

# Homework Assignment

## Chapter 3: Solving Inequalities

### Big Ideas:

- You can use algebraic inequalities to represent relationships between quantities that are not equal.
- You can represent an inequality using symbols in an infinite number of ways. Equivalent representations have the same solutions.
- You can use properties of inequality to transform an inequality into simpler equivalent inequalities and then find solutions.

### Essential Understanding

- An inequality is a mathematical sentence that uses an inequality symbol to compare the values of two expressions.
- A solution to an inequality is any number that makes the inequality true. You can use a number line to visually represent the values that satisfy an inequality (the solution).
- Just as you use the properties of equality to solve equations, you use the addition, subtraction, multiplication and division properties of inequality to solve inequalities.
- Equivalent inequalities are inequalities that have the same solutions.
- You solve one, two and multi-step inequalities in the same way you “DID” equations
- A set is a collection of distinct elements, and can be defined in several ways including roster and rule/set notation. Given two or more sets, you can describe which elements belong to at least one of the sets (union/or), and which elements belong to all of the sets (intersection/and).
- A compound inequality consists of two distinct inequalities joined by the words “and” or “or”. You find the solutions of a compound inequality by identifying where the solutions sets overlap (intersection/and), or by combining the solution sets to form a larger solution set (union/or).
- Absolute value equations and inequalities are solved by isolating the absolute value and defining its meaning using compound equations or compound inequalities.

### Homework

All homework is done in a notebook or on loose leaf.

Unless problem is meant to be a “mental” problem, all work should be shown.

If assigned the alternate evens, do these problems:

2, 6, 10, 14, 18, 22, 26, 30, 34, 38, 42, 46, 50, 54, 58, 62, 66, 70, 74, 78, 82, 86, 90, 94, 98, 102, etc.

- Section 3-1: Inequalities and their Graphs: pgs. 168-170: 10-38 alternate evens; 40, 42, 43, 56, 57, 60, 61, 62; 65-75
- Section 3-2: Solving Inequalities Using Addition & Subtraction: pgs. 174-177: 14-26 alternate evens; 34, 38, 42-44; 48-50; 54-62 alternate evens, just solve; 69, 70, 71; 81-89
- Section 3-3: Solving Inequalities Using Multiplication & Division: pgs. 181-183: 10-30 alternate evens, solve only; 31, 32; 41-44; 50, 54, 58, 59; 65-73
- Section 3-4: Solving Multi-Step Inequalities: pgs. 190-192: 10-42 alternate evens; 44, 45, 47, 51, 53-56; 58-65
- Section 3-5: Working with Sets: pgs. 197-199: 10-46 alternate evens; 53-63

- Section 3-8: Union & Intersection of Sets: pgs. 218-220: 10-38 alternate evens; 39; 46-59
- Section 3-6: Compound Inequalities: pgs. 204-206: 10-22 alternate evens; 35-42; 49; 53-61
- Section 3-7: Absolute Value Equations & Inequalities: pgs. 211-213: 10-46 alternate evens; 50-58 alternate evens; 64, 65; 71-74; 77-79; 83-93
- Optional: Chapter Test: pg. 227: 1-29 all (Extra Credit for Test)

### Steps to Solving a Single Variable First Degree Inequality

1. **Distribute** both sides of the inequality (where applicable) & combine like terms.
2. Use addition (or subtraction) property of inequality to **Isolate the variable(s)** on one side of the inequality and to **Isolate the constant(s)** on the other side of the inequality & combine like terms.
3. **Divide** (or multiply by the reciprocal) both sides of the inequality by the coefficient of the variable to make the coefficient of the variable = "1". **Remember if you multiply or divide both sides of an inequality by a negative value you MUST REVERSE your inequality sign.**
4. **Check your answer**, by substituting **two** values found for the variable into the **original inequality**. (Remember to check the minimum / maximum value of the solution **and** one other value)

\*\*\*\*\* Remember: **Inequalities' Bill of Rights!** \*\*\*\*\*

What you do to one side of an inequality you **MUST** do to the other side of the inequality.

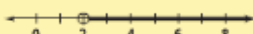
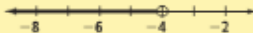
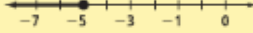
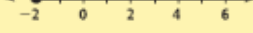
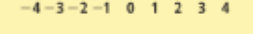


### Answers:

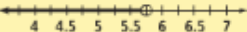
### 3-1:

## Answers

### Practice and Problem-Solving Exercises

8.  $v \geq 5$
9.  $b < 4$
10.  $g - 3 \leq 17$
11.  $\frac{k}{9} > \frac{1}{3}$
12. a. no  
b. no  
c. no
13. a. yes  
b. no  
c. yes
14. a. no  
b. no  
c. no
15. a. yes  
b. no  
c. no

16. a. no  
b. yes  
c. no
17. D
18. B
19. A
20. C
21. 
22. 
23. 
24. 
25. 
26. 
27. 

28. 

29.  $x > -4$
30.  $x \leq 8$
31.  $x \geq 2$
32.  $x < -7$
33.  $x \geq 5$
34.  $x < 2$
35. Let  $p$  = the number of people seated;  
 $p \leq 172$ .
36. Let  $a$  = age of person being elected;  
 $a \geq 35$ .
37. Let  $w$  = number of watts of the light bulb;  
 $w \leq 75$ .
38. Let  $s$  = number of students at concert;  
 $s \geq 475$ .
39. Let  $m$  = amount of money earned;  
 $m > 20,000$ .

