LEARNING AS ONE NATION
Expanded Project

JHS LEARNING ACTIVITY

Name: _____ **Grade/Score:** _____
Grade and Section: _____ **Date:** _____

Subject *(Check or choose from below.)*

- ☐ Religion/Values Education
- ☐ Natural Sciences
- ☐ Araling Panlipunan
- ☐ Filipino
- ☐ English
- ☐ Math
- ☐ TLE / ICT
- ☐ MAPEH
- ☐ HGP _____

Type of Activity *(Check or choose from below.)*

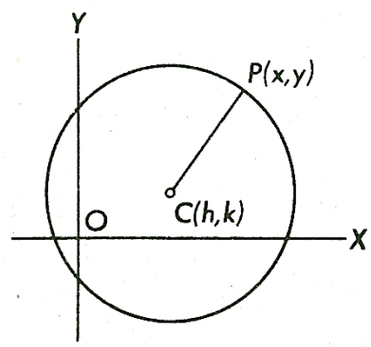
- ☐ Concept Notes
- ☐ Skills: Exercise / Drill
- ☐ Performance Task
- ☐ Illustration
- ☐ Formal Theme
- ☐ Informal Theme
- ☐ Others: _____

Activity Title: The Center-Radius Form of the Equation of a Circle

Learning Target: To illustrate the circle in the Cartesian coordinate plane.
To determine the center-radius form of the equation of a circle

References: *(Author, Title, Pages)* T. Peterson, Ph.D., Calculus with Analytic Geometry, p. 154;
J.E.A. Mangyao, M.V. Bernido, CVIF Learning Activities

Study the diagram. Let P(x,y) be any point on the circle and the point C(h,k) be the center of the circle. The distance between the points C and P is just the length of segment $\overline{CP}$. We can find this length using the distance formula:



$$\sqrt{(x-h)^2+(y-k)^2} = CP.$$

We then squaring both sides of the equation, and note that by the definition of a circle, CP = r, which is just the radius. Thus, we get,

$$\boxed{(x-h)^2+(y-k)^2 = r^2}$$

which is the <u>standard form</u> of the equation of the circle. It is also often called the <u>center-radius form</u> of the equation of a circle. Just remember to be careful with the signs of the coordinates of the center of the circle.

Example:

Write the following equation of a circle in center-radius form. Then determine the radius and the coordinates of the center of the circle.

$$(x^2-2x+1)+(y^2-4y+4)=16$$

Solution: We recognize perfect squares, so we have:

$$(x-1)^2+(y-2)^2=16 \quad .$$

Comparing with the standard equation form, we note that,

$$(x-\mathbf{1})^2+(y-\mathbf{2})^2=\mathbf{4}^2.$$

Therefore, the radius of the circle is 4 and the center is at point $(1,2)$.

Exercises:

1. Determine the radius and the center of the circle,
$$(x^2+4x+4)+(y^2-6y+9)=16 \quad .$$
2. Given the radius, r = 4, and center C (-2, 5), determine the equation of the circle. Graph the circle in a Cartesian plane.