

## Extra Practice

### Chapter 2

#### Lesson 2-1

Find the next two terms in each sequence.

- 12, 17, 22, 27, 32, ... **37, 42**
- 1, 1.1, 1.11, 1.111, 1.1111, ...  
**1.11111, 1.111111**
- 5000, 1000, 200, 40, ...  **$8, \frac{8}{5}$**
- 1, 12, 123, 1234, ... **12,345, 123,456**
- 3, 0.3, 0.03, 0.003, ... **0.0003, 0.00003**
- 1, 4, 9, 16, 25, ... **36, 49**

Draw the next figure in each sequence.

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- For a science experiment, you measure the height of a plant every two days. Using inductive reasoning and the data table at the right, predict the height of the plant on day 10 of the experiment. **8 cm**

Plant Height

Day	Height (cm)
2	2
4	3.5
6	5
8	6.5

Find one counterexample to show that each conjecture is false.

- The result of a number multiplied by a positive integer is always larger than the original number.  
**Answers may vary. Sample: Multiplying a number by 1 does not result in a larger number.**
- A four-sided figure with four right angles is a square. **a rectangle**
- February has exactly 28 days every year. **During a leap year February has 29 days.**

#### Lessons 2-2 and 2-3

For Exercises 13–15, identify the hypothesis and conclusion of each conditional.

- If you can predict the future, then you can control the future.  
**Hyp: You can predict the future.**  
**Concl: You can control the future.**
  - If Dan is nearsighted, then Dan needs glasses. **Hyp: Dan is nearsighted.**  
**Concl: Dan needs glasses.**
  - If lines  $k$  and  $m$  are skew, then lines  $k$  and  $m$  are not perpendicular. **Hyp: Lines  $k$  and  $m$  are skew.**  
**Concl: Lines  $k$  and  $m$  are not perpendicular.**
- If you can control the future, then you can predict the future.**  
**If Dan needs glasses, then Dan is nearsighted.**  
**If lines  $k$  and  $m$  are not perpendicular, then lines  $k$  and  $m$  are skew.**

**Extra Practice** (continued)

## Chapter 2

If the given statement is not in *if-then* form, rewrite it. Write the converse, inverse, and contrapositive of each conditional statement. Determine the truth value of each statement.

17. If  $3x - 7 = 20$ , then  $x = 9$ .  
**Converse:** If  $x = 9$ , then  $3x - 7 = 20$ ; true.  
**Inverse:** If  $3x - 7 \neq 20$ , then  $x \neq 9$ ; true.  
**Contrapositive:** If  $x \neq 9$ , then  $3x - 7 \neq 20$ ; true.
18. Baseball players are athletes.  
**Conditional:** If you are a baseball player, then you are an athlete; true.  
**Converse:** If you are an athlete, then you are a baseball player; false.  
**Inverse:** If you are not a baseball player, then you are not an athlete; false.  
**Contrapositive:** If you are not an athlete, then you are not a baseball player; true.
19. The product of two even numbers is even.  
**Conditional:** If two numbers are even, then their product is even; true.  
**Converse:** If the product of two numbers is even, then the two numbers are even; false.  
**Inverse:** If two numbers are not both even, then their product is not even; false.  
**Contrapositive:** If the product of two numbers is not even, then the two numbers are not both even; true.
- For each of the statements, write the conditional form and then the converse of the conditional. If the converse is true, combine the statements as a biconditional.
20. The number one is the smallest positive square.  
**Conditional:** If a number is one, then it is the smallest positive square.  
**Converse:** If a number is the smallest positive square, then it is one.  
**Biconditional:** A number is one if and only if it is the smallest positive square.
21. Rectangles have four sides. **Conditional:** If a figure is a rectangle, then it has four sides.  
**Converse:** If a figure has four sides, then it is a rectangle.
22. A square with area  $100 \text{ m}^2$  has sides that measure 10 m.  
**Conditional:** If a square has an area of  $100 \text{ m}^2$ , then it has sides that measure 10 m.  
**Converse:** If a square has sides that measure 10 m, then it has an area of  $100 \text{ m}^2$ .  
**Biconditional:** A square has an area of  $100 \text{ m}^2$  if and only if it has sides that measure 10 m.
23. Two numbers that add up to be less than 12 have a product less than 37.  
**Converse:** If two numbers add up to be less than 12, then their product is less than 37.  
**Conditional:** If two numbers have a product that is less than 37, then they add up to be less than 12.
24. Three points on the same line are collinear. **Conditional:** If three points are on the same line, then they are collinear.  
**Converse:** If three points are collinear, then they are on the same line.  
**Biconditional:** Three points are collinear if and only if they are on the same line.
- Is each statement a good definition? If not, find a counterexample.
25. A real number is an even number if its last digit is 0, 2, 4, 6, or 8.  
**No; to be even the real number must be an integer.**
26. A circle with center  $O$  and radius  $r$  is defined by the set of points in a plane a distance  $r$  from the point  $O$ . **yes**
27. A plane is defined by two lines. **no; two skew lines are a counterexample.**
28. Segments with the same length are congruent. **yes**

**Extra Practice** (continued)

## Chapter 2

For Exercises 29 and 30, write the two statements that form each biconditional.

Tell whether each statement is *true* or *false*.

29. Lines  $m$  and  $n$  are skew if and only if lines  $m$  and  $n$  do not intersect.  
**If lines  $m$  and  $n$  are skew, then lines  $m$  and  $n$  do not intersect; true.**  
**If lines  $m$  and  $n$  do not intersect, then lines  $m$  and  $n$  are skew; false.**
30. A person can be president of the United States if and only if the person is a citizen of the United States.  
**If a person can be the president of the United States, then the person is a citizen of the United States; true.**  
**If a person is a citizen of the United States, then the person can be president of the United States; false.**

**Lesson 2-4**

Using the statements below, apply the Law of Detachment or the Law of Syllogism to draw a conclusion.

