Equations of Lines

Reporting Category Equations and Inequalities

Topic Writing equations of lines

Primary SOL A.6 The student will graph linear equations and linear inequalities in two variables, including

a) determining the slope of a line when given an equation of the line, the graph of the line, or two points on the line. Slope will be described as rate of change and will be positive, negative, zero, or undefined; and

b) writing the equation of a line when given the graph of the line, two points on the line, or the slope and a point on the line.

Related SOL A.7d

Materials

- Scissors
- Slope-Intercept Cards (attached)
- Silent Bingo Game Card (attached)
- Silent Bingo Game Problems (attached)
- Graphing calculators (optional)
- Graph paper (optional)

Vocabulary

horizontal line form, point-slope form, rate of change, slope, slope-intercept form, standard form, vertical line form, x-*intercept,* y-*intercept* (A.6)

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

1. Give each student a pair of scissors and a copy of the attached set of Slope-Intercept Cards. Have students cut the cards apart and then match up the cards to make sets of five cards each—equation in standard form, equation in slope-intercept form, *m*, *b*, and graph.
2. Distribute copies of the Silent Bingo Game Card and the Silent Bingo Game Problems. Have students play the Silent Bingo Game individually. Tell students that they may work the numbered problems in any order. Once they have completed a problem, they should search for its answer on the Bingo card and place the problem number in the small box directly above the answer. Whenever a student gets "Bingo," check his/her game card.
3. Encourage students to complete other problems once they get "Bingo." (Note: If students work the problems in order, they will need to do most of the problems to get "Bingo.")

Assessment

- **Questions**
  - Write the equation of a line that has an undefined slope.
  - Write the equation of a line that has a zero slope.
  - Write the equation of a line that has a negative slope and a positive *y*-intercept.

  - Write the equation of a line that has a positive slope and a positive *x*-intercept.
- **Journal/Writing Prompts**
  - Explain why the graph of a horizontal line does not have an *x*-intercept. Describe how you know this from the equation.
  - Explain why the graph of a vertical line does not have a *y*-intercept. Describe how you know this from the equation.
- **Other**
  - Have students create a design on graph paper, using at least 10 lines. Have them write the equations of the lines, including the start and stop points for each line. Alternatively, have students program their designs, using software or graphing calculators.

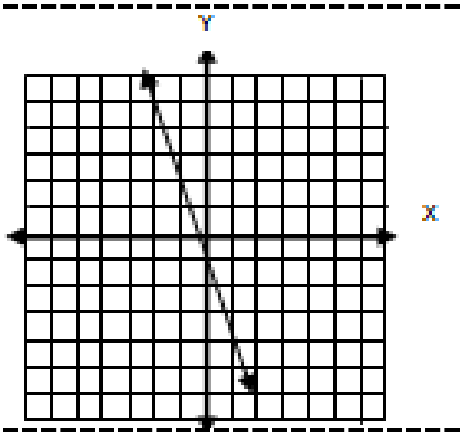
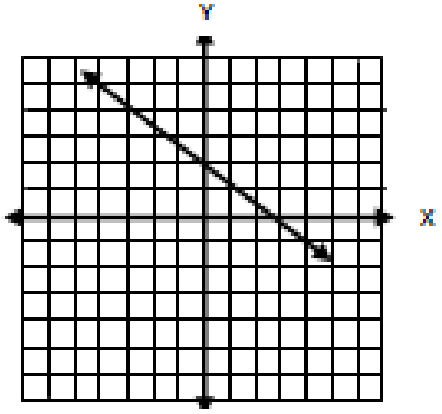
Strategies for Differentiation

