

Think

Can you eliminate choices?

Yes. The boundary line is solid and the region below it is shaded, so you know the inequality symbol must be \leq . You can eliminate choices C and D.

Problem 5 Writing an Inequality From a Graph

Multiple Choice Which inequality represents the graph at the right?

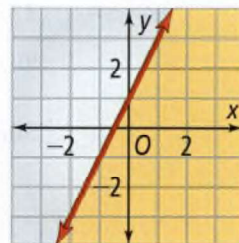
A $y \leq 2x + 1$

C $y \geq 2x + 1$

B $y \leq x + 1$

D $y < 2x + 1$

The slope of the line is 2 and the y -intercept is 1, so the equation of the boundary line is $y = 2x + 1$. The boundary line is solid, so the inequality symbol is either \leq or \geq . The symbol must be \leq , because the region below the boundary line is shaded. The inequality is $y \leq 2x + 1$.



The correct answer is A.

- Got It?** 5. You are writing an inequality from a graph. The boundary line is dashed and has slope $\frac{1}{3}$ and y -intercept -2 . The area above the line is shaded. What inequality should you write?

Lesson Check

Do you know HOW?

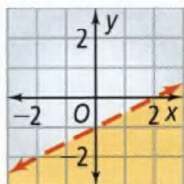
1. Is $(-1, 4)$ a solution of the inequality $y < 2x + 5$?

Graph each linear inequality.

2. $y \leq -2x + 3$

3. $x < -1$

4. What is an inequality that represents the graph at the right?



Do you UNDERSTAND? MATHEMATICAL PRACTICES

5. **Vocabulary** How is a linear inequality in two variables like a linear equation in two variables? How are they different?
6. **Writing** To graph the inequality $y < \frac{3}{2}x + 3$, do you shade above or below the boundary line? Explain.
7. **Reasoning** Write an inequality that describes the region of the coordinate plane *not* included in the graph of $y < 5x + 1$.



Practice and Problem-Solving Exercises MATHEMATICAL PRACTICES

A Practice

Determine whether the ordered pair is a solution of the linear inequality.

See Problem 1.

8. $y \leq -2x + 1$; $(2, 2)$

9. $x < 2$; $(-1, 0)$

10. $y \geq 3x - 2$; $(0, 0)$

11. $y > x - 1$; $(0, 1)$

12. $y \geq -\frac{2}{5}x + 4$; $(0, 0)$

13. $3y > 5x - 12$; $(-6, 1)$

Graph each linear inequality.

See Problem 2.

14. $y \leq x - 1$

15. $y \geq 3x - 2$

16. $y < -4x - 1$

17. $y > 2x - 6$

18. $y < 5x - 5$

19. $y \leq \frac{1}{2}x - 3$

20. $y > -3x$

21. $y \geq -x$

Graph each inequality in the coordinate plane.

See Problems 3 and 4.

22. $x \leq 4$

23. $y \geq -1$

24. $x > -2$

25. $y < -4$

26. $-2x + y \geq 3$

27. $x + 3y < 15$

28. $4x - y > 2$

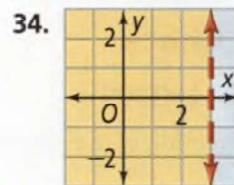
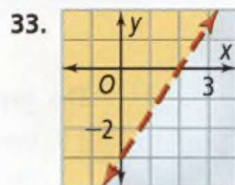
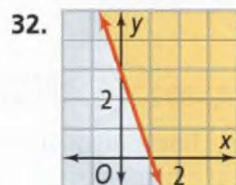
29. $-x + 0.25y \leq -1.75$

30. Carpentry You budget \$200 for wooden planks for outdoor furniture. Cedar costs \$2.50 per foot and pine costs \$1.75 per foot. Let x = the number of feet of cedar and let y = the number of feet of pine. What is an inequality that shows how much of each type of wood can be bought? Graph the inequality. What are three possible amounts of each type of wood that can be bought within your budget?

31. Business A fish market charges \$9 per pound for cod and \$12 per pound for flounder. Let x = the number of pounds of cod. Let y = the number of pounds of flounder. What is an inequality that shows how much of each type of fish the store must sell today to reach a daily quota of at least \$120? Graph the inequality. What are three possible amounts of each fish that would satisfy the quota?

Write a linear inequality that represents each graph.

See Problem 5.



B Apply

35. Think About a Plan A truck that can carry no more than 6400 lb is being used to transport refrigerators and upright pianos. Each refrigerator weighs 250 lb and each piano weighs 475 lb. Write and graph an inequality to show how many refrigerators and how many pianos the truck could carry. Will 12 refrigerators and 8 pianos overload the truck? Explain.

- What inequality symbol should you use?
- Which side of the boundary line should you shade?

36. Employment A student with two summer jobs earns \$10 per hour at a cafe and \$8 per hour at a market. The student would like to earn at least \$800 per month.

- Write and graph an inequality to represent the situation.
- The student works at the market for 60 h per month and can work at most 90 h per month. Can the student earn at least \$800 each month? Explain how you can use your graph to determine this.

37. Error Analysis A student graphed $y \geq 2x + 3$ as shown at the right. Describe and correct the student's error.

38. Writing When graphing an inequality, can you always use $(0, 0)$ as a test point to determine where to shade? If not, how would you choose a test point?

C Challenge

39. Music Store A music store sells used CDs for \$5 each and buys used CDs for \$1.50 each. You go to the store with \$20 and some CDs to sell. You want to have at least \$10 left when you leave the store. Write and graph an inequality to show how many CDs you could buy and sell.

