### Lesson 4 Practice Problems

1. Match each equation to its description.
	1. circle centered at $\left(0,-4\right)$ with a radius of 3
	2. circle centered at $\left(1,-4\right)$ with a radius of $\sqrt{3}$
	3. circle centered at $\left(1,4\right)$ with a radius of $\sqrt{3}$
	4. circle centered at $\left(1,0\right)$ with a radius of 3
	5. circle centered at $\left(1,-4\right)$ with a radius of 3
	6. $\left(x−1\right)^{2}+y^{2}=9$
	7. $x^{2}+\left(y+4\right)^{2}=9$
	8. $\left(x−1\right)^{2}+\left(y−4\right)^{2}=3$
	9. $\left(x−1\right)^{2}+\left(y+4\right)^{2}=9$
	10. $\left(x−1\right)^{2}+\left(y+4\right)^{2}=3$
2. Write an equation of a circle that is centered at $\left(-3,2\right)$ with a radius of 5.
	1. $\left(x−3\right)^{2}+\left(y+2\right)^{2}=5$
	2. $\left(x+3\right)^{2}+\left(y−2\right)^{2}=5$
	3. $\left(x−3\right)^{2}+\left(y+2\right)^{2}=25$
	4. $\left(x+3\right)^{2}+\left(y−2\right)^{2}=25$
	5. Plot the circles $x^{2}+y^{2}=4$ and $x^{2}+y^{2}=1$ on the same coordinate plane.
	6. Find the image of any point on $x^{2}+y^{2}=4$ under the transformation $\left(x,y\right)\rightarrow \left(\frac{1}{2}x,\frac{1}{2}y\right)$.
	7. What do you notice about $x^{2}+y^{2}=4$ and $x^{2}+y^{2}=1$?
3. $\left(x,y\right)\rightarrow \left(x−3,4−y\right)$ 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
 |
| --- | --- |
| * $\left(1,1\right)$
 | * $\left(-2,3\right)$
 |
| * $\left(6,1\right)$
 | *
 |
| * $\left(3,5\right)$
 | *
 |

* (From Unit 6, Lesson 3.)
1. The triangle whose vertices are $\left(1,1\right),\left(5,3\right),$ and $\left(4,5\right)$ is transformed by the rule $\left(x,y\right)\rightarrow \left(3x,3y\right)$. Is the image similar or congruent to the original figure?
	1. The image is congruent to the original triangle.
	2. The image is similar but not congruent to the original triangle.
	3. The image is neither similar nor congruent to the original triangle.
* (From Unit 6, Lesson 3.)
1. Match each coordinate rule to a description of its resulting transformation.
	1. $\left(x,y\right)\rightarrow \left(3x,3y\right)$
	2. $\left(x,y\right)\rightarrow \left(x−3,y−3\right)$
	3. $\left(x,y\right)\rightarrow \left(x+3,y+3\right)$
	4. $\left(x,y\right)\rightarrow \left(x−3,y\right)$
	5. $\left(x,y\right)\rightarrow \left(x+3,y\right)$
	6. $\left(x,y\right)\rightarrow \left(x,y−3\right)$
	7. $\left(x,y\right)\rightarrow \left(x,y+3\right)$
	8. Translate along the directed line segment from $\left(0,0\right)$ to $\left(-3,0\right)$.
	9. Translate along the directed line segment from $\left(0,0\right)$ to $\left(0,-3\right)$.
	10. Translate along the directed line segment from $\left(0,0\right)$ to $\left(3,0\right)$.
	11. Translate along the directed line segment from $\left(0,0\right)$ to $\left(0,3\right)$.
	12. Translate along the directed line segment from $\left(0,0\right)$ to $\left(3,3\right)$.
	13. Translate along the directed line segment from $\left(0,0\right)$ to $\left(-3,-3\right)$.
	14. Dilate using the origin as the center and a scale factor of 3.
* (From Unit 6, Lesson 2.)
1. 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?
	1. $\frac{1}{729}$
	2. $\frac{1}{27}$
	3. $\frac{1}{9}$
	4. $\frac{1}{3}$
* (From Unit 5, Lesson 14.)



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