

- B May 28, Class 9A, Week 5, Lesson B
- The following students should complete this assignment Lesson B: Boiangiu, Brickman, Epstein, Mousseiri, Zelikovitz
Read pages 103 and 104 attached
- Do the attached problems pages 1 through 6

Rotations

Rotations of 90° will result in a line perpendicular to the original, so the slope will be the negative reciprocal. To write the equation of a line after a 90° rotation, use the same procedure for translations and dilations, except use the negative reciprocal of the slope.

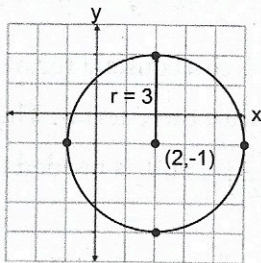
EQUATION OF THE CIRCLE**Center Radius Form of the Equation of a Circle**

$(x - h)^2 + (y - k)^2 = r^2$ where the center has coordinates (h, k) and radius has length r .

- To graph a circle, first identify the center and radius from the equation. Plot a point at the center. Then plot points up, down, left, and right a distance r from the center.

Example:

Graph the equation $(x - 2)^2 + (y + 1)^2 = 9$.



The center is located at $(2, -1)$, and $r^2 = 9$, so $r = 3$. We plot the center point at $(2, -1)$; then plot points up, down, right, and left 3 units from the center. Use these four points as a guide to complete the circle.

General Form of the Equation of a Circle

$$x^2 + y^2 + Cx + Dy + E = 0$$

To find the coordinates of the center and the radius from the general form of the equation, you will need to convert it to the center-radius form using the following procedure:

1. Group the x -terms and y -terms on one side of the equation, and the constant on the other side of the equation.
2. Complete the square with the x -terms, and then complete the square with the y -terms.

Example:

- Find the coordinates of the center and the length of the radius of a circle whose equation is $x^2 + 4x + y^2 - 6y + 7 = 0$.

Solution:

Bring the constant term to the right.

$$x^2 + 4x + y^2 - 6y = -7$$

The coefficient of x is 4, so a constant term of $\left(\frac{4}{2}\right)^2$, or 4, is needed to complete the square with the x -terms. The coefficient of y is -6 , so a constant term of $\left(\frac{-6}{2}\right)^2$, or 9, is needed to complete the square with the y -terms.

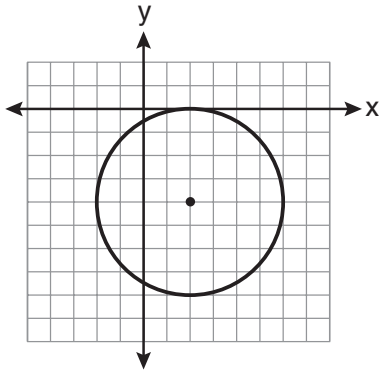
$$x^2 + 4x + 4 + y^2 - 6y + 9 = -7 + 4 + 9$$

$$(x + 2)^2 + (y - 3)^2 = 6$$

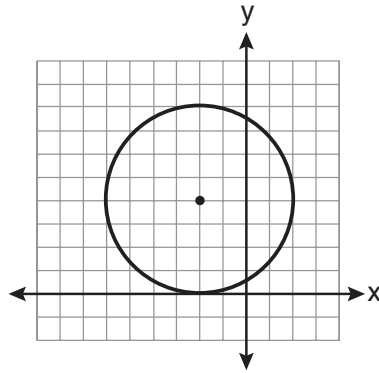
The center has coordinates $(-2, 3)$ and the radius has a length of $\sqrt{6}$.

Use this space for computations.

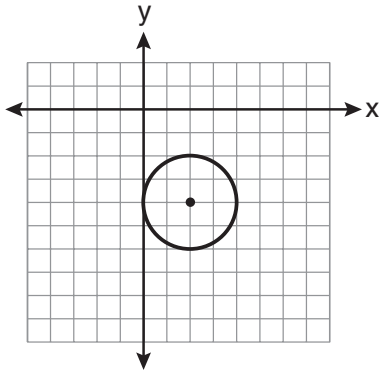
1. The equation of a circle is $(x - 2)^2 + (y + 4)^2 = 4$. Which diagram is the graph of the circle?



