Amplifying an Instructional Task – Geometry Example

Original Task

The student is expected to show that the equation of a circle with center at the origin and radius r is $x^2 + y^2 = r^2$ *and determine the equation for the graph of a circle with radius r and center* (h, k), $(x - h)^2 + (y - k)^2 = r^2$. *G(12)(E)*

Write the equation for the graph of the circle whose diameter has endpoints $(-3, 4)$ and $(1, 2)$.

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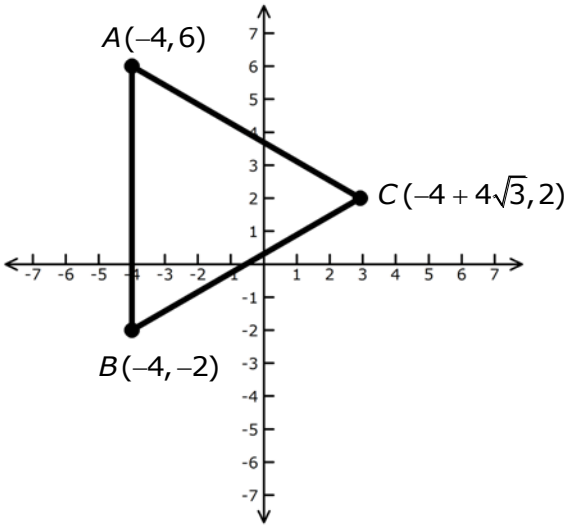
Amplified Task

Triangle *ABC* is equilateral. Write the equations of three circles that are tangent to each other and have centers at each of the vertices of the triangle shown below. For example, circle *A* has center at point *A* and is tangent to both circle *B* and circle *C*.



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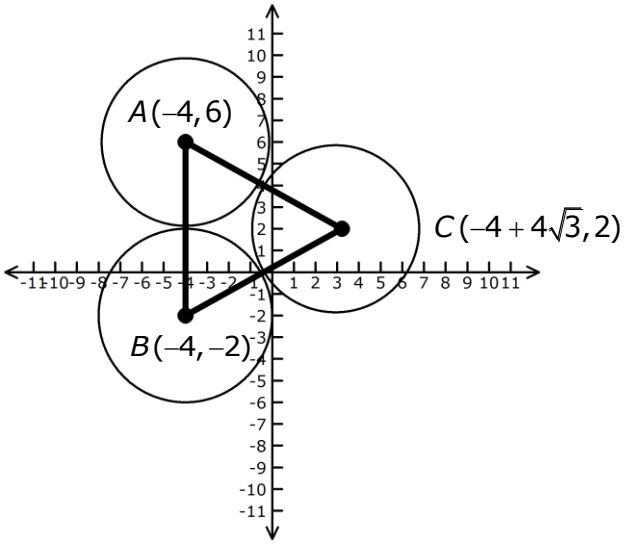
Task B (Scaffolded Task)

Triangle *ABC* is equilateral. Circles *A*, *B*, and *C* are congruent and tangent.



1. Complete the table.

	Circle *A*	Circle *B*	Circle *C*
Center			
Radius			
Equation			

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Task C (Scaffolded Task)

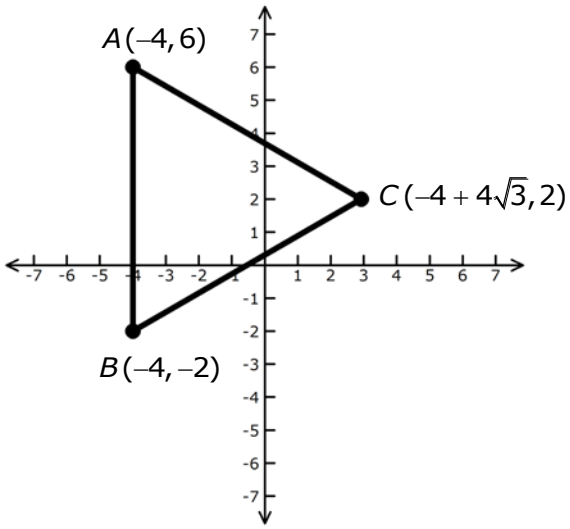
Determine which student in your pair will be partner A and which student will be partner B. Discuss the following questions. The indicated partner will begin the discussion.

a. Partner A: How can the information in the problem be used to write the equations of the circles?
b. Partner B: What additional information is necessary to write the equations of the circles?

Use the following conversation starters if needed.

Partner A	Partner B
The problem states . . . *The graph shows . . .*	*The problem does not state . . .* *I also need . . .*

Triangle *ABC* is equilateral. Write the equations of three circles that are tangent to each other and have centers at each of the vertices of the triangle shown below. For example, circle *A* has center at point *A* and is tangent to both circle *B* and circle *C*.



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Task D (Enriched Task)

Triangle *ABC* is equilateral with vertices at $(-4,6),(-4,-2),$ and $(-4+4\sqrt{3},2)$.

1. Write the equations of three circles that are tangent to each other and have centers at each of the vertices of the triangle.

2. Write the equation of the circle inscribed in triangle *ABC* (incircle).

3. Write the equation of the circle circumscribed around triangle *ABC* (circumcircle).