

Lesson 4 Practice Problems

1. Match each equation to its description.

- | | |
|---|--------------------------------|
| A. circle centered at $(0, -4)$ with a radius of 3 | 1. $(x - 1)^2 + y^2 = 9$ |
| B. circle centered at $(1, -4)$ with a radius of $\sqrt{3}$ | 2. $x^2 + (y + 4)^2 = 9$ |
| C. circle centered at $(1, 4)$ with a radius of $\sqrt{3}$ | 3. $(x - 1)^2 + (y - 4)^2 = 3$ |
| D. circle centered at $(1, 0)$ with a radius of 3 | 4. $(x - 1)^2 + (y + 4)^2 = 9$ |
| E. circle centered at $(1, -4)$ with a radius of 3 | 5. $(x - 1)^2 + (y + 4)^2 = 3$ |

2. Write an equation of a circle that is centered at $(-3, 2)$ with a radius of 5.

- A. $(x - 3)^2 + (y + 2)^2 = 5$
- B. $(x + 3)^2 + (y - 2)^2 = 5$
- C. $(x - 3)^2 + (y + 2)^2 = 25$
- D. $(x + 3)^2 + (y - 2)^2 = 25$
3. a. Plot the circles $x^2 + y^2 = 4$ and $x^2 + y^2 = 1$ on the same coordinate plane.
- b. Find the image of any point on $x^2 + y^2 = 4$ under the transformation $(x, y) \rightarrow \left(\frac{1}{2}x, \frac{1}{2}y\right)$.
- c. What do you notice about $x^2 + y^2 = 4$ and $x^2 + y^2 = 1$?

4. $(x, y) \rightarrow (x - 3, 4 - y)$ is an example of a transformation called a glide reflection. Complete the table using the rule.

Does this glide reflection produce a triangle congruent to the original?

input	output
(1, 1)	(-2, 3)
(6, 1)	
(3, 5)	

(From Unit 6, Lesson 3.)

5. The triangle whose vertices are (1, 1), (5, 3), and (4, 5) is transformed by the rule $(x, y) \rightarrow (3x, 3y)$. Is the image similar or congruent to the original figure?

- A. The image is congruent to the original triangle.
- B. The image is similar but not congruent to the original triangle.
- C. The image is neither similar nor congruent to the original triangle.

(From Unit 6, Lesson 3.)

6. Match each coordinate rule to a description of its resulting transformation.

A. $(x, y) \rightarrow (3x, 3y)$

B. $(x, y) \rightarrow (x - 3, y - 3)$

C. $(x, y) \rightarrow (x + 3, y + 3)$

D. $(x, y) \rightarrow (x - 3, y)$

E. $(x, y) \rightarrow (x + 3, y)$

F. $(x, y) \rightarrow (x, y - 3)$

G. $(x, y) \rightarrow (x, y + 3)$

1. Translate along the directed line segment from $(0, 0)$ to $(-3, 0)$.

2. Translate along the directed line segment from $(0, 0)$ to $(0, -3)$.

3. Translate along the directed line segment from $(0, 0)$ to $(3, 0)$.

4. Translate along the directed line segment from $(0, 0)$ to $(0, 3)$.

5. Translate along the directed line segment from $(0, 0)$ to $(3, 3)$.

6. Translate along the directed line segment from $(0, 0)$ to $(-3, -3)$.

7. Dilate using the origin as the center and a scale factor of 3.

(From Unit 6, Lesson 2.)

7. A cone-shaped container is oriented with its circular base on the top and its apex at the bottom. It has a radius of 18 inches and a height of 6 inches. The cone starts filling up with water. What fraction of the volume of the cone is filled when the water reaches a height of 2 inches?

A. $\frac{1}{729}$

B. $\frac{1}{27}$

C. $\frac{1}{9}$

D. $\frac{1}{3}$

(From Unit 5, Lesson 14.)