

# Extra Practice

## Chapter 3

### Lessons 3-1 to 3-4

Solve each inequality. Graph and check your solution.

- |   |   |   |
|---|---|---|
| 1. $-8w < 24$ $w > -3$<br>                            | 2. $9 + p \leq 17$ $p \leq 8$<br>             | 3. $\frac{r}{4} > -1$ $r > -4$<br>          |
| 4. $7y + 2 \leq -8$ $y \leq -\frac{10}{7}$<br>        | 5. $t - 5 \geq -13$ $t \geq -8$<br>           | 6. $9h > -108$ $h > -12$<br>                |
| 7. $8w + 7 > 5$ $w > -\frac{1}{4}$<br>                | 8. $\frac{s}{6} \leq 3$ $s \leq 18$<br>       | 9. $\frac{6c}{5} \geq -12$ $c \geq -10$<br> |
| 10. $-8\ell + 3.7 \leq 31.7$ $\ell \geq -3.5$<br>     | 11. $9 - t \leq 4$ $t \geq 5$<br>             | 12. $m + 4 \geq 8$ $m \geq 4$<br>           |
| 13. $y + 3 < 16$ $y < 13$<br>                         | 14. $n - 6 \leq 8.5$ $n \leq 14.5$<br>        | 15. $12b - 5 > -29$ $b > -2$<br>            |
| 16. $4 - a > 15$ $a < -11$<br>                        | 17. $4 - x \leq 3$ $x \geq 1$<br>             | 18. $1 - 4d \geq 4 - d$ $d \leq -1$<br>     |
| 19. $n + 7 \leq 3n - 1$ $n \geq 4$<br>                | 20. $\frac{s}{2} + 1 < s + 2$ $s > -2$<br>    | 21. $3 - \frac{2x}{3} > 5$ $x < -3$<br>     |
| 22. $8r - \frac{r}{6} > \frac{1}{6} - 8$ $r > -1$<br> | 23. $1.4 + 2.4x < 0.6$ $x < -\frac{1}{3}$<br> | 24. $x - 2 < 3x - 4$ $x > 1$<br>            |
| 25. $2(m - 5) + 4m \leq 56$ $m \leq 11$ ;<br>         | 26. $6(c + 3) - 9 \geq 27$ $c \geq 3$ ;<br>   | 27. $-3(2t - 1) + 5t > 7$ $t < -4$ ;<br>    |

Define a variable and write an inequality for each situation.

28. A car dealership sells at least 35 cars each week. **28-33: Choice of variables may vary. c is the number of cars sold;  $c \geq 35$**
29. No more than 425 tickets to a musical will be sold. **t is the number of tickets;  $t \leq 425$**
30. You must be at least 18 years old to vote. **y is age in years;  $y \geq 18$**
31. The party store sold more than 720 balloons in July. **b is the number of balloons;  $b > 720$**
32. The booster club raised \$102 in their car wash. They want to buy \$18 soccer balls for the soccer team. Write and solve an inequality to find how many soccer balls they can buy.  **$18x \leq 102$ , 5 balls**
33. You earn \$7.50 per hour and need to earn \$35. Write and solve an inequality to find how many hours you must work.  **$7.5h \geq 35$ ,  $4\frac{2}{3}$  h**

**Extra Practice** (continued)

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Write and solve an inequality for each situation.

- 34.** Suppose you are trying to increase your coin collection to at least 500 coins. How many more coins do you need if you already have a collection of 375 coins? **34–39: Choice of variable may vary.**  
 $375 + c \geq 500$   
 $c \geq 125$
- 35.** Janet has a balance of \$125 on a credit card. On her next statement, she wants to reduce her balance to no more than \$60. How much does she need to pay off?  
 $125 - p \leq 60$   
 $65 \leq p$
- 36.** A homeroom class with 25 students is holding a fund-raiser to support school sports. Their goal is to raise at least \$200. On average, how much money does each student need to contribute to meet or exceed the goal?  
 $25c \geq 200$   
 $c \geq 8$
- 37.** You are reading a book with 19 chapters. How many chapters should you read each week if you want to finish the book in 5 weeks or less?  
 $\frac{19}{n} \leq 5$   
 $3.8 \leq n$
- 38.** The sophomore class is putting on a variety show to raise money. It costs \$700 to rent the banquet hall they are going to use. If they charge \$15 for each ticket, how many tickets do they need to sell in order to raise at least \$1000?  
 $15n - 700 \geq 1000$   
 $n \geq 114$
- 39.** A technical-support company charges \$10 per month plus \$35 per hour of phone support. If you need to spend less than \$100 per month on support, how many hours can you get?  
 $35h + 10 < 100$   
 $h < 2.5$

**Lesson 3-5**

Write each set in roster form and in set-builder notation.

