Unit 4 - Lesson 26
Characteristics of Parallel Lines

Name:
Date: $\qquad$ Period: $\qquad$

Focus Standards: 8.EE.B. 5 Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.
8.EE.C. 8 Analyze and solve pairs of simultaneous linear equations.
a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.
b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, $3 x+2 y=5$ and $3 x+2 y=6$ have no solution because $3 x+2 y$ cannot simultaneously be 5 and 6 .
c. Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.

## Student Outcomes

- Students know that when a system of linear equations has no solution, i.e., no point of intersection of the lines, then the lines are parallel.


## Exercises

1. Sketch the graphs of the system: $\left\{\begin{array}{l}y=\frac{2}{3} x+4 \\ y=\frac{4}{6} x-3\end{array}\right.$

a. Identify the slope of each equation. What do you notice?
b. Identify the $y$-intercept of each equation. Are the $y$-intercepts the same or different?
2. Sketch the graphs of the system: $\left\{\begin{array}{l}y=-\frac{5}{4} x+7 \\ y=-\frac{5}{4} x+2\end{array}\right.$

a. Identify the slope of each equation. What do you notice?
b. Identify the $y$-intercept of each equation. Are the $y$-intercepts the same or different?
3. Sketch the graphs of the system: $\left\{\begin{array}{l}y=2 x-5 \\ y=2 x-1\end{array}\right.$

a. Identify the slope of each equation. What do you notice?
b. Identify the $y$-intercept of each equation. Are the $y$-intercepts the same or different?
4. Write a system of equations that has no solution.
5. Write a system of equations that has $(2,1)$ as a solution.
6. How can you tell if a system of equations has a solution or not?
7. Does the system of linear equations shown below have a solution? Explain.
$\left\{\begin{array}{l}6 x-2 y=5 \\ 4 x-3 y=5\end{array}\right.$
$(4 x-3 y=5$
8. Does the system of linear equations shown below have a solution? Explain.
$\left\{\begin{array}{c}-2 x+8 y=14 \\ x=4 y+1\end{array}\right.$
$x=4 y+1$
9. Does the system of linear equations shown below have a solution? Explain.
$\left\{\begin{array}{c}12 x+3 y=-2 \\ 4 x+y=7\end{array}\right.$
$4 x+y=7$
10. Genny babysits for two different families. One family pays her $\$ 6$ each hour and a bonus of $\$ 20$ at the end of the night. The other family pays her $\$ 3$ every half hour and a bonus of $\$ 25$ dollars at the end of the night. Write and solve the system of equations that represents this situation. At what number of hours do the two families pay the same for babysitting services from Genny?

## Problem Set

Answer Problems 1-5 without graphing the equations.
11. Does the system of linear equations shown below have a solution? Explain.
$\{2 x+5 y=9$
$\{-4 x-10 y=4$
12. Does the system of linear equations shown below have a solution? Explain.
$\left\{\begin{array}{l}\frac{3}{4} x-3=y \\ 4 x-3 y=5\end{array}\right.$ $4 x-3 y=5$
13. Does the system of linear equations shown below have a solution? Explain.
$\left\{\begin{array}{l}x+7 y=8 \\ 7 x-y=-2\end{array}\right.$
14. Does the system of linear equations shown below have a solution? Explain.
$\{y=5 x+12$
(10x-2y=1
15. Does the system of linear equations shown below have a solution? Explain.
$\left\{\begin{array}{l}y=\frac{5}{3} x+15 \\ 5 x-3 y=6\end{array}\right.$
16. Given the graphs of a system of linear equations below, is there a solution to the system that we cannot see on this portion of the coordinate plane? That is, will the lines intersect somewhere on the plane not represented in the picture? Explain.

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19. Given the graphs of a system of linear equations below, is there a solution to the system that we cannot see on this portion of the coordinate plane? That is, will the lines intersect somewhere on the plane not represented in the picture? Explain.

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