CORNELL NOTES

TOPIC/OBJECTIVE: Glea: Area, Arc Length and Equations of Circles

CONTENT/CLASS: Geometry

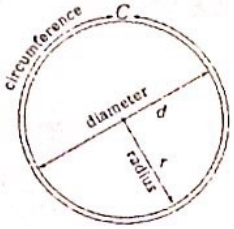
NAME:

CLASS/PERIOD: 5

DATE: 3/2/16

ESSENTIAL QUESTION:

QUESTIONS:



(half of diameter) *all radii are ≅ in a circle

r = radius distance from center to edge of a circle

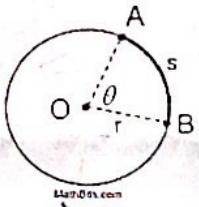
d = diameter - distance through the center from one edge to another in a circle. *all diameters are ≅ in a circle

Circumference distance around the circle.

$C = \pi \cdot d$ or $C = 2 \cdot \pi \cdot r$

Area of a Circle = $\pi \cdot r^2$

Sector = part of a circle. (slice)

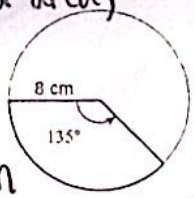


Central Angle = An angle in a circle whose vertex is at center

Arc = part of the circumference

Area of a Sector = $\frac{\theta}{360} \cdot \pi r^2$ (Sector area)

Example



$S.A. = \frac{135}{360} \cdot \pi (8cm)^2$

$S.A. = 24\pi cm^2$ (exact)

$S.A. \approx 75.40 cm^2$ (approximate)

To get an exact answer, put everything except π in calculator. Push MATH → Enter → Enter to get a fraction.

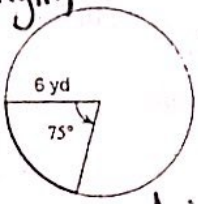
Length of Arc AB = $\frac{\theta}{360} \cdot \pi \cdot d$

Or

Length of Arc AB = $\frac{\theta}{360} \cdot 2 \cdot \pi \cdot r$ (most common form)

(Arc length)

Example



$A.L. = \frac{75}{360} \cdot 2 \cdot \pi \cdot 6yd$

$A.L. = 2.5\pi yd = \frac{5\pi}{2} yd$ (π exact)

$A.L. \approx 7.85 yd$ (approximate)

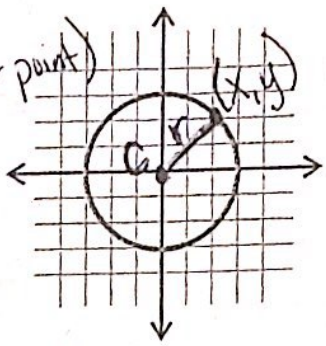
SUMMARY:

QUESTIONS:

NOTES:

The Equation of a Circle:

Circle: a set of point equidistant from (equally far from) a given point. The given point is called the center of the circle.



Given : Circle C (label a circle using the center point) C=(h,k)

Let (h,k) be the center of circle C.

Let (x, y) be any point on the circle

Let r = the radius of circle C

The **standard form** or **center-radius form** equation of a circle:

$$(x-h)^2+(y-k)^2=r^2$$

Where **(h, k) is the center** and **r is the radius.**

h, k r

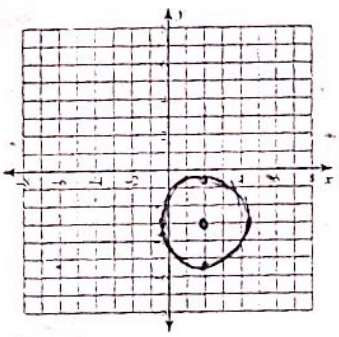
Example 1. Write an equation with the center of (13, -12) and radius of 4 :

$(x-13)^2+(y-(-12))^2=4^2 \rightarrow (x-13)^2+(y+12)^2=16$

↖ same equation ↗ (simplified version)

Examples of graphing equations

$(x-2)^2+(y+3)^2=5$

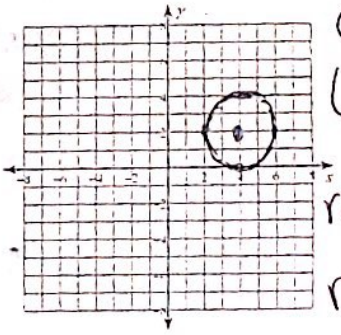


center (2, -3)

radius $=\sqrt{5}$

$r \approx 2.24$

$(x-4)^2+(y-2)^2=4$



center (4, 2)

radius $=\sqrt{4}$

$r=2$

$(x-2)^2$

$=(x-2)(x-2)$

$=x^2-2x-2x+4$

$=x^2-4x+4$

$(y+3)^2$

	y	3
y	y^2	3y
3	3y	9

y^2+6y+9

Completing the Square Example Problem

Complete the square to find the center and the radius of the circle.

$4x^2+4y^2-16x+24y-36=0$

Step 1: put the x's + the y's together

Step 2: factor out a common number, if possible

Step 3: Fill in blanks to complete the square + balance the equation

Step 4: move any numbers to the right side of the equation

$\frac{4x^2}{4}-\frac{16x}{4}+\frac{4y^2}{4}+\frac{24y}{4}-\frac{36}{4}=\frac{0}{4}$

$x^2-4x+4+y^2+6y+9-9=0$ (+4, +9)

$(x-2)^2+(y+3)^2-9=13$

+9 +9

$(x-2)^2+(y+3)^2=22$

center: (2, -3) $r=\sqrt{22}$