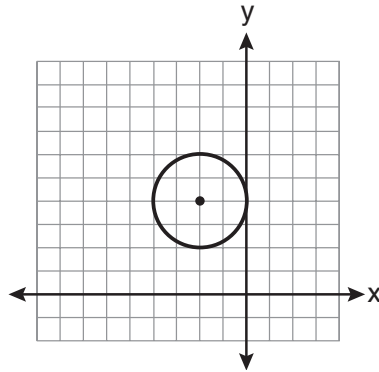
(1)



(3)



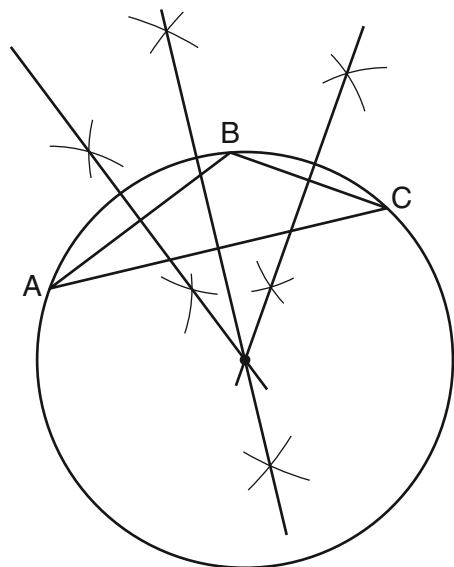
(2)



(4)

**Use this space for
computations.**

2. The diagram below shows the construction of the center of the circle circumscribed about $\triangle ABC$.

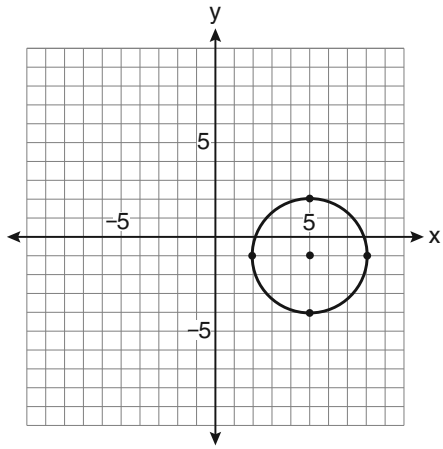


This construction represents how to find the intersection of

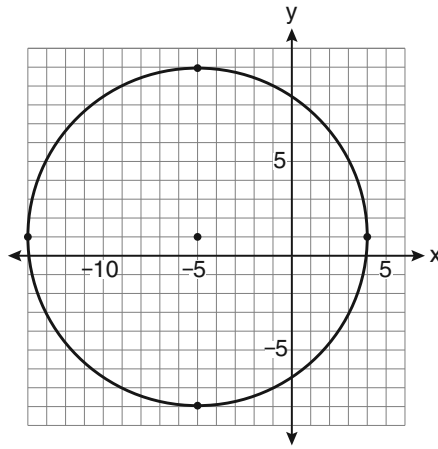
- (1) the angle bisectors of $\triangle ABC$
- (2) the medians to the sides of $\triangle ABC$
- (3) the altitudes to the sides of $\triangle ABC$
- (4) the perpendicular bisectors of the sides of $\triangle ABC$

Use this space for computations.

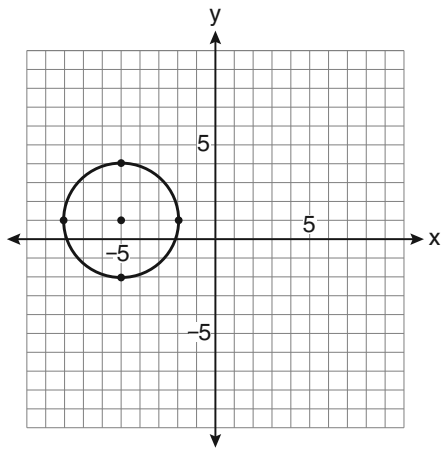
3 Which graph represents a circle with the equation $(x - 5)^2 + (y + 1)^2 = 9$?