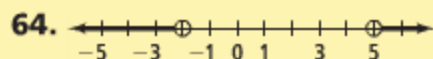
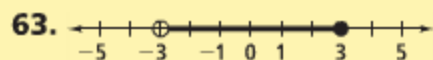
- 40.** Answers may vary. Sample:  
You can use a counterexample to explain the student's error. For instance, when  $x = -1$ ,  $3(-1) + 1 = -3 + 1 = -2$ , and  $-2 \not\geq 0$ .
- 41.** Check students' work.
- 42.** D
- 43.**  $x \leq 186,000$
- 44.**  $n$  is less than 5.
- 45.**  $b$  is greater than 0.
- 46.** 7 is greater than or equal to  $x$ .
- 47.**  $z$  is greater than or equal to 25.6.
- 48.** 4 is greater than  $q$ .
- 49.** 21 is greater than or equal to  $m$ .
- 50.** 35 is greater than or equal to  $w$ .
- 51.** 2 less than  $g$  is less than 7.

- 52.**  $a$  is less than or equal to 3.
- 53.**  $r$  more than 6 is greater than  $-2$ .
- 54.** 8 is less than or equal to  $h$ .
- 55.** 1.2 is greater than  $k$ .
- 56.**  $m \leq 108$
- 57.** Answers may vary. Sample: *No more than* means "is less than or equal to," since the amount cannot be greater than the given number. *No less than* means "is greater than or equal to," since the amount cannot be less than the given number.
- 58.**  $x \geq 973$  mi
- 59.**  $998 > 978$ , so Option A  $>$  Option B.

**60.** D; answers may vary. Sample: Use reasoning or guess and check to see that values of  $x$  that are less than 3 make the inequality true.

**61.** Answers may vary. Sample: If  $0 > -2$ , then  $0^2 > (-2)^2$ , or  $0 > 4$ , which is false.

**62.**  $x$  and  $y$  are additive inverses.



**65.** C

**66.** F

**67.** A

**68.** [2]

(OR equivalent diagram)  $f > 842$  (OR equivalent inequality)

[1] incorrect diagram or incorrect inequality

[1] incorrect

**69.** increase; 20%

**70.** decrease; 10%

**71.** decrease; 67%

**72.** 44

**73.**  $-\frac{5}{24}$

**74.**  $-3$

**75.**  $-1\frac{3}{7}$

**76.** 11

**77.**  $-2$

**78.**  $-11$

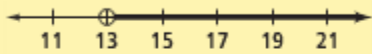
**79.**  $-\frac{1}{9}$

# 3-2:

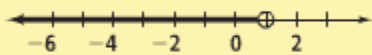
## Lesson 3-2

### Practice and Problem-Solving Exercises page 174

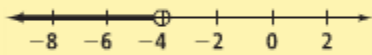
13.  $y > 13$



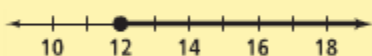
14.  $v < 1$



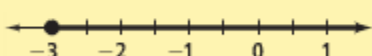
15.  $c < -4$



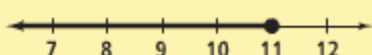
16.  $f \geq 12$



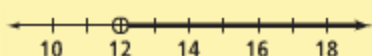
17.  $t \geq -3$



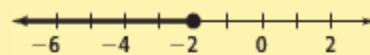
18.  $s \leq 11$



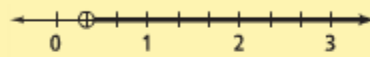
19.  $p > 12$



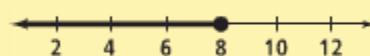
20.  $x \leq -2$



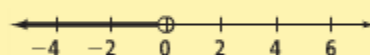
21.  $f > \frac{1}{3}$



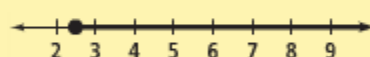
22.  $z \leq 8$



23.  $r < 0$



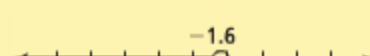
24.  $y \geq 2.5$



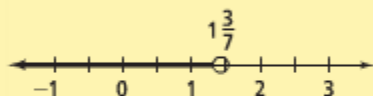
25.  $s < 4.7$



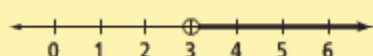
26.  $n < -1.6$



27.  $c < 1\frac{3}{7}$

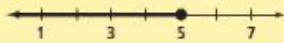


28.  $p > 3$

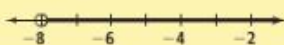


29. 3      30.  $\frac{7}{5}$       31. 4.2      32.  $\frac{1}{3}$

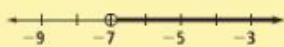
33.  $x \leq 5$



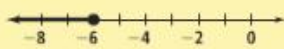
34.  $n > -8$



35.  $c > -7$



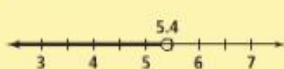
36.  $b \leq -6$



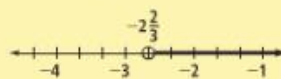
37.  $a \geq -1$



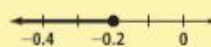
38.  $z < 5.4$



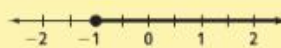
39.  $n > -2\frac{2}{3}$



40.  $b \leq -0.2$



41.  $d \geq -1$



42.  $5274 + s \geq 10,000$ ;  $s \geq 4726$

43.  $3 + 4 + g \geq 10$ ;  $g \geq 3$

44.  $d \leq 250 - 20 - 100$ ;  $d \leq 130$

45. Add 4 to each side.

46. Subtract 9 from each side.

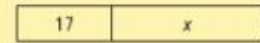
47. Add  $\frac{1}{2}$  to each side.

48. no

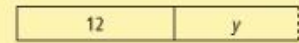
49. yes

50. no

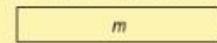
51.  $17 + x = 51$



52.  $12 + y = 18$



53.  $m = 13 - 3$



54.  $y \geq 12$

55.  $d \leq 2$

56.  $z < 5.3$

57.  $-4\frac{4}{5} > p$

58.  $a < -9.8$

59.  $-1.2 > z$

60.  $v > -\frac{3}{16}$

61.  $p > 12$

62.  $y < 3$

63.  $h \geq -\frac{7}{8}$

64.  $v \geq -3$

65.  $5\frac{7}{16} \geq m$

66. at least 19 senators

67. a. yes

b. No; in the first inequality,  $r$  is greater than or equal to the amount. In the second inequality,  $r$  is less than or equal to the amount.