- 40.**  $A$  is the set of integers that are greater than  $-4$  and less than  $2$ .  
 $A = \{-3, -2, -1, 0, 1\}$ ;  $A = \{x \mid x \text{ is an integer, } x > -4, x < 2\}$
- 41.**  $B$  is the set of natural numbers less than  $9$ .  
 $B = \{1, 2, 3, 4, 5, 6, 7, 8\}$ ;  $B = \{x \mid x \text{ is a natural number, } x < 9\}$
- 42.**  $C$  is the set of real numbers that are factors of  $20$ .  
 $C = \{1, 2, 4, 5, 10, 20\}$ ;  $C = \{x \mid x \text{ is a real number, } x \text{ is a factor of } 20\}$

Write the solutions of each inequality in set-builder notation.

- 43.**  $3y + 5 \leq 17$   
 $\{y \mid y \leq 4\}$
- 44.**  $6m - 11 > 31$   
 $\{m \mid m > 7\}$
- 45.**  $2 - 4p \geq -42$   
 $\{p \mid p \leq 11\}$

List all the subsets of each set.

- 46.**  $\{0, 1\}$   
 $\{\}, \{0\}, \{1\}, \{0, 1\}$
- 47.**  $\{-4, 0, 4\}$   
 $\{\}, \{-4\}, \{0\}, \{4\}, \{-4, 0\}, \{-4, 4\}, \{0, 4\}, \{-4, 0, 4\}$
- 48.**  $\{w, x, y, z\}$   
 $\{\}, \{w\}, \{x\}, \{y\}, \{z\}, \{w, x\}, \{w, y\}, \{w, z\}, \{x, y\}, \{x, z\}, \{y, z\}, \{w, x, y\}, \{w, x, z\}, \{w, y, z\}, \{x, y, z\}, \{w, x, y, z\}$
- 49.** Suppose  $U = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$  is the universal set and  $T = \{1, 3, 5, 7, 9\}$ . What is  $T'$ ?  
 $T' = \{0, 2, 4, 6, 8, 10\}$
- 50.** Suppose  $U = \{1, 2, 3, 4, 5, \dots\}$  is the universal set and  $C = \{1, 2, 3\}$ . What is  $C'$ ?  
 $C' = \{4, 5, 6, \dots\}$

## Extra Practice (continued)

### Chapter 3

#### Lesson 3-6

Solve each compound inequality.

51.  $8 < w + 3 < 10$     $5 < w < 7$

52.  $-6 < t - 1 < 6$     $-5 < t < 7$

53.  $6m - 15 \leq 9$  or  $10m > 84$   
 $m \leq 4$  or  $m > 8.4$

54.  $9j - 5j \geq 20$  and  $8j > -36$     $j \geq 5$

55.  $37 < 3c + 7 < 43$     $10 < c < 12$

56.  $3 < 5 + 6h < 10$     $-\frac{1}{3} < h < \frac{5}{6}$


57.  $1 + t < 4 < 2 + t$     $2 < t < 3$


58.  $2 + 3w < -1 < 3w + 5$     $-2 < w < -1$


59.  $2x - 3 \leq x$  and  $2x + 1 \geq x + 3$   
 $2 \leq x \leq 3$

60.  $3n - 7 > n + 1$  or  $4n - 5 < 3n - 3$   
 $n < 2$  or  $n > 4$


Write each interval as an inequality. Then graph the solutions.


61.  $(-\infty, 5)$     $x < 5$   


62.  $[2, 9)$     $2 \leq x < 9$   


63.  $(-\infty, 1]$  or  $[6, \infty)$     $x \leq 1$  or  $x \geq 6$   


Write a compound inequality for each situation. Graph your solution.

64. Water will not be in liquid form when it is colder than  $32^\circ\text{F}$  or warmer than  $212^\circ\text{F}$ .  
 $t < 32$  or  $t > 212$   


65. The width of a parking space needs to be at least 8 feet and no more than 11 feet.  
 $8 \leq w \leq 11$   


66. A car salesman has been told to sell a particular car for more than \$14,500 and up to the sticker price of \$15,755.  
 $14,500 < p < 15,755$   


#### Lesson 3-7

Choose a variable and write an absolute value inequality that represents each set of numbers.