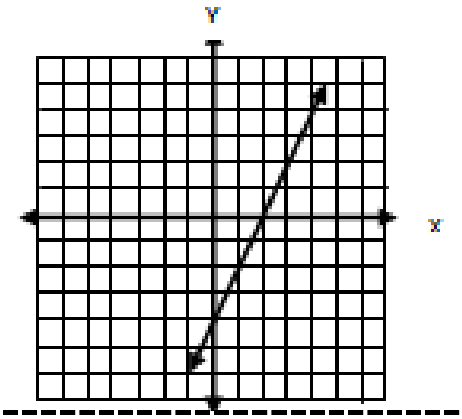
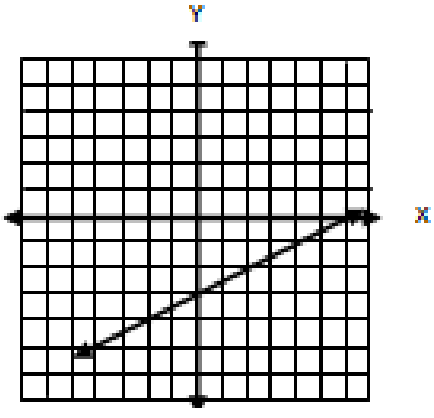
- Encourage use of graph paper, graphing calculators, and white boards with grids for students to see the slope and intercepts.
- Laminate the Slope-Intercept Cards so students can write on the cards with dry erase markers.
- Have students work in pairs for both activities, as needed.

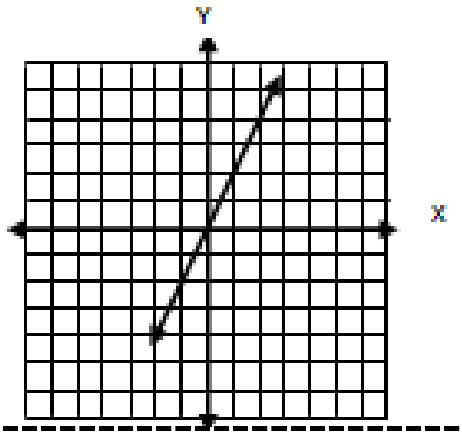
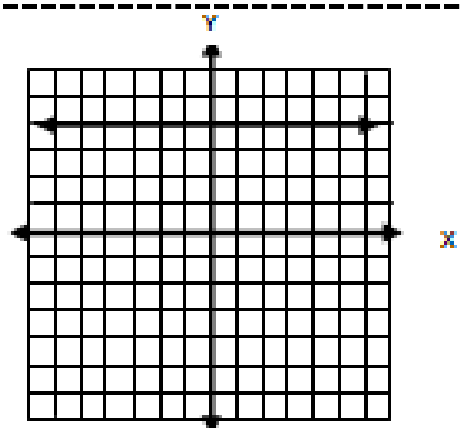
Slope-Intercept Cards

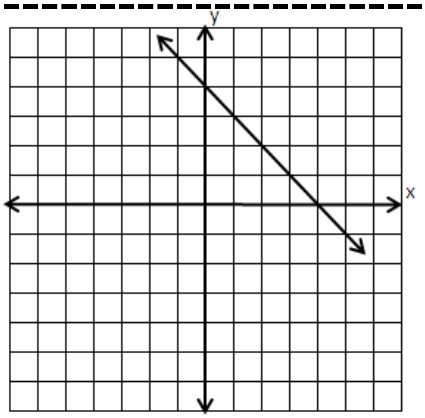
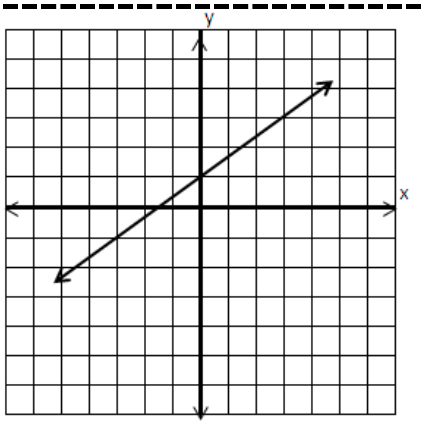
Copy on cardstock and cut out.