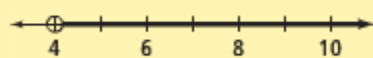
c. In part (a), these are equations with only one solution. In part (b), because the inequality relationship is different, there is no relationship between the two inequalities.

68. any three numbers greater than or equal to 8.3 and less than or equal to 10; sample: 8.4, 8.5, 8.6

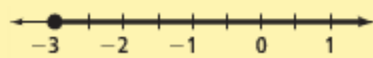
69. Answers may vary. Sample: 94, 95, or 96.

70. 3 should be added to both sides of the inequality;

$$-3 + x + 3 > 1 + 3, x > 4.$$



71. The graph should be shaded to the right, not the left.



72. a. Check students' work.

b. Check students' work.

73. a. No; the solution should be  $a \geq 8.6 - 3.2$ , or  $a \geq 5.4$ .

b. Answers may vary. Sample: Other numbers that are not substituted could also be solutions to the inequality.

74. a. acute

b. right

c. obtuse

75. at least \$88.74
76. not true; sample:  $x = 5$  and  $y = -2$
77. true
78. true
79. not true; sample:  
 $x = 5, y = 3, w = 4$
80. Answers may vary. Sample:  
 $a = 1, b = 2, c = -3, d = 0$
81. D
82. H
83. C
84. [2] more than 4;  $4 \times 15 = 60$  and  $4 \times 14 = 56, 56 + g > 60$ , so  $g > 4$  (OR equivalent work)
- [1] incorrect solution with appropriate work OR correct solution with no work shown or incorrect work shown

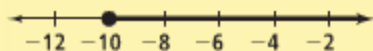
85. Let  $h$  = distance in miles the hummingbird migrates;  $h > 1850$ .
86. Let  $o$  = length of octopus in feet;  
 $o \leq 18$ .
87. 72
88. -1
89. 0.56
90. 20
91.  $-\frac{15}{22}$
92. -24

### 3-3:

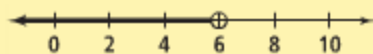
#### Lesson 3-3

#### Practice and Problem-Solving Exercises page 181

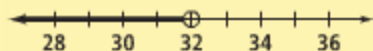
7.  $x \geq -10$



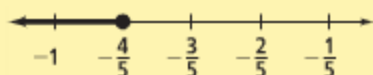
8.  $w < 6$



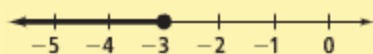
9.  $p < 32$



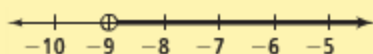
10.  $y \leq -\frac{4}{5}$



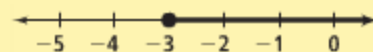
11.  $v \leq -3$



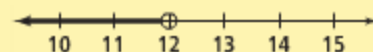
12.  $x > -9$



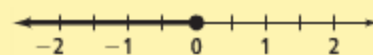
13.  $x \geq -3$



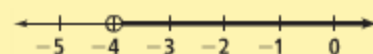
14.  $k < 12$



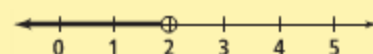
15.  $m \leq 0$



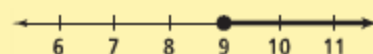
16.  $b > -4$



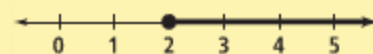
17.  $m < 2$



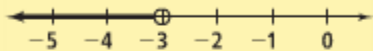
18.  $y \geq 9$



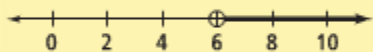
19.  $m \geq 2$



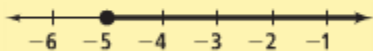
20.  $t < -3$



21.  $c > 6$



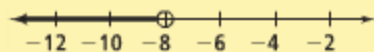
22.  $w \geq -5$



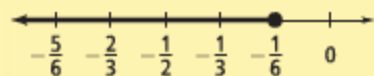
23.  $z > -3$



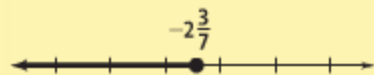
24.  $d < -8$



25.  $b \leq -\frac{1}{6}$



26.  $y \leq -2\frac{3}{7}$



## Answers

### Practice and Problem-Solving Exercises (continued)

31. no more than 66 text messages  
 32. at most 6 tetras  
 33–36. Answers may vary. Samples are given.  
 33.  $-5, -4, -3, -2$   
 34.  $-12, -11, -10, -9$   
 35.  $-6, -5, -4, -3$   
 36.  $-3, -2, -1, 0$   
 37. Multiply each side by  $-4$  and reverse the inequality symbol.  
 38. Multiply each side by  $5$ .  
 39. Divide each side by  $5$ .  
 40. Multiply each side by  $\frac{4}{3}$ .  
 41.  $-2$    42.  $-5$    43.  $4$    44.  $18$   
 45. Sometimes true; sample: It is true when  $x = 4$  and  $y = 0.5$  but false when  $x = 4$  and  $y = -2$ .

