

Tooele County Lesson Plan Template

Class: College Prep	Standard: 3.2.a: Derive the equation of a circle, given center and radius, using the Pythagorean Theorem. 3.2.b: complete the square to find the center and radius of a circle whe ngiven the equation.
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What do I want my students to learn and be able to do? Learning Objective in Student Friendly Language (Post in class for students to see.)

Discover the equation of the circle through the Pythagorean Theorem

Tier 1 Instruction - Step by Step Procedure	Considerations for Special Populations:	What will I do if they don't learn it? (Tier 2 & 3 interventions)
5 minutes Homework Q&A	*Manipulatives	* Small group instruction
10 minutes Distance Formula Quiz		
5 minutes Review: completing the square		
2 minutes Pass out paper, scissors, rulers		*Reciprocal Teaching
5 minutes Cut out a triangle with 6 inch hypotenuse. Make 4 copies of the triangle.		
2 minutes Label sides of triangle and determine orientation for the entire class.		
15 minutes Invite students to place triangles on foam core board.		
5 minutes Discuss relationship between sides of triangle and hypotenuse. Write generic equation for pythagorean theorem using x and y as leg lengths.		
5 minutes What happens when triangle is in the 3rd quadrant? What are the coordinates? Does this change the pythagorean theorem?	What explicit teaching strategies need to be emphasized?	What will I do if they already know it? (What additional challenges will I assign?)
2 minutes Official Equation of a Circle	* Partner sharing (think, pair, share)	*Predict transformations of circles and the impact on the equation of a circle. Experiment with calculators to verify predictions.
5 minutes Practice Writing equations given center and radius or from a graph, or point on circle (use distance formula)		
10 minutes Write equation in expanded form. Work backward to get it back into standard form by completing the square		
5 minutes Identify center and radius, graph circles no matter the form of equation		
5 -10 minutes Homework!	*I do, we do, you do guided instruction	

Key Vocabulary: Pythagorean Theorem- Hypotenuse - the side opposite the right angle Center of a circle _____ Radius of a circle	
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How will you know that they learned the material? Circles Quiz 10.4 Homework	Resources/Materials Needed: Paper, scissors, foam core board, thumbtacks, rulers
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Reflect on how the lesson was received by the students:

10.4 Circling Triangles (or Triangulating Circles)

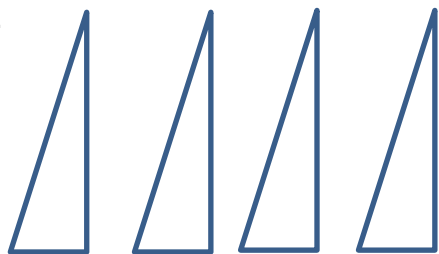
A Develop Understanding Task



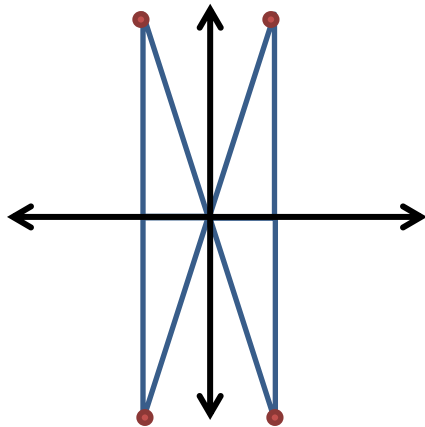
Using the corner of a piece of colored paper and a ruler, cut a right triangle with a 6" hypotenuse, like so:



Use this triangle as a pattern to cut three more just like it, so that you have a total of four congruent triangles.



1. Choose one of the legs of the first triangle and label it x and label the other leg y . What is the relationship between the three sides of the triangle?
2. When you are told to do so, take your triangles up to the board and place each of them on the coordinate axis like this:



Mark the point at the end of each hypotenuse with a pin.



3. What shape is formed by the pins after the class has posted all of their triangles? Why would this construction create this shape?

4. What are the coordinates of the pin that you placed in:
 - a. the first quadrant?
 - b. the second quadrant?
 - c. the third quadrant?
 - d. the fourth quadrant?

5. Now that the triangles have been placed on the coordinate plane, some of your triangles have sides that are of length $-x$ or $-y$. Is the relationship $x^2 + y^2 = 6^2$ still true for these triangles? Why or why not?

6. What would be the equation of the graph that is the set on all points that are 6" away from the origin?

7. Is the point $(0, -6)$ on the graph? How about the point $(3, 5.193)$? How can you tell?

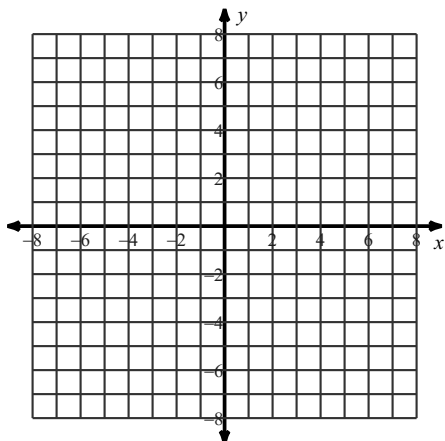
8. If the graph is translated 3 units to the right and 2 units up, what would be the equation of the new graph? Explain how you found the equation.



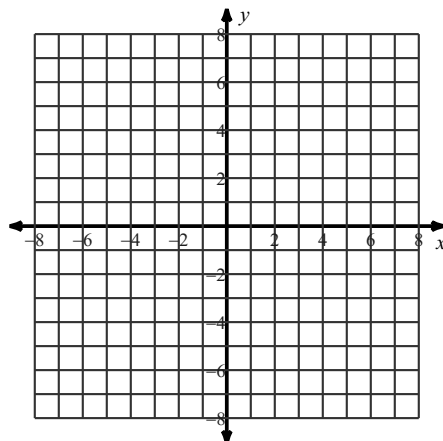
10.4 Equations of Circles

Identify the center and radius of each. Then sketch the graph.

