

Example 1 Dashed Boundary

Graph $x + 4y > 2$.

Step 1 The boundary of the graph is the graph of $x + 4y = 2$. Since the inequality symbol is $>$, the boundary will be dashed.

Step 2 Test the point $(0, 0)$ because it is not on the boundary.

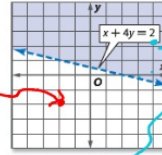
$x + 4y > 2$	Original inequality
$0 + 4(0) \not> 2$	$(x, y) = (0, 0)$
$0 > 2$ ✗	False

The region that does *not* contain $(0, 0)$ is shaded.

CHECK The graph indicates that $(0, 3)$ is a solution.

$x + 4y > 2$	Original inequality
$0 + 4(3) \not> 2$	$(x, y) = (0, 3)$
$12 > 2$ ✓	True

The solution checks.



$-2 + -8 > 2$ (2, -2)
 $-10 > 2$

$4 + 4(2) > 2$ (4, 2)
 $4 + 8 > 2$
 $12 > 2$

2-8 Graphing Linear and Absolute Value Inequalities

Example 1 Graph each inequality. 1-4. See margin.

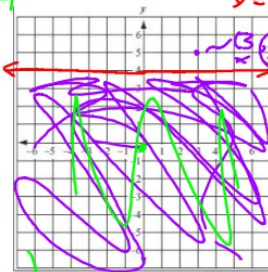
1. $y \leq 4$

3. $x + 4y \leq 2$

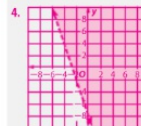
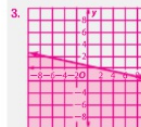
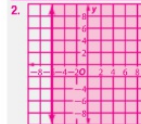
2. $x \geq -6$

4. $3x + y > -8$

$(0, 0)$
 $0 \leq 4$



Additional Answers



Real-World Example 2 Solid Boundary

RECREATION A recreation center offers various 30-minute and 60-minute art classes. The recreation director has allotted up to 20 hours per week for art classes.

- a. Write an inequality to represent the number of classes that can be offered per week. Graph the inequality.

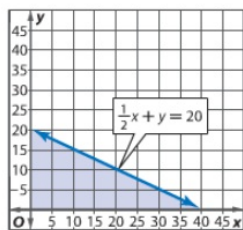
Let x represent the number of 30-minute or $\frac{1}{2}$ -hour art classes, and let y represent the number of 60-minute or 1-hour art classes. Because the sum can equal the maximum, the inequality symbol is \leq , and the boundary is solid. The inequality is $\frac{1}{2}x + y \leq 20$.

Step 1 Graph the boundary $\frac{1}{2}x + y = 20$.

Step 2 Test the point $(0, 0)$.

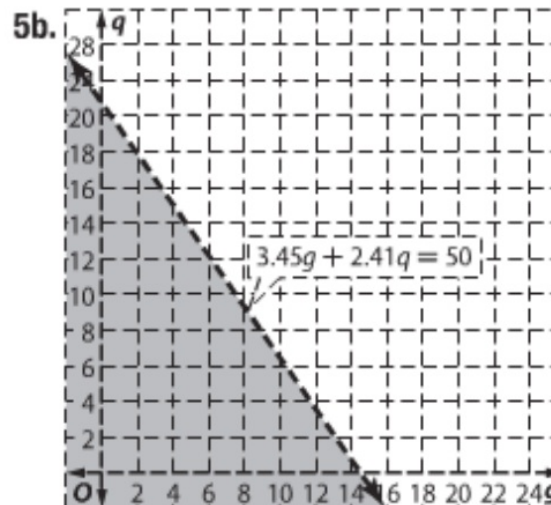
$$\begin{aligned} \frac{1}{2}x + y &\leq 20 && \text{Original inequality} \\ \frac{1}{2}(0) + (0) &\leq 20 && (x, y) = (0, 0) \\ 0 &\leq 20 && \checkmark \text{ True} \end{aligned}$$

The region that contains $(0, 0)$ is shaded.



- b. Can the recreation director schedule 25 of the 30-minute classes and 15 of the 60-minute classes during a given week? Explain your reasoning.

The point $(25, 15)$ lies outside the shaded region, so it does not satisfy the inequality. Thus, the recreation director cannot schedule 25 30-minute and 15 60-minute classes.



Example 2

5. **CCSS MODELING** Gregg needs to buy gas and oil for his car. Gas costs \$3.45 a gallon, and oil costs \$2.41 a quart. He has \$50 to spend.