46. Always true; the product of two negative numbers is always greater than  $0$ .  
 47. Sometimes true; sample: It is true when  $x = 4$  and  $y = 2$  but false when  $x = 0$  and  $y = 2$ .  
 48. Sometimes true; sample: It is true when  $x = 4$  and  $y = 2$  but false when  $x = 4$  and  $y = 0$ .  
 49. at least  $0.08$  mi per min  
 50.  $\frac{-4.5}{9} > \frac{9p}{9}$    Div. Prop. of Ineq.  
 $-0.5 > p$    Simplify.  
 51.  $3(-1) \geq 3(\frac{t}{3})$    Mult. Prop. of Ineq.  
 $-3 \geq t$    Simplify.  
 52.  $\frac{4}{3}(\frac{3}{4}n) < \frac{4}{3}(4)$    Mult. Prop. of Ineq.  
 $n < \frac{16}{3}$    Simplify.  
 53.  $2(0.5) \leq 2(\frac{1}{2}c)$    Mult. Prop. of Ineq.  
 $1 \leq c$    Simplify.  
 54.  $\frac{-8u}{-8} > \frac{4}{-8}$    Div. Prop. of Ineq.  
 $u > -\frac{1}{2}$    Simplify.  
 55.  $5(\frac{n}{5}) \leq 5(-2)$    Mult. Prop. of Ineq.  
 $n \leq -10$    Simplify.  
 56.  $\frac{-12}{4} > \frac{4a}{4}$    Div. Prop. of Ineq.  
 $-3 > a$    Simplify.  
 57.  $-\frac{7}{5}(1) > -\frac{7}{5}(-\frac{5}{7}s)$    Mult. Prop. of Ineq.  
 $-\frac{7}{5} > s$    Simplify.  
 58. at least  $7\frac{3}{11}$  h  
 59. If the most expensive sandwiches and drinks are ordered, the cost is  $3(7) + 3(2) = 27$ , leaving  $\$3$ . If the most expensive snack is bought, the least number of snacks you can afford is  $1$ . If the least expensive sandwiches and drinks are ordered, the cost is  $3(4) + 3(1) = 15$ , leaving  $\$15$ . If the least expensive snack is bought, the greatest number of snacks you can afford is  $15$ .

- 60.** Check students' work.
- 61.**  $x < 20, x < 30, x < 40, \dots$ ; any inequality following the one that  $a$  is a solution to. This is because each following inequality has the same solutions as the previous inequalities, with more values as solutions.
- 62.** Yes for  $g > 0$ ; because of the Mult. Prop. of Ineq.,  $x \leq y$  and  $y \leq z$ , so it follows that  $x \leq z$ . If  $g < 0$ ,  $x < z$ .
- 63.**  $\frac{4}{9}p \geq 116\frac{2}{3}; p \geq 262\frac{1}{2}$ , so the least number of pavers needed is 263.
- 64.**  $3.14d > 29.5$  and  $d > 9.4$ , so the men's basketballs need a 10-in. box;  $3.14d > 27.75, d > 8.8$  so the youth basketballs need a 9-in. box.
- 65.** D
- 66.** G
- 67.** [2]  $w = \ell - 3, 18 = 2\ell + 2(\ell - 3),$   
 $18 = 4\ell - 6, 24 = 4\ell,$  so  $\ell = 6$   
 in. (OR equivalent work)
- [1] incorrect solution with appropriate work OR correct solution with no work shown or incorrect work shown
- 68.**  $x \leq -11$
- 69.**  $y \geq 13.6$
- 70.**  $q < 5$
- 71.**  $-\frac{1}{4} > c$
- 72.**  $-1 < b$
- 73.**  $y \leq 75$
- 74.** 2
- 75.** -2
- 76.** 1

### 3-4:

## Answers

### Practice and Problem-Solving Exercises

- 9.**  $f \leq 3$
- 10.**  $n > -2.5$
- 11.**  $y > -2$
- 12.**  $p \leq 5$
- 13.**  $r \geq 3.5$
- 14.**  $j \geq -1.5$
- 15.**  $5s \geq 250; s \geq 50$  mph
- 16.**  $10 + s \leq 12; s \leq 2$  but greater than 0
- 17.**  $k \geq 1$
- 18.**  $c < 2$
- 19.**  $j < -1$
- 20.**  $y \geq 2$
- 21.**  $z < 9$
- 22.**  $d < -4$
- 23.**  $x < 3$
- 24.**  $v \leq -1$
- 25.**  $f \leq 6$
- 26.**  $p \geq 1$
- 27.**  $m \geq -5$
- 28.**  $t < 10$
- 29.** all real numbers
- 30.** no solution
- 31.** all real numbers
- 32.** no solution
- 33.** all real numbers
- 34.** all real numbers
- 35.**  $x \geq -4$
- 36.**  $s \leq -2$
- 37.**  $t \geq \frac{9}{5}$
- 38.**  $s < 5\frac{1}{2}$
- 39.**  $n \geq -2$
- 40.**  $t \leq 4.4$
- 41.**  $a \geq 0.5$
- 42.**  $n \geq 1$
- 43.**  $k \leq \frac{13}{6}$
- 44.** 33 text messages

45. 5.5 h

46. Answers may vary. Sample:  
 $3.75q - 18.75 > 4q + 12$ , Distr.  
Prop.  $-18.75 > 0.25q + 12$ ;  
subtr.  $3.75q$  from each side.  
 $-30.75 > 0.25q$ ; subtr. 12 from each  
side  $-123 > q$ ; div. each side by 0.25.

47. D

48. Check students' work.

49. a.  $v \geq 4$

b.  $4 \leq v$

c. They are equivalent.

d. Check students' work.

50. a. always true

b. always true

c. never true

51. at least \$3750

52. a.  $y < c$ ; answers may vary. Sample:  
The values of  $y$  that are less than 2  
make the inequality true.

b. Answers may vary. Sample: 1.75

c.  $y < \frac{22}{13}$ , which is about 1.69; the  
solutions are close.

53.  $3y$  was subtracted from instead of added to  
each side;  $7y \leq 2$ ,  $y \leq \frac{2}{7}$ .

54. 5 wasn't fully distributed;  $5p + 15 > 4p + 2$ ,  
 $p + 15 > 2$ ,  $p > -13$ .