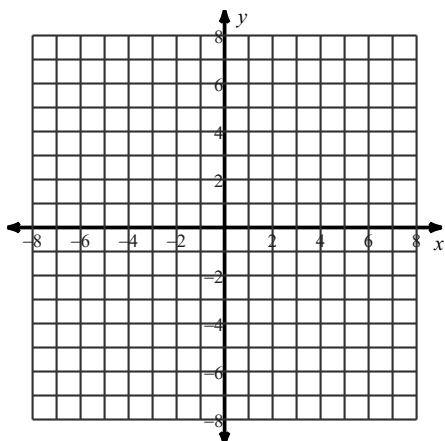
1) $(x - 2)^2 + (y + 2)^2 = 4$



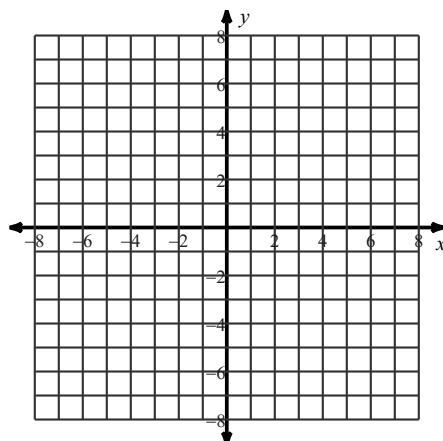
2) $x^2 + (y - 1)^2 = 9$



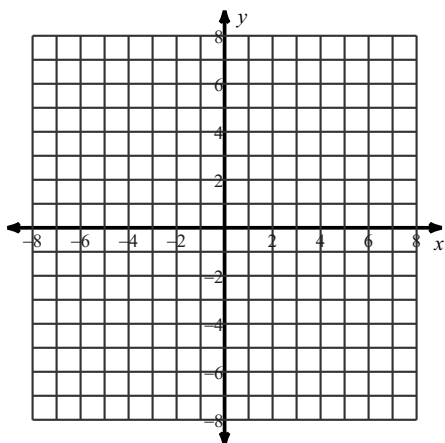
3) $(x - 3)^2 + (y + 3)^2 = 8$



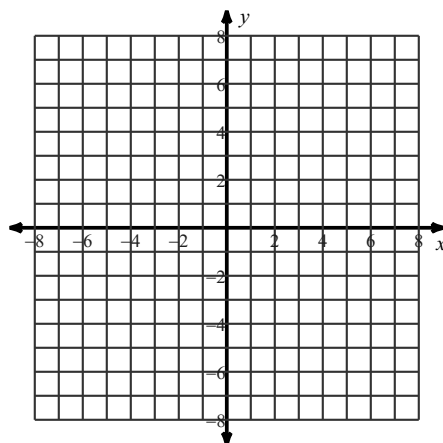
4) $(x - 3)^2 + (y + 2)^2 = 1$



5) $21 + 6x - 8y = -y^2 - x^2$



6) $16 + 8y + y^2 + x^2 = -2x$



Identify the center and radius of each.

7) $-16y + x^2 = -y^2 + 24x - 183$

8) $14x + x^2 - 20y = -100 - y^2$

Use the information provided to write the equation of each circle.

9) Center: $(1, -6)$
Radius: 11

10) Center: $(\sqrt{7}, 7)$
Radius: 8

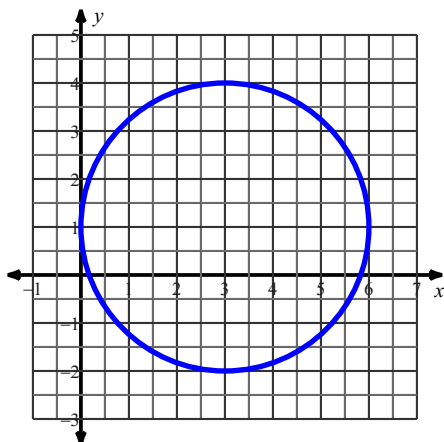
11) Center: $(-3, 13)$
Radius: 4

12) Center: $(-17, 13)$
Point on Circle: $(-17, 15)$

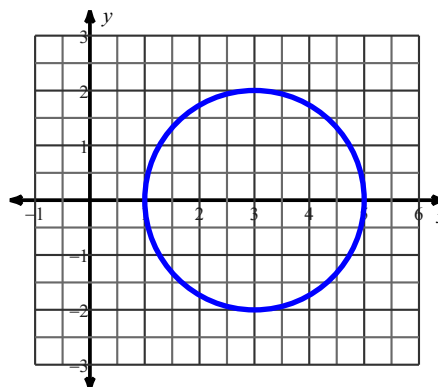
13) Center: $(0, 13)$
Point on Circle: $(-2, 14)$

14) Center: $(12, -8)$
Point on Circle: $(13, -6)$

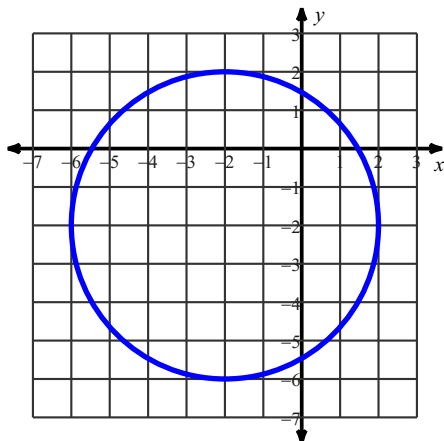
15)



16)



17)



18)