- a. Write an inequality to represent the situation, where g is the number of gallons of gas he buys and q is the number of quarts of oil. $3.45g + 2.41q \leq 50$
- b. Graph the inequality. **See Chapter 2 Answer Appendix.**
- c. Can Gregg buy 10 gallons of gasoline and 8 quarts of oil? Explain.

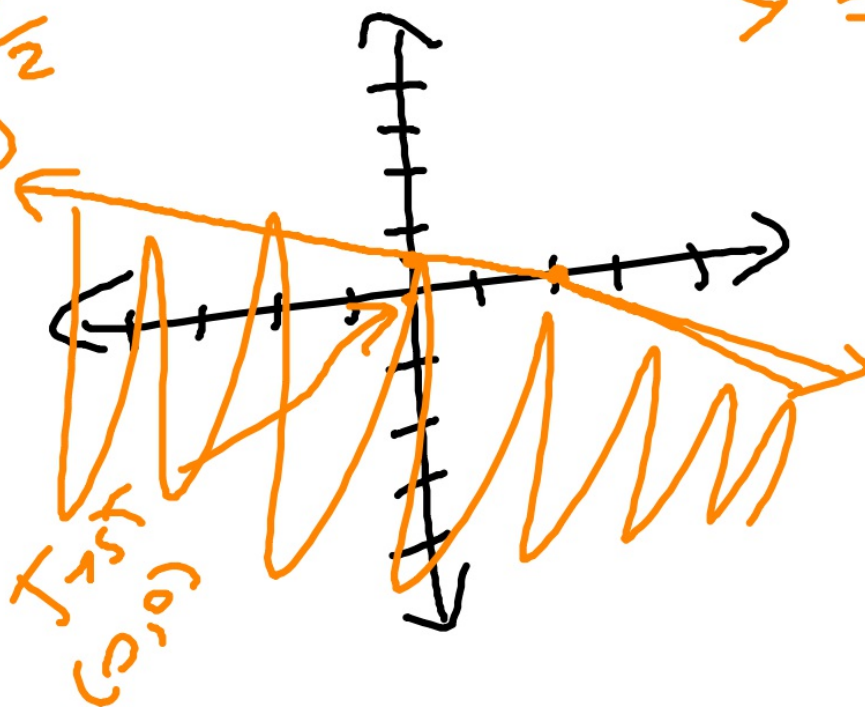
5c. No; (10, 8) is not in the shaded region.

3. $x + 4y \leq 2$ ← $0 + 0 \leq 2$

③ $x + 4y = 2$ $0 + 4y = 2$

$4y = 2$
 $y = \frac{1}{2}$

x	y
0	$\frac{1}{2}$
2	0



Example 1 Graph each inequality. **8–13. See Chapter 2 Answer Appendix.**

8. $x + 2y > 6$

9. $y \geq -3x - 2$

10. $2y + 3 \leq 11$

11. $4x - 3y > 12$

12. $6x + 4y \leq -24$

13. $y \geq \frac{3}{4}x + 6$

Example 2

14. **COLLEGE** April's guidance counselor says that she needs a combined score of at least 1700 on her college entrance exams to be eligible for the college of her choice. The highest possible score is 2400. There are 1200 possible points on the math portion and 1200 on the verbal portion.
- The inequality $x + y \geq 1700$ represents this situation, where x is the verbal score and y is the math score. Graph this inequality. **See Chapter 2 Answer Appendix.**
 - Refer to your graph. If she scores a 680 on the math portion of the test and 910 on the verbal portion of the test, will April be eligible for the college of her choice? **no**

Example 3

Graph each inequality. **15–20. See Chapter 2 Answer Appendix.**

15. $y > |3x|$

16. $y + 4 \leq |x - 2|$

17. $y - 6 < |-2x|$

18. $y + 8 < 2\left|\frac{2}{3}x + 6\right|$

19. $2y > |4x - 5|$

20. $-y \leq |3x - 4|$

21. **SCHOOL DANCE** Carlos estimates that he will need to earn at least \$700 to take his girlfriend to the prom. Carlos works two jobs as shown in the table.

Job	Pay
Main St. Deli	\$8 per hour
Babysitting	\$6 per hour

- Write an inequality to represent this situation. **$8a + 6b \geq 700$**
- Graph the inequality.
- Will he make enough money if he works 50 hours at each job? **yes**

21b. See Chapter 2 Answer Appendix.

**27. 01
no**

