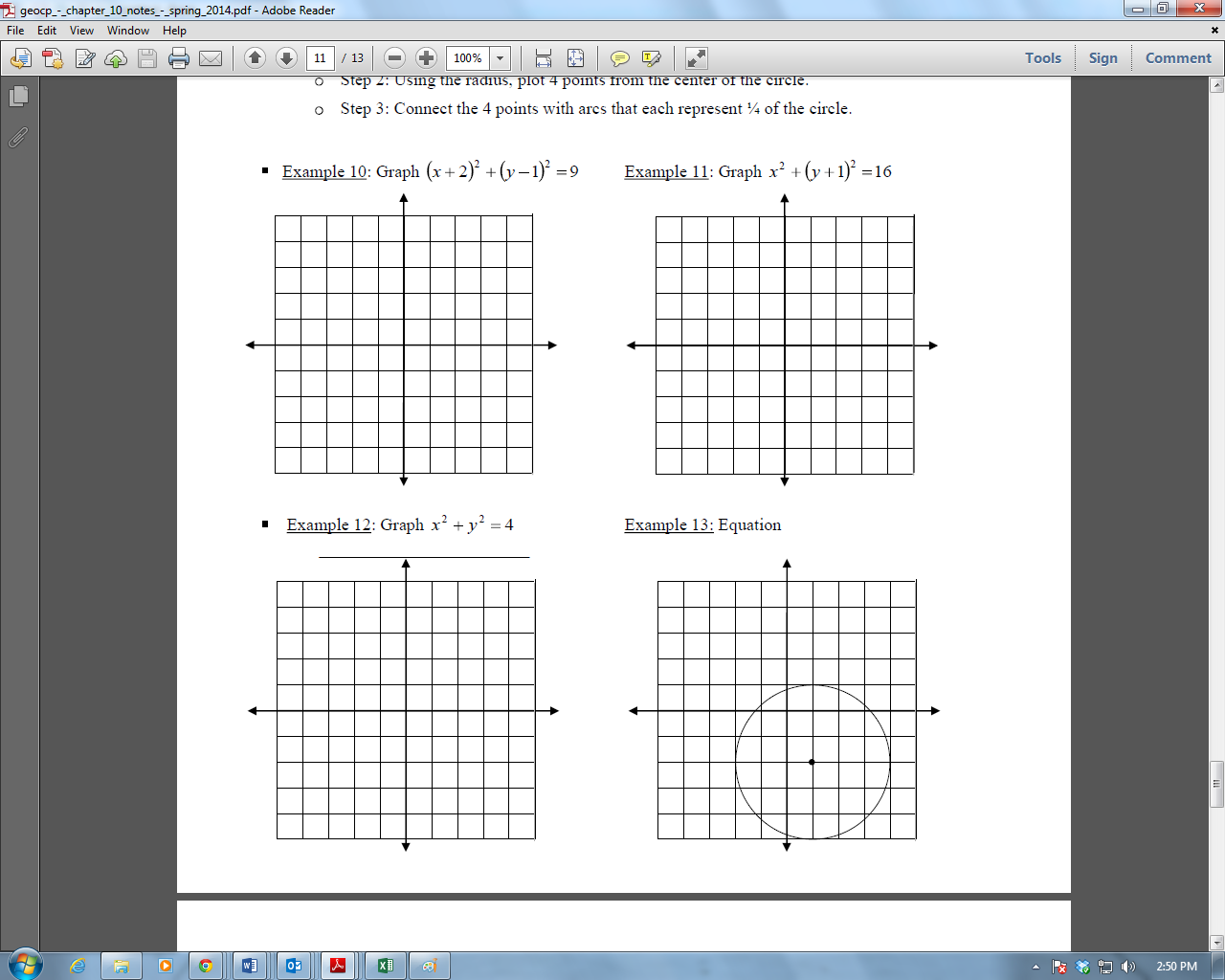
**Ex 7:** Endpoints of the diameter are (-1, 3) and (-5, 7) Equation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

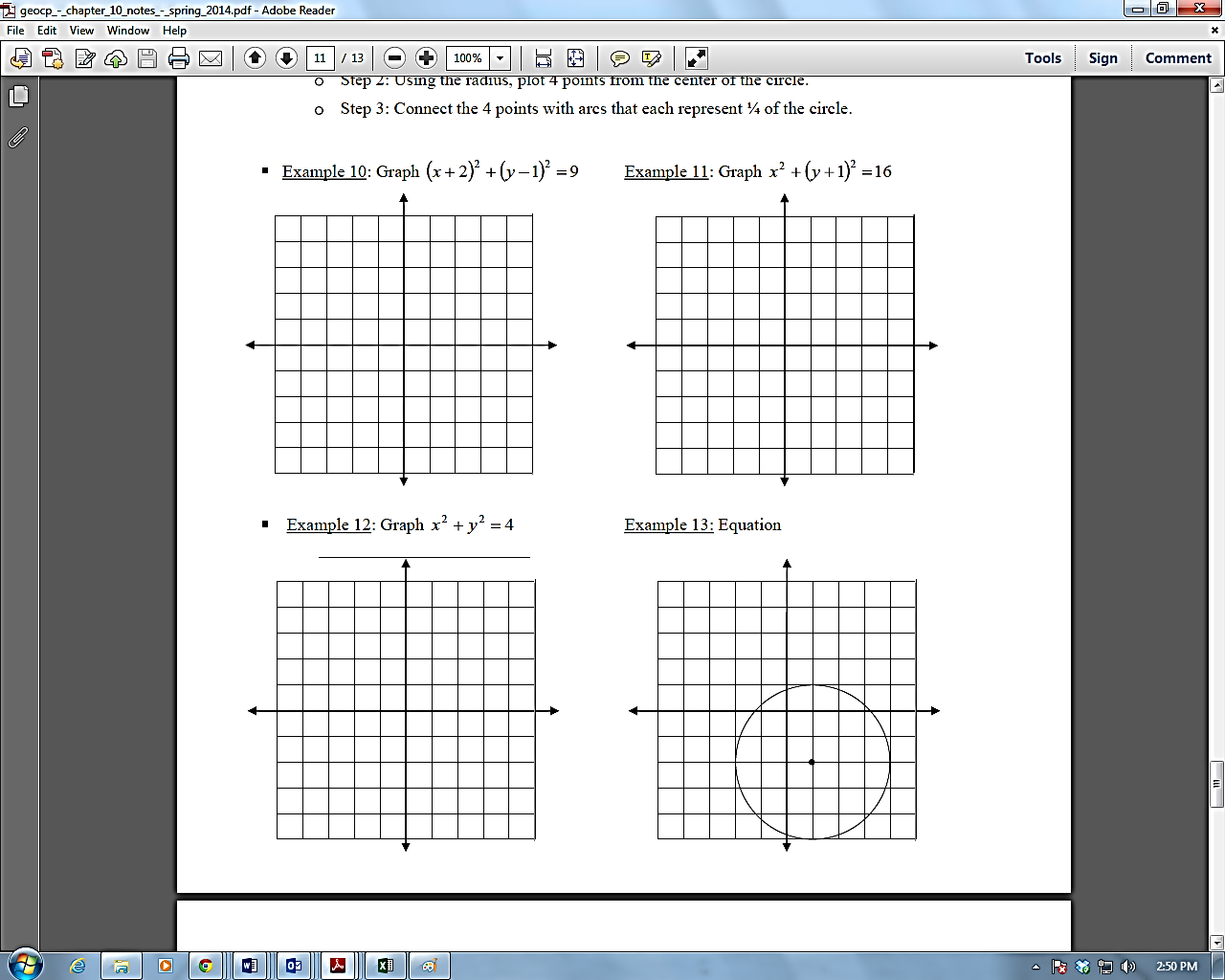
**Ex8:** What is the exact circumference of the circle with equation (x – 1 )2 + ( y – 7)2 = 25 ?

**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