

Summary

In this lesson students use Geometer’s Sketchpad. First, they create a triangle and it’s perpendicular bisectors, create a circle with center at the intersection of the perpendicular bisectors, and observe that the intersection of the perpendicular bisectors creates a circle which circumscribes the triangle. Second, they use a right triangle within a circle to develop the equation for a circle. Third, they show how the distance formula relates to the equation for a circle.

Enduring Understanding

We can use what we know about the distance formula to help us derive a formula for circles. From this formula we can identify the radius of the circle as well as the location of the center.

Essential Questions

How does a circle formula help us? How is the circle formula related to the distance formula?

Skill Focus

- Triangle circum-centers
- Using the distance formula
- Deriving and using circle formulas

Vocabulary Focus

Assessment

Materials

Launch

“Have students work in pairs and do part II-IV. Observe the discuss that goes on between partners.”

Explore

- How can you create a circle from any triangle?
- How does the distance formula work?
- How can we derive a formula for circles using the distance formula?
- What can we tell about a circle from its formula?

“Have students work in pairs and do part II-IV. Observe the discuss that goes on between partners.”
 “The students really struggled with the word conjecture even though we all discussed it ahead of time. Maybe a few examples could be given at the front of the worksheet. We wouldn’t use this lesson again unless we did it as a class lesson. The students really had a difficult time making any useful connections.”

Summarize

“Bring everyone back together and talk about what they discovered”

Apply

“This lesson brought up a lot of questions about the core- should we try to teach everything there is to know about circles? The angle stuff is okay, but some of the segment formulas get fairly complicated, and hard for the students to remember. How vital is equation of a circle, beyond the CRT’s? We don’t have all the answers, but we had a good discussion. For our lesson, we did some different things- using technology and not using technology. Both had pros and cons... The good things in this meeting were the discussion, and the realization that hi or lo tech is not as important as using inquiry to teach the concept.”

Directions:

Have students investigate the problems below. Allow them to do as much as possible by themselves. They can make the connections better if they must think about it instead of just being told.

Geo 4.5 Triangles and Circles, Circle Equations

I. Create a circle by using a triangle.

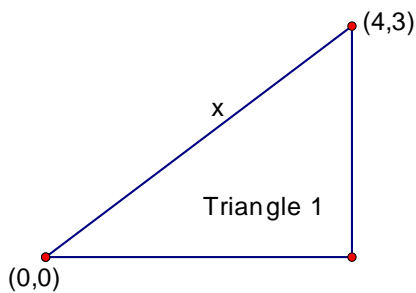
- Use geometer's sketchpad or graph paper to create any triangle ABC.
- Construct the perpendicular bisectors of two of the three sides. Label the intersection of the perpendicular bisectors D.
- Find the length of AD, BD, and CD. What do you observe?

- Create a circle with center D. Change the radius to match the measure of AD, BD, and CD.
- What did you just prove? _____

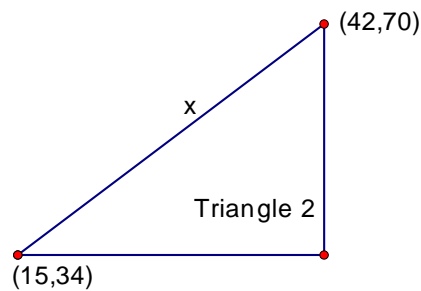
II. Use a right triangle to define a circle equation.

Use the two triangles below to explain where the distance formula comes from.

For triangle 1, show how to use the Pythagorean theorem to find x .



For triangle 2, show how to use the distance formula to find x .



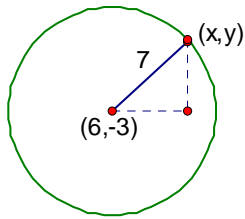
Explain how the distance formula works.

III. Show how the distance formula relates to the equation of a circle.

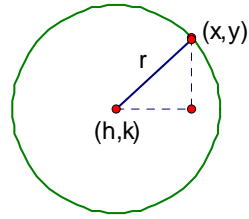
For circle 1, use the distance Formula to write the equation

Use circle 2 and the distance formula to write the standard form of the equation for a circle,

of the circle.



circle 1



circle 2

III. Given the center and radius, 1) draw the circle on graph paper, and 2) write the equation of the circle.

a) Center = (3, -2), r = 3

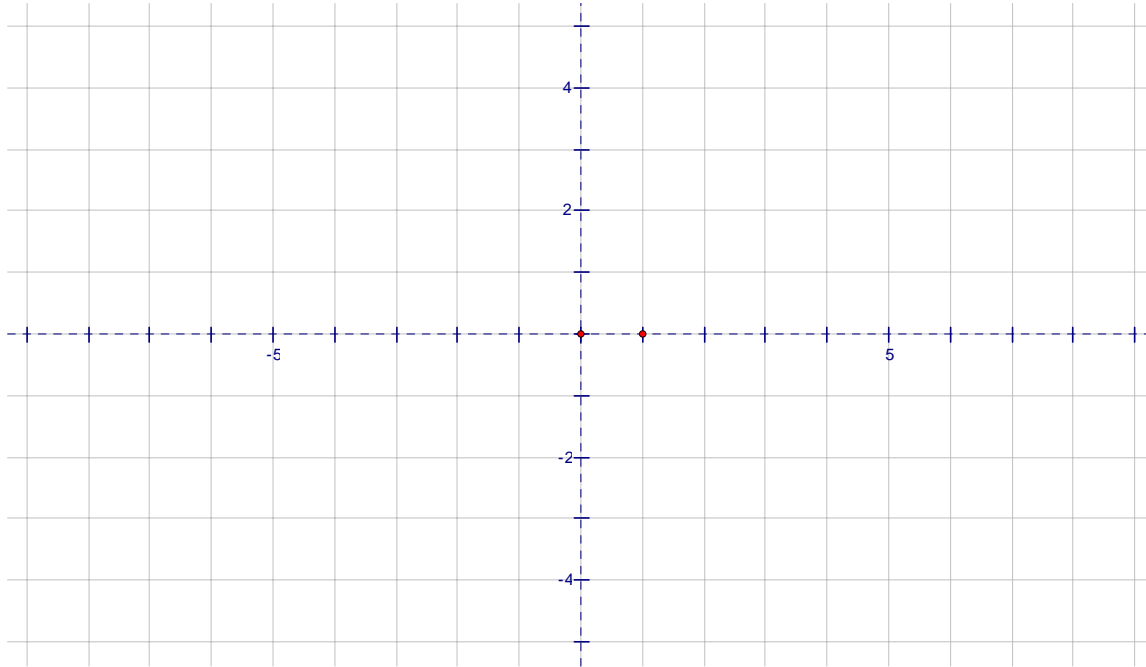
b) Center = (0, 4), r = 4

c) Center = (-2, -1), r = 5

Equation

Equation

Equation



IV. Find the center and radius of the circle.

$$(x - 2)^2 + (y - 5)^2 = 36$$

Center is _____ Radius is _____

$$(x + 5)^2 + (y + 4)^2 = 49$$

Center is _____ Radius is _____