67. all real numbers less than 2 units from 0    $|x| < 2$


68. all real numbers more than 0.5 units from 4.5    $|x - 4.5| > 0.5$

69. all real numbers less than 1 unit from  $-4$     $|x + 4| < 1$


70. all real numbers 3 or more units from  $-1$     $|x + 1| \geq 3$

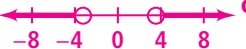
71. all real numbers less than or equal to 5 units from 3    $|x - 3| \leq 5$


Solve each inequality. Graph and check your solution.


72.  $|x| < 5$     $-5 < x < 5$   


73.  $|t| > 1$     $t < -1$  or  $t > 1$   


74.  $|t| - 5 \leq 3$     $-8 \leq t \leq 8$   


75.  $|-6m + 2| > 20$     $m < -3$  or  $m > \frac{11}{3}$   


76.  $|3c| - 1 \geq 11$     $c \leq -4$  or  $c \geq 4$   


77.  $|8 - w| \leq 8$     $0 \leq w \leq 16$   


## Extra Practice (continued)

### Chapter 3

78.  $|2b + 3| < 7$



79.  $|c - 5| \leq 6$   $-1 \leq c \leq 11$



80.  $|n| + 4 \leq 5$



81. Write an absolute value inequality that has numbers between 2 and 3 as the solutions. **Answers may vary. Sample:**  $|x - 2.5| < 0.5$

82. Holes with radius 3 cm must be drilled in sheets of metal. The radius must have an error no more than 0.01 cm. Write an absolute value inequality whose solutions are acceptable radii.  $|x - 3| \leq 0.01$

**Write and solve an absolute value inequality for each situation.**

83. The ideal diameter of an aircraft tire is 105 inches. The acceptable error for each tire is 0.175 inches. Find the range of acceptable tire diameters.

$|d - 105| \leq 0.175$ ;  $104.825 \leq d \leq 105.175$

84. A tractor crankshaft is designed to have a radius of 4.25 cm. The acceptable error for the radius is 0.005 cm. Find the range of acceptable radii for the crankshaft.  $|r - 4.25| \leq 0.005$ ;  $4.245 \leq r \leq 4.255$

85. The ideal weight of an exercise ball is 175 ounces. Each ball can have an error of 0.35 ounces. What is the range of acceptable weights?

$|w - 175| \leq 0.35$ ;  
 $174.65 \leq w \leq 175.35$

### Lesson 3-8

Find each union or intersection. Let  $X = \{1, 4, 9\}$ ,  $Y = \{x \mid x \text{ is an odd whole number less than } 10\}$ , and  $Z = \{2, 4, 6, 8\}$ .

86.  $X \cup Y$   $\{1, 3, 4, 5, 7, 9\}$

87.  $X \cup Z$   $\{1, 2, 4, 6, 8, 9\}$

88.  $Y \cup Z$   $\{1, 2, 3, 4, 5, 6, 7, 8, 9\}$

89.  $X \cap Y$   $\{1, 9\}$

90.  $X \cap Z$   $\{4\}$

91.  $Y \cap Z$   $\{\}$

Solve each inequality. Write the solutions as either the union or intersection of two sets.

92.  $|2x - 7| < 11$

$\{x \mid x > -2\} \cap \{x \mid x < 9\}$

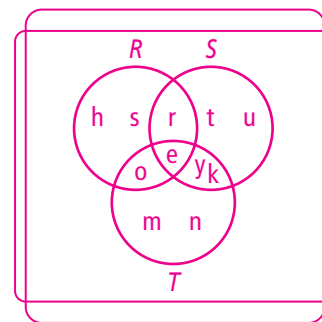
93.  $|5b + 8| \geq 17$

$\{b \mid b \leq -5\} \cup \{b \mid b \geq 1.8\}$

94.  $3|m - 4| \leq 18$

$\{m \mid m \geq -2\} \cap \{m \mid m \leq 10\}$

95. Let  $R = \{h, o, r, s, e\}$ ,  $S = \{t, u, r, k, e, y\}$ , and  $T = \{m, o, n, k, e, y\}$ . Draw a Venn diagram to represent the union and intersection of these sets.



96. In a survey of 100 people, some of them jog for exercise, some of them ride a bike, some do both, and 15 do not jog or ride a bike. If 46 of the people surveyed jog and 21 of them both jog and ride a bike, how many of the people surveyed only ride a bike? **39**