$3x + y = -1$	$x + y = 4$
$3x + 4y = 8$	$2x - y = 4$
$x - 2y = 6$	$2x - 3y = -3$
$2x - y = 0$	$2y = 8$

$y = -3x - 1$	$m = -3$
$b = -1$	
$y = -\frac{3}{4}x + 2$	$m = -\frac{3}{4}$
$b = 2$	

$y = 2x - 4$	$m = 2$
$b = -4$	
$y = \frac{1}{2}x - 3$	$m = \frac{1}{2}$
$b = -3$	

$y = 2x$	$m = 2$
$b = 0$	
$y = 4$	$m = 0$
$b = 4$	

$y = -x + 4$	$m = -1$
$b = 4$	
$y = \frac{2}{3}x + 1$	$m = \frac{2}{3}$
$b = 1$	

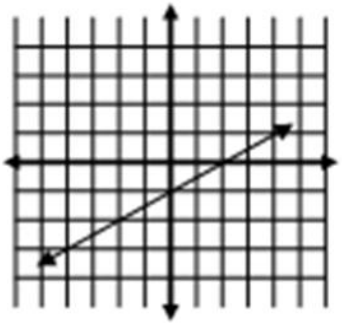
Silent Bingo Game Card

B	I	N	G	O
☐ $y = 2x + 1$	☐ $y = \frac{1}{3}x + 3$	☐ $y = \frac{1}{2}x - 1$	☐ $x = 8$	☐ $y = 3x - 5$
☐ $y = \frac{1}{2}x + 4$	☐ $y = -\frac{1}{3}x$	☐ $y = -5x + 11$	☐ $y = -x - 2$	☐ $x = 2$
☐ $y = 3x + 2$	☐ $y = -2x + 9$	Free Space	☐ $y = 4$	☐ $y = -2x + 3$
☐ $y = \frac{1}{2}x + 6$	☐ $y = -\frac{1}{3}x + 1$	☐ $y = -2x + 1$	☐ $y = -\frac{3}{2}x + 3$	☐ $y = 6x - 8$
☐ $y = -3$	☐ $y = 2$	☐ $y = 4x + 2$	☐ $y = \frac{1}{2}x + 1$	☐ $y = 3x$

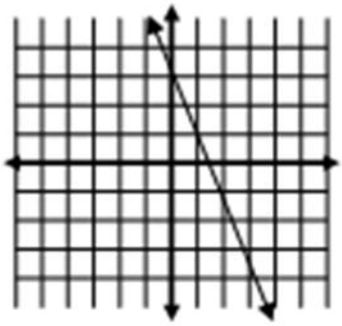
Silent Bingo Game Problems

Find the equation of each line in the problems below. Match the equation to the answer on your game card, and write the number of each problem in its correct answer box.

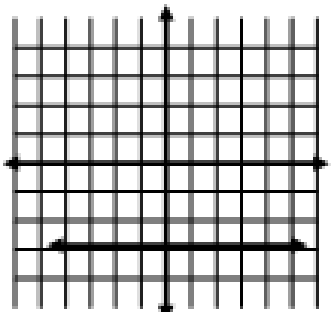
1.



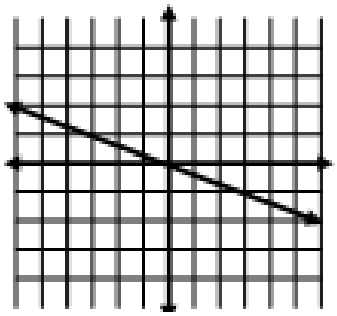
2.



3.



4.



5. slope = $\frac{1}{2}$ y-intercept = 1

6. $m = 4$ $b = 2$

7. slope = 0 y-intercept = 4

8. m = undefined x-intercept = 2

9. slope = 3 y-intercept = 0

10. slope = $-\frac{1}{3}$ y-intercept = 1

11. $m = 2$ (1, 3)

12. $m = -1$ (−4, 2)

13. $m = \frac{1}{2}$ (2, 5)

14. $m = 3$ (0, 2)

15. $m = \frac{1}{3}$ (−3, 2)

16. (2, −3) (−3, 7)

17. (2, 4) (1, −2)

18. (0, −5) (3, 4)

19. (1, 6) (3, −4)

20. $m = \frac{1}{2}$ (−2, 5)

21. (6, −3) $m = -2$

22. (2, 0) (−2, 6)

23. (12, 2) (7, 2)

24. (8, 1) (8, −1)