55.  $-5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5$ , and 6

56. 10 h

57. a. 73 boxes

b. 4 trips

58. 9.6 kg

59. 3

60. 8

61. \$8.13

62.  $m \leq -4$

63.  $y \geq -8$

64.  $y > -20$

65.  $t \geq -3$

66. whole numbers

67. natural numbers

68. integers

## Answers

### Lesson Check

- $G = \{1, 3, 5, 7, 9, 11, 13, 15, 17\}$ ;  
 $G = \{x \mid x \text{ is an odd natural number, } x < 18\}$
- $\{d \mid d \leq 3\}$
- $\{\}$  or  $\emptyset$ ,  $\{4\}$ ,  $\{8\}$ ,  $\{12\}$ ,  $\{4, 8\}$ ,  $\{4, 12\}$ ,  $\{8, 12\}$ ,  $\{4, 8, 12\}$
- $W' = \{\text{spring, summer, fall}\}$
- $A$ ; Its complement is the set of all elements in the universal set that are not in  $A$ .
- a.** Yes; the empty set is a subset of every set.  
**b.** No; the number 5 in the first set is not an element of the second set.  
**c.** Yes; the element in the first set is also an element of the second set.
- sometimes
- The student forgot that 0 is also a whole number.

### Practice and Problem-Solving Exercises

- $\{0, 1, 2, 3\}$ ;  $\{m \mid m \text{ is an integer, } -1 < m < 4\}$
- $\{1, 2, 3, 4, 6, 12\}$ ;  $\{n \mid n \text{ is a real number that is a factor of 12}\}$
- $\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ ;  $\{p \mid p \text{ is a natural number, } p < 11\}$
- $\{\}$  or  $\emptyset$ ;  $\{r \mid r \text{ is an even natural number, } r < 2\}$
- $\{y \mid y \geq 4\}$
- $\{r \mid r < 11\}$
- $\{m \mid m > -5\}$
- $\{d \mid d \leq -7\}$
- $\{p \mid p \geq 1\}$
- $\{k \mid k < -13\}$
- 19–22. See back of book.
- 23–28. See next page.

## Answers

### Practice and Problem-Solving Exercises (continued)

- $\{\}$  or  $\emptyset$ ,  $\{1\}$
- $\{\}$  or  $\emptyset$ ,  $\{+\}$ ,  $\{-\}$ ,  $\{\times\}$ ,  $\{\div\}$ ,  $\{+, -\}$ ,  $\{+, \times\}$ ,  $\{+, \div\}$ ,  $\{-, \times\}$ ,  $\{-, \div\}$ ,  $\{\times, \div\}$ ,  $\{+, -, \times\}$ ,  $\{+, -, \div\}$ ,  $\{+, \times, \div\}$ ,  $\{-, \times, \div\}$ ,  $\{+, -, \times, \div\}$
- $\{1, 4, 5\}$
- $\{1, 3, 5, 7\}$
- $\{\dots, -4, -2, 0, 2, 4, \dots\}$
- $\{2\}$
- $A' = \{\text{Tuesday, Thursday, Friday, Saturday}\}$
- True; every element of  $A$  is an element of  $U$ .
- False; some elements of  $U$  are not elements of  $B$ .
- False; some elements of  $B$  are not elements of  $A$ .
- True; the empty set is a subset of every set.
- $B = \{b \mid b \text{ is an integer, } b \geq 11\}$
- $M = \{m \mid m \text{ is odd integer, } 1 \leq m \leq 19\}$
- $S = \{s \mid s \text{ is a factor of 12}\}$
- $G = \{g \mid g \text{ is an integer}\}$
- $\{\text{Alabama, Alaska, Arkansas, Arizona}\}$
- $\{\text{Mercury, Venus, Earth}\}$
- $\{x \mid x < 0\}$
- $\{\}$  or  $\emptyset$
- $\{x \mid x \text{ is a real number}\}$
- $\{x \mid x \leq 0\}$
- $\{x \mid x \text{ is a real number}\}$
- $\{\}$  or  $\emptyset$
- $C' = \{2, 6, 10, 14\}$
- $T' = \{x \mid x \text{ is an integer, } x \leq 0\}$
- Answers may vary. Sample:  
 $2n - 5 > -5$
- 1

50. Determine the number of elements in the set. Raise 2 to that number.

51. 512

52. 2

53. A

54. F

55. D

56. G

57. [2] Mum's Florist:  
 $\$24.60 \div 24 = \$1.025$  each. First  
 Flowers Florist:  $\$7.50 \div 6 = \$1.25$   
 each. Mum's Florist has a lower  
 cost per rose.

[1] incorrect solution with  
 appropriate work OR correct  
 solution with no work shown or  
 incorrect work shown

58.  $b > 8$

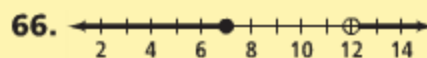
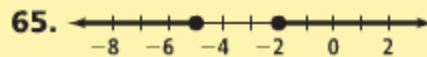
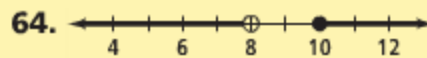
59.  $t \leq 5$

60.  $z < 13$

61. 6

62. -3

63. 3

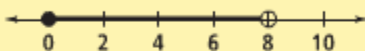


### 3-6:

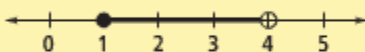
## Answers

### Lesson Check

1.  $0 \leq x < 8$



2.  $1 \leq r < 4$



3.  $85 \leq x \leq 100$

4.  $x \leq 6$ ;  $(-\infty, 6]$

5. A, C, and D

6. Answers may vary. Sample: The bracket indicates a specific number is part of the solution. The symbol  $\infty$  means that the numbers continue without end. So a parenthesis should follow.

