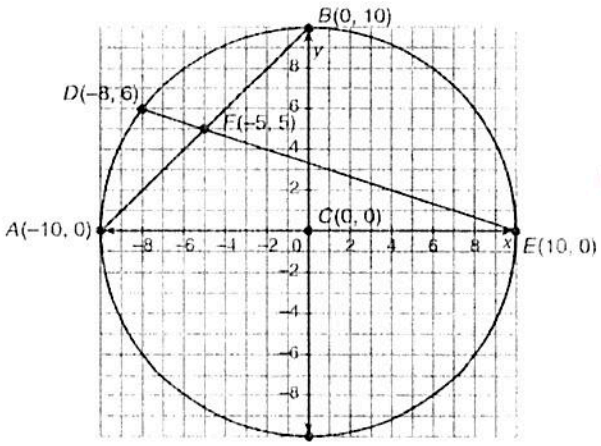
Name Key Date

The Coordinate Plane

Circles and Polygons on the Coordinate Plane

1. In circle C, chords $\overline{AB}$ and $\overline{DE}$ intersect at point F. Use the given information to algebraically show that if two chords intersect, then the product of the lengths of the segments of one chord is equal to the product of the lengths of the segments of the other chord.

* distance formula *



$DF = \sqrt{10}$

$AF = \sqrt{50}$

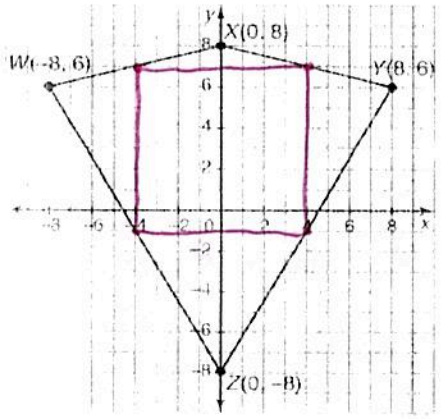
$EF = \sqrt{250}$

$BF = \sqrt{50}$

$\sqrt{10} \times \sqrt{250} = \sqrt{50} \times \sqrt{50}$

$50 = 50$

2. Quadrilateral *WXYZ* is a kite. Draw the quadrilateral formed by connecting the midpoints of the sides of the kite and label this quadrilateral *ABCD*. Then classify quadrilateral *ABCD*. Show all your work.



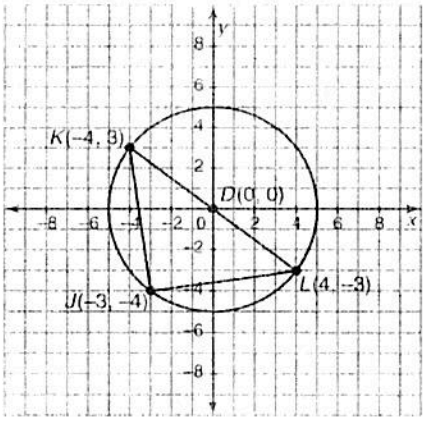
Square

(Side lengths of 8)

* use midpoint formula *

Name _____ Date _____

3. Triangle *JKL* is inscribed in circle *D*.



a. Show that △*JKL* is an isosceles right triangle.

* legs are ≅

↓

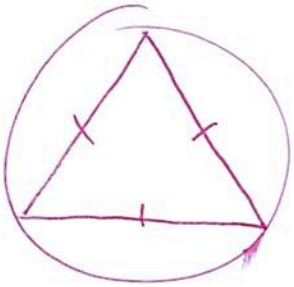
distance

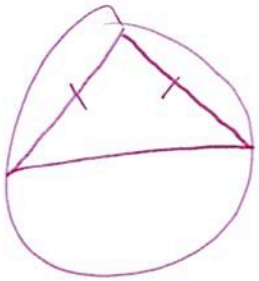
$KJ = \sqrt{50}$

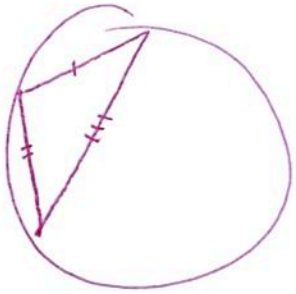
$JL = \sqrt{50}$ > ≅ → isosceles

b. Is a triangle inscribed in a circle always an isosceles right triangle or only under certain conditions? Explain how you know.

Not always







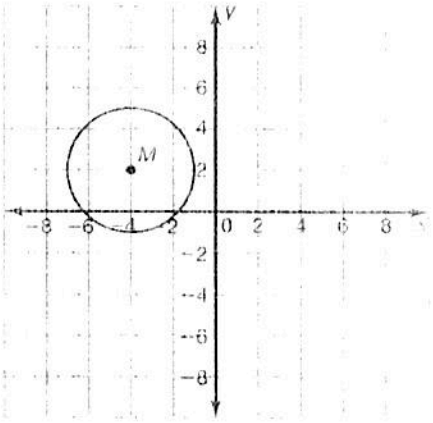
Name _____ Date _____

Bring On the Algebra
Deriving the Equation for a Circle

1. Write an equation in standard form for:

   a. a circle with a center at M (−4, 2) and a radius of 3.