31. If Jorge can't raise money, he can't buy a new car. Jorge can't raise money.  
**Jorge can't buy a new car.**
32. If Shauna is early for her meeting, she will gain a promotion. If Shauna wakes up early, she will be early for her meeting. Shauna wakes up early.  
**Shauna will gain a promotion.**
33. If Linda's band wins the contest, they will win \$500. If Linda practices, her band will win the contest. Linda practices.  
**Linda's band will win \$500.**
34. If Brendan learns the audition song, he will be selected for the chorus.  
 If Brendan stays after school to practice, he will learn the audition song.  
 Brendan stays after school to practice.  
**Brendan will be selected for the chorus.**

For Exercises 35–38, apply the Law of Detachment, the Law of Syllogism, or both to draw a conclusion. Tell which law(s) you used.

35. If you enjoy all foods, then you like cheese sandwiches. If you like cheese sandwiches, then you eat bread.  
**If you enjoy all foods, then you eat bread; Law of Syllogism.**
36. If you go to a monster movie, then you will have a nightmare. You go to a monster movie.  
**You will have a nightmare; Law of Detachment.**
37. If Catherine is exceeding the speed limit, then she will get a speeding ticket. Catherine is driving at 80 mi/h. If Catherine is driving at 80 mi/h, then she is exceeding the speed limit.  
**Catherine will get a speeding ticket; both laws.**
38. If Carlos has more than \$250, then he can afford the video game he wants. If Carlos worked more than 20 hours last week, then he has more than \$250. If Carlos works 15 hours this week, then he worked more than 20 hours last week.  
**If Carlos works 15 hours this week, then he can afford the video game that he wants; Law of Syllogism.**

# Extra Practice (continued)

## Chapter 2

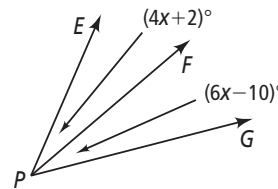
### Lesson 2-5

**39. Algebra** You are given that  $2c^2 = 2bc + \frac{ac}{2}$  with  $c \neq 0$ . Show that  $4b = 4c - a$  by filling in the blanks.

- |                                |  |
|--------------------------------|--|
| a. $2c^2 = 2bc + \frac{ac}{2}$ | a. Given   |
| b. $4c^2 = 4bc + ac$           | b. <u>?</u> and <u>?</u> <b>Mult. Prop. of =, Distr. Prop.</b> |
| c. $4c = 4b + a$               | c. <u>?</u> and Distributive Property <b>Mult. Prop. of =</b>  |
| d. <u>?</u>                    | d. Subtraction Property <b><math>4c - a = 4b</math></b>        |
| e. $4b = 4c - a$               | e. <u>?</u> <b>Symm. Prop. of =</b>                            |

**40. Algebra** Solve for  $x$ . Show your work. Justify each step.

**Given:**  $\overrightarrow{PF}$  bisects  $\angle EPG$ .      $4x + 2 = 6x - 10$   
**The two angles formed by the**      $4x + 12 = 6x$      **Add. Prop. of =**  
**bisector have equal measures, so**      $12 = 2x$      **Subt. Prop. of =**  
     $6 = x$      **Div. Prop. of =**



Name the property of equality or congruence that justifies going from the first statement to the second statement.

- |                                      |                        |  |
|--------------------------------------|------------------------|--|
| <b>41.</b> $\angle M \cong \angle N$ | <b>42.</b> $3x = 24$   | <b>43.</b> $\overline{PQ} \cong \overline{RS}$ and $\overline{RS} \cong \overline{TU}$ |
| $\angle N \cong \angle M$            | $x = 8$                | $\overline{PQ} \cong \overline{TU}$  |
| <b>Symm. Prop. of Congruence</b>     | <b>Div. Prop. of =</b> | <b>Trans. Prop. of Congruence</b>  |

### Lesson 2-6

Find the value of  $x$ .

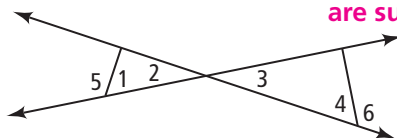
**44.** **24**

**45.** **15**

**46.** **25**

**47. Given:**  $\angle 1$  and  $\angle 2$  are complementary.  
 $\angle 3$  and  $\angle 4$  are complementary.

**Prove:**  $\angle 5 \cong \angle 6$



**47.**  $\angle 2$  and  $\angle 3$  are ver.  $\angle$ s, so  $\angle 2 \cong \angle 3$  by the Vert.  $\angle$ s Thm.  $\angle 1$  and  $\angle 2$  are compl. and  $\angle 3$  and  $\angle 4$  are compl. (Given), so  $\angle 1 \cong \angle 4$  by the Cong. Complements Thm. From the diagram,  $\angle 5$  and  $\angle 1$  are suppl. and  $\angle 4$  and  $\angle 6$  are suppl. Therefore  $\angle 5 \cong \angle 6$  by the Cong. Supplements Thm.

**48.** Prove or disprove the following statement.

If  $\angle APB$  and  $\angle CPD$  are vertical angles,  $\angle APB$  and  $\angle APE$  are complementary, and  $\angle CPD$  and  $\angle CPF$  are complementary, then  $\angle APE$  and  $\angle CPF$  are vertical angles.