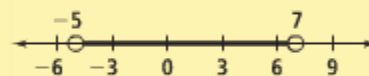
7.  $x \leq 7$  or  $x > 7$ ;  $(-\infty, \infty)$

8. The graph of a compound inequality with the word *and* contains the overlap of the graphs that form the

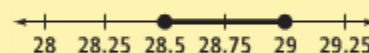
inequality. The graph of a compound inequality with the word *or* contains both of the graphs that form the inequality.

### Practice and Problem-Solving Exercises

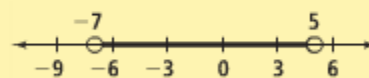
9.  $-5 < x < 7$



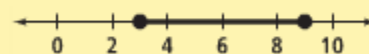
10.  $28.5 \leq x \leq 29$



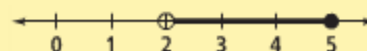
11.  $-7 < k < 5$



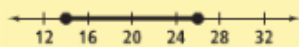
12.  $3 \leq y \leq 9$



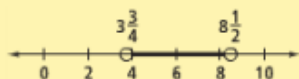
13.  $2 < p \leq 5$



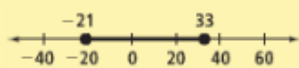
14.  $14 \leq k \leq 26$



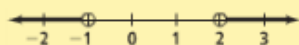
15.  $3\frac{3}{4} < x < 8\frac{1}{2}$



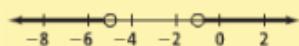
16.  $-21 \leq q \leq 33$



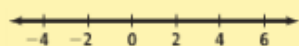
17.  $b < -1$  or  $b > 2$



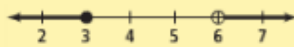
18.  $m > -1$  or  $m < -5$



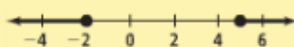
19.  $d \geq 2$  or  $d < 2$



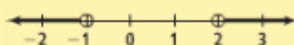
20.  $c \leq 3$  or  $c > 6$



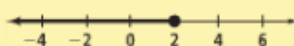
21.  $y \leq -2$  or  $y \geq 5$



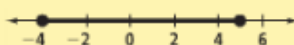
22.  $z > 2$  or  $z < -1$



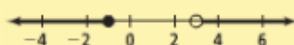
23.  $x \leq 2$



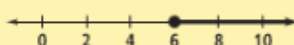
24.  $-4 \leq x \leq 5$



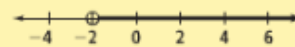
25.  $x \leq -1$  or  $x > 3$



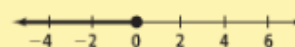
26.  $x \geq 6$



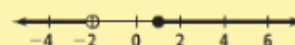
27.  $(-2, \infty)$



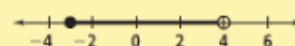
28.  $(-\infty, 0]$



29.  $(-\infty, -2)$  or  $[1, \infty)$



30.  $[-3, 4)$



31.  $(1, 6]$

32.  $(-5, 4]$

33.  $(-\infty, -5)$  or  $[5, \infty)$

34.  $(-\infty, -1]$  or  $(25, \infty)$

35.  $-3 < x < 4$

36.  $x < -2$  or  $x \geq 1$

37–50. See next page.

37.  $3 \leq x < 6$

38.  $r > 3.5$  or  $r \leq -2$

39.  $2\frac{2}{3} \leq v \leq 6$

40.  $y > 9\frac{1}{2}$  or  $y < -6\frac{2}{3}$

41.  $-4\frac{1}{12} \leq w < 12\frac{1}{4}$

42. between 6.3 and 8.1, inclusive

43.  $4 < x < 14$

44. any length greater than 3.25 in. and less than 10.75 in.

45. any length greater than 6 ft and less than 36 ft

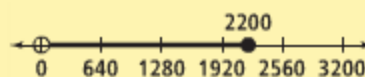
46. any length greater than 21 mm and less than 49 mm

47. any length greater than 11 m and less than 23 m

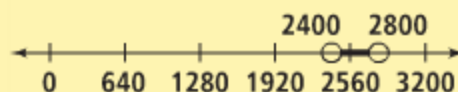
48.  $20 \leq d \leq 32$

49. any real number except 4

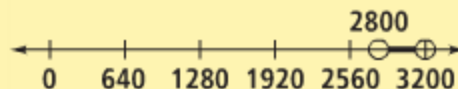
50.  $(0, 2200]$



$(2400, 2800)$



$(2800, 3200)$



51.  $F < -37.966$  or  $F > 673.844$ ;  $(-\infty, -37.966)$  or  $(673.844, \infty)$

52. a.  $102.5 \leq R \leq 184.5$

b. 22 years old

53. B

54. F

**55.** [2]  $35 \leq 10.4 + 0.0059g \leq 50$ ,  
 $24.6 \leq 0.0059g \leq 39.6$ ,  
 $4169.49 \leq g \leq 6711.86$ ; minimum water consumption is 4169 gal and maximum water consumption is 6712 gal (OR equivalent work).

[1] incorrect solution with appropriate work  
 OR correct solution with no work shown  
 or incorrect work shown

**56.**  $\{\}$  or  $\emptyset$ ,  $\{1\}$ ,  $\{3\}$ ,  $\{5\}$ ,  $\{7\}$ ,  $\{1, 3\}$ ,  $\{1, 5\}$ ,  
 $\{1, 7\}$ ,  $\{3, 5\}$ ,  $\{3, 7\}$ ,  $\{5, 7\}$ ,  $\{1, 3, 5\}$ ,  
 $\{1, 3, 7\}$ ,  $\{1, 5, 7\}$ ,  $\{3, 5, 7\}$ ,  $\{1, 3, 5, 7\}$