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

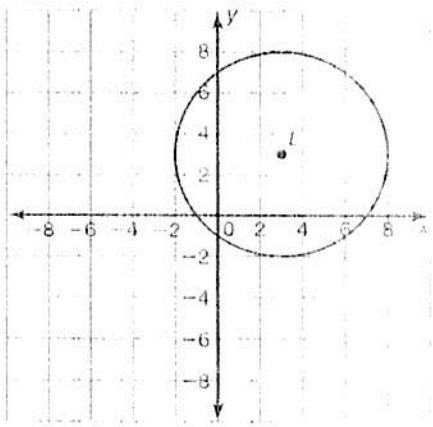


   b. a circle with the same center as the circle M, but whose circumference is 20 times that of circle M.

$(x+4)^2 + (y-2)^2 = 3600$

   c. a circle with a center at L (3, 3) and a radius of 5.

$(x-3)^2 + (y-3)^2 = 25$



   d. a circle with the same center as the circle L, but whose area is 20 times that of circle L.

$(x-3)^2 + (y-3)^2 = 500$

2. Determine if each equation represents a circle. If so, describe the location of the center and radius.

a. $x^2 + y^2 - 4x + 6y + 9 = 0$

Yes → $(x-2)^2 + (y+3)^2 = 4$

center : $(2, -3)$

$r = 2$

b. $4x^2 + 4y^2 - 8x - 20y - 30 = 0$

Yes → $(x-1)^2 + (y-2.5)^2 = 14.75$

Center : $(1, 2.5)$

$r = \sqrt{14.75} \approx 3.84$

c. $3x^2 + y^2 + 3x + 9y - 15 = 0$

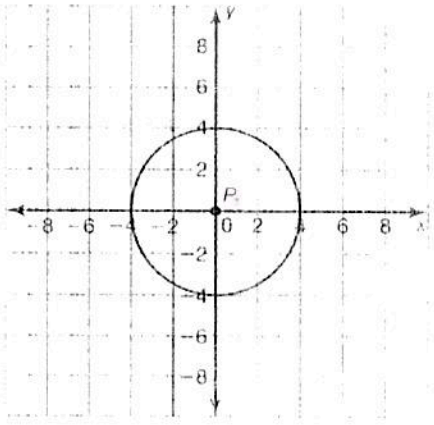
No

Name _____ Date _____

Is That Point on the Circle?

Determining Points on a Circle

1. Consider circle P centered at the origin with a radius of 4 units as shown.



   a. Verify that point $K(1, \sqrt{15})$ lies on circle P.

$1^2 + \sqrt{15}^2 = 4^2$

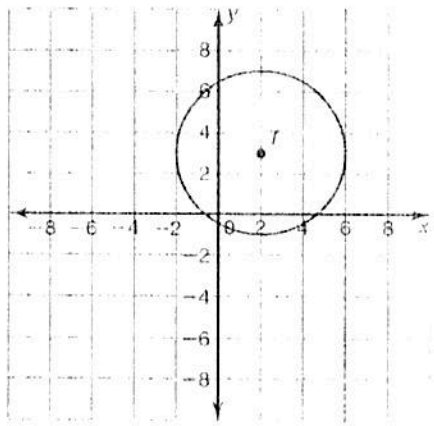
$1 + 15 = 16$

$16 = 16$ ✓ yes

   b. Use symmetry to determine three more points on circle P.

$(-1, \sqrt{15})$ $(-1, -\sqrt{15})$ $(1, -\sqrt{15})$

2. Consider circle T with its center point located at (2, 3) with a radius of $3\sqrt{2}$ units as shown.



   a. Verify that point $R(5, 0)$ lies on circle T.

$3^2 + 3^2 = (3\sqrt{2})^2$

$9 + 9 = 18$

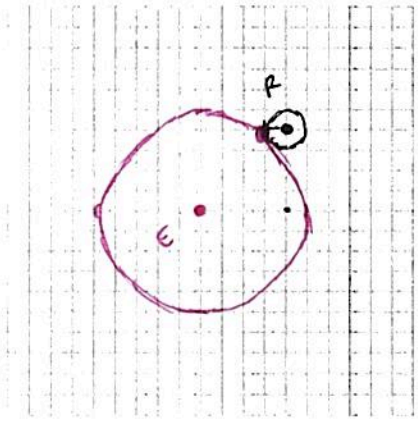
$18 = 18$ ✓ yes

   b. Use symmetry to determine three more points on circle P.

$(5, 6)$ $(-1, 0)$ $(-1, 6)$

3. Maddie brought home a new puppy, Ralph, which she needs to introduce to her current dog, Ellie. She ties Ellie in the middle of her backyard. She ties a shorter rope, exactly 4 feet to the east and 4 feet north of Ellie's rope, for her new puppy, Ralph. Based upon the graph, the dogs can meet at the point (3, 4).

   a. Graph the range each dog will be able to travel on their rope. Use the origin as the place where Ellie is tied down. Show your work.



Ellie 5-radius

Ralph 1-radius

   b. Use symmetry to describe the location of the other point that is on the very edge of both of the dogs' ranges.

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