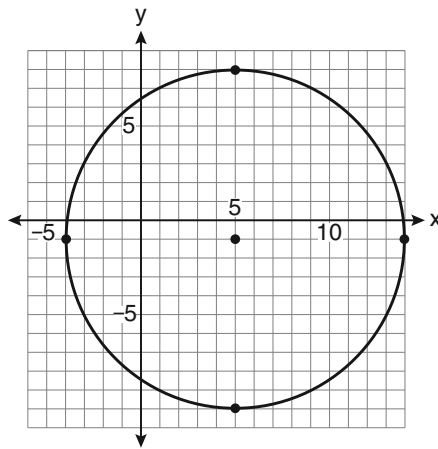
(1)



(3)



(2)



(4)

**Use this space for
computations.**

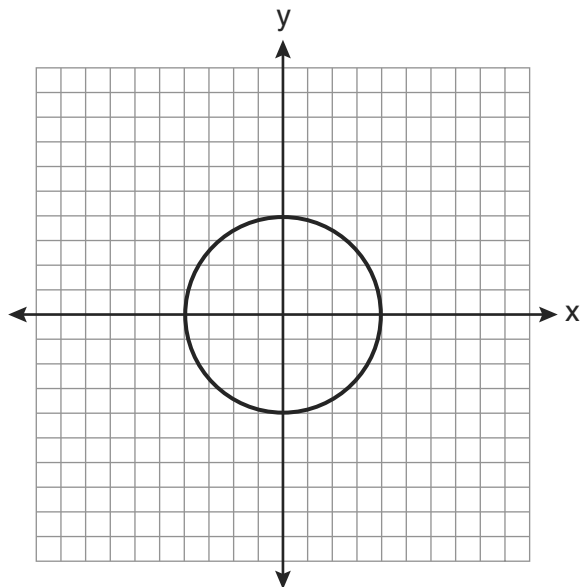
4 Which equation represents the circle whose center is $(-2,3)$ and whose radius is 5?

(1) $(x - 2)^2 + (y + 3)^2 = 5$ (3) $(x + 2)^2 + (y - 3)^2 = 25$

(2) $(x + 2)^2 + (y - 3)^2 = 5$ (4) $(x - 2)^2 + (y + 3)^2 = 25$

**Use this space for
computations.**

5 What is an equation for the circle shown in the graph below?



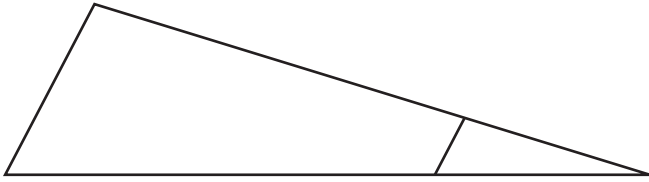
(1) $x^2 + y^2 = 2$

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

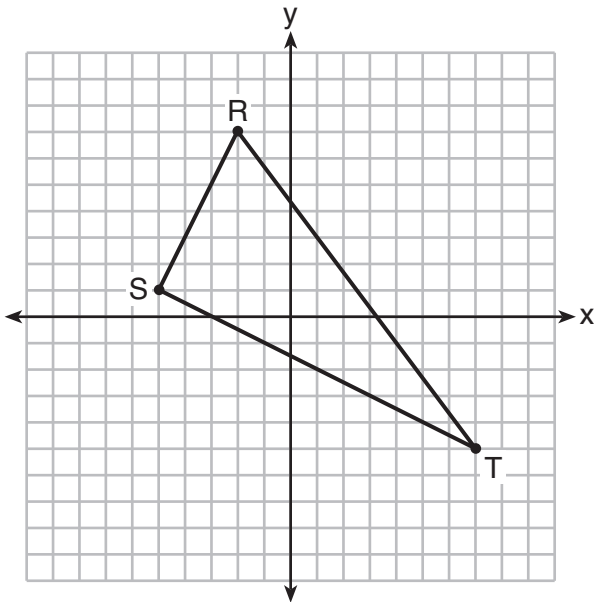
(3) $x^2 + y^2 = 8$

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

Use this space for
computations.



6 Triangle RST is graphed on the set of axes below.



How many square units are in the area of $\triangle RST$?

- (1) $9\sqrt{3} + 15$ (3) 45
(2) $9\sqrt{5} + 15$ (4) 90