**57.**  $B' = \{1, 2, 3, 5, 7, 15\}$

**58.** no

**59.**  $\frac{1}{3} < b$

**60.**  $n \leq 3$

**61.**  $7 \geq r$

**62.** =

**63.**  $>$

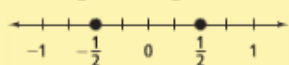
**64.**  $>$

### 3-7:

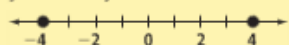
## Answers

### Practice and Problem-Solving Exercises

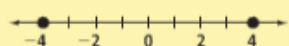
**9.**  $b = -\frac{1}{2}$  or  $b = \frac{1}{2}$



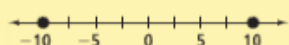
**10.**  $y = 4$  or  $y = -4$



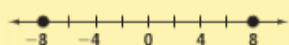
**11.**  $n = 4$  or  $n = -4$



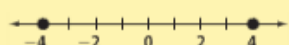
**12.**  $s = 10$  or  $s = -10$



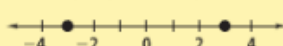
**13.**  $x = 8$  or  $x = -8$



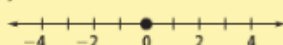
**14.**  $d = 4$  or  $d = -4$



**15.**  $m = 3$  or  $m = -3$



**16.**  $y = 0$



**17.**  $r = 13$  or  $r = 3$

**18.**  $c = 2$  or  $c = -10$

**19.**  $g = -1$  or  $g = -5$

**20.**  $m = 1$  or  $m = -5$

**21.** no solution

**22.**  $w = 2$  or  $w = -2$

**23.**  $v = 6$  or  $v = 0$

**24.**  $d = 0$  or  $d = -8$

**25.**  $f = 1.5$  or  $f = -2$

**26.** no solution

**27.**  $y = 3$  or  $y = 0$

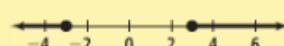
**28.**  $x = 1$  or  $x = -5$

**29.** no solution

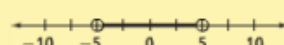
**30.**  $n = 2$  or  $n = -2$

**31.** no solution

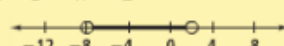
**32.**  $x \geq 3$  or  $x \leq -3$



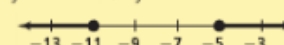
**33.**  $-5 < x < 5$



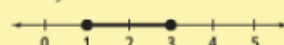
**34.**  $-8 < x < 2$



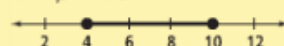
**35.**  $y \leq -11$  or  $y \geq -5$



**36.**  $1 \leq y \leq 3$

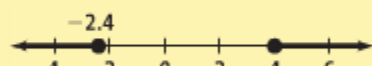


**37.**  $4 \leq p \leq 10$

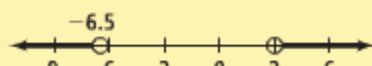


**38-61.** See next page.

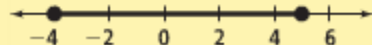
**41.**  $t \leq -2.4$  or  $t \geq 4$



**42.**  $x < -6.5$  or  $x > 3$

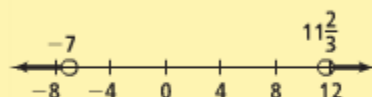


**43.**  $-4 \leq v \leq 5$

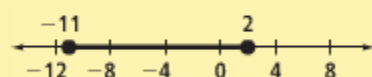


**44.**  $d < -7$  or  $d > 11\frac{2}{3}$

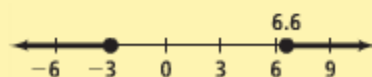
**44.**  $d < -7$  or  $d > 11\frac{2}{3}$



**45.**  $-11 \leq f \leq 2$



**46.**  $m \leq -3$  or  $m \geq 6.6$



47. any length between 89.95 cm and 90.05 cm, inclusive
48. any length between 28.5 in. and 29 in., inclusive
49.  $d = 9$  or  $d = -9$
50.  $p = 0.6$  or  $p = -0.6$
51. no solution
52.  $f = 1\frac{1}{2}$  or  $f = -1\frac{1}{2}$
53.  $y = 3.4$  or  $y = -0.6$
54.  $t = 1.8$  or  $t = -1.8$
55.  $c = 8.2$  or  $c = -0.2$
56. no solution
57.  $-6\frac{1}{4} < n < 6\frac{1}{4}$
58.  $c < -7\frac{7}{8}$  or  $c > -6\frac{1}{8}$
59.  $-8 < m < 4$
60.  $d \leq -2.1$  or  $d \geq 2.1$
61.  $49^\circ\text{F} \leq T \leq 64^\circ\text{F}$
62.  $99^\circ\text{F} \leq T \leq 100.8^\circ\text{F}$
63.  $t = 4\frac{4}{9}$  s and  $17\frac{7}{9}$  s
64. There is no solution since the absolute value cannot be a negative number.
65.  $-1 \leq y + 7 \leq 1$ ,  $-8 \leq y \leq -6$
66. Check students' work. Sample:  $|x - 4| = 2$
67. Answers may vary. Sample: To be more than 1 unit away from  $-5$  on a number line means  $x + 5 > 1$  or  $x + 5 < -1$ .
68.  $|v - 0.4| \leq 0.03$ ;  $0.37 \leq v \leq 0.43$
69. a. between 193.74 g and 209.26 g, inclusive  
b. Yes; answers may vary. Sample: Some nickels could weigh more and some could weigh less, and their average could be the official amount.
70. minimum 850,000 barrels, maximum 950,000 barrels
71.  $|x| < 4$
72.  $|x| \leq 7$
73.  $|x - 6| > 2$
74.  $|x + 1| \geq 2$
75. between 89.992 mm and 90.008 mm, inclusive
76.  $|x - 5| \leq 0.25$ ; minimum 4.75 ft, maximum 5.25 ft

77. 2
78.  $\frac{2}{3}, 3$
79. 3
80. always
81. always
82. sometimes
83. 4.265
84. 40
85. 5
86. \$65.80
87. 120
88.  $-282 \leq e \leq 20,320$
89.  $36.9 \leq T \leq 37.5$
90.  $2x + 10$
91.  $-3y + 21$
92.  $4\ell + 5$
93.  $-m + 12$
94.  $A = \{x \mid x \text{ is a whole number, } x < 10\}$
95.  $B = \{x \mid x \text{ is an odd integer, } 1 \leq x \leq 7\}$
96.  $C = \{-14, -12, -10, -8, -6\}$
97.  $D = \{8, 9, 10, 12, 14, 15, 16\}$

## Answers

### Got It? (continued)

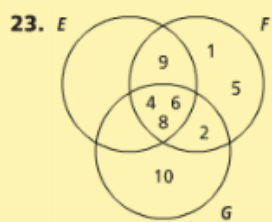
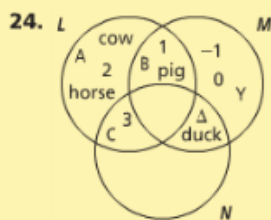
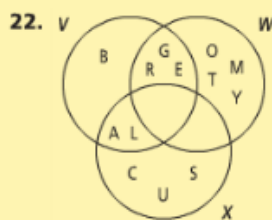
5. a.  $\{x \mid x \geq 3\} \cap \{x \mid x < 6\}$   
 b.  $\{x \mid x < -2\} \cup \{x \mid x > 5\}$

### Lesson Check

- $X \cup Y = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$
- $X \cap Y = \{2, 4, 6, 8, 10\}$
- $X \cap Z = \emptyset$
- $Y \cup Z = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$
- 31 people
- $A \cup B$  contains more elements because it contains all the elements in both sets.
- The union of sets is the set that contains all elements of each set. The intersection of sets is the set of elements that are common to each set.
- true

### Practice and Problem-Solving Exercises

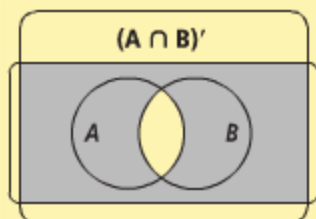
- $A \cup B = \{0, 1, 2, 3, 4, 6, 8\}$
- $A \cup C = \{1, 2, 3, 4, 5, 7, 10\}$
- $A \cup D = \{1, 3, 4, 5, 7, 9\}$
- $B \cup C = \{0, 2, 4, 5, 6, 7, 8, 10\}$
- $B \cup D = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$
- $C \cup D = \{1, 2, 3, 5, 7, 9, 10\}$
- $A \cap B = \{4\}$
- $A \cap C = \emptyset$
- $A \cap D = \{1, 3\}$
- $B \cap C = \{2\}$
- $B \cap D = \emptyset$
- $C \cap D = \{5, 7\}$



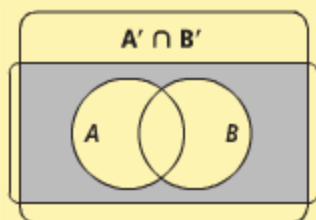
- 10 girls
- 158 people
- $\{x \mid x > -3\} \cap \{x \mid x < \frac{10}{3}\}$
- $\{n \mid n > -13\} \cap \{n \mid n \leq 14\}$
- $\{w \mid w \leq -\frac{3}{4}\} \cup \{w \mid w \geq 1\}$
- $\{d \mid d \leq -2.8\} \cup \{d \mid d \geq -1.6\}$
- $\{x \mid x < -7\} \cup \{x \mid x > 21\}$

- $\{t \mid t \geq -2\frac{1}{3}\} \cap \{t \mid t \leq 3\}$
- $W \cup Y \cup Z = \{0, 2, 3, 4, 5, 6, 7, 8\}$
- $X \cap Y \cap Z = \emptyset$
- $W \cap X \cap Z = \{6\}$
- $M \cap N = \{x \mid x \text{ is a multiple of } 15\}$
- 62 patients
- 3; 11; 14
- $A \cap B = A$

- 40.**  $\{(1, -3), (1, -2), (1, -1), (1, 0), (2, -3), (2, -2), (2, -1), (2, 0), (3, -3), (3, -2), (3, -1), (3, 0)\}$
- 41.**  $\{(\pi, 2), (\pi, 4), (2\pi, 2), (2\pi, 4), (3\pi, 2), (3\pi, 4), (4\pi, 2), (4\pi, 4)\}$
- 42.**  $\{(\text{grape, jam}), (\text{grape, juice}), (\text{apple, jam}), (\text{apple, juice}), (\text{orange, jam}), (\text{orange, juice})\}$
- 43.**  $\{(\text{reduce, plastic}), (\text{reuse, plastic}), (\text{recycle, plastic})\}$
- 44.** false, since



$\neq$



**45.** Sometimes; when  $A=B=C$ , the statement is true. When  $A, B,$  and  $C$  are distinct sets the statement is false.

**46.** B

**47.** F

**48.** [2] The \$20 raise is greater since the weekly rate will be \$100. The 20% raise will only give  $\$80 + \$80(0.2) = \$96$  a week. (OR equivalent explanation)

[1] incorrect answer with appropriate explanation OR correct answer with no explanation or incorrect explanation

- 49.**  $x = 4$  or  $x = -4$
- 50.**  $n = 2$  or  $n = -2$
- 51.**  $f = 2$  or  $f = 8$
- 52.**  $y = \frac{4}{3}$  or  $y = -\frac{8}{3}$
- 53.**  $-5 \leq d \leq 5$
- 54.**  $x \leq -4$  or  $x \geq 10$
- 55.**  $w < -15$  or  $w > 9$
- 56.**  $x = \frac{4}{3}$  or  $x = -\frac{4}{3}$
- 57.** yes
- 58.** no
- 59.** yes

**60-63.**

