# **Chapter 2 Answers**

### Practice 2-1

1. Sample: It is 12:00 noon on a rainy day. 2. Sample: The **3.** Sample: car will not start because of a dead battery. 4. If you are strong, then you drink milk. **5.** If a 6 rectangle is a square, then it has four sides the same length. 6. If you are tired, then you did not sleep. **7.** If x = 26, then x - 4 = 22; true. 8. If x > 0, then |x| > 0; **9.** If *m* is positive, then  $m^2$  is positive; true. true. **10.** If 2y - 1 = 5, then y = 3; true. **11.** If x > 0, then point A is in the first quadrant; false; (4, -5) is in the fourth quadrant. **12.** If lines are parallel, then their slopes are **13.** If you have a sibling, then you are a twin; equal; true. false; a brother or sister born on a different day. 14.



15. Hypothesis: If you like to shop; conclusion: Visit Pigeon Forge outlets in Tennessee.
16. Pigeon Forge outlets are good for shopping.
17. If you visit Pigeon Forge outlets, then you like to shop.
18. It is not necessarily true. People may go to Pigeon Forge outlets because the people they are with want to go there.
19. Drinking Sustain makes you train harder and run faster.
20. If you drink Sustain, then you will train harder and run faster.
21. If you train harder and run faster.

### Practice 2-2

1. Two angles have the same measure if and only if they are **2.** 2x - 5 = 11 if and only if x = 8. congruent. **3.** The converse, "If |n| = 17, then n = 17," is not true. 4. A figure has eight sides if and only if it is an octagon. 5. If a whole number is a multiple of 5, then its last digit is either 0 or 5. If a whole number has a last digit of 0 or 5, then it is a multiple of 5. 6. If two lines are perpendicular, then the lines form four right angles. If two lines form four right angles, then the lines are perpendicular. 7. If you live in Texas, then you live in the largest state in the contiguous United States. If you live in the largest state in the contiguous United States, then you live in Texas. 8. Sample: Other vehicles, such as trucks, fit this description. 9. Sample: Other objects, such as spheres, are round. **10.** Sample: This is not specific enough; many numbers in a set could fit this description. 11. Sample: Baseball also fits this definition. **12.** Sample: *Pleasing, smooth, and rigid* all are too vague. 13. yes 14. no 15. yes

### Practice 2-3

∠A and ∠B are complementary.
 2. Football practice is canceled for Monday.
 3. △DEF is a right triangle.
 4. If you liked the movie, then you enjoyed yourself.
 5. If two lines are not parallel, then they intersect at a point.

**6.** If you vacation at the beach, then you like Florida.

. . . . . . . . . . . . . . .

7. not possible 8. Tamika lives in Nebraska.

**9.** not possible **10.** It is not freezing outside.

**11.** Shannon lives in the smallest state in the United States.

**12.** On Thursday, the track team warms up by jogging 2 miles.

#### Practice 2-4

**1.** UT = MN**2.**  $m \angle QWR = 30$  **3.** SB = MN5. *JL* **4.** y = 51**6.** Given; Addition Property of Equality: Division Property of Equality 7. Given: Addition; Subtraction Property of Equality; Multiplication Property of Equality; Division Property of Equality **8.** Substitution **9.** Substitution **10.** Transitive Property of Equality **11.** Symmetric Property of Congruence **12.** Transitive Property of Congruence **13.** Definition of Complementary Angles; 90, Substitution; 3*x*, Simplify; 3x, 84, Subtraction Property of Equality; 28, Division Property of Equality **14.** Given; (2x - 4), Substitution; 6x - 12, Distributive Property; -x, Subtraction Property of Equality; 12, Multiplication Property of Equality

#### Practice 2-5

**1.** 30 **2.** 15 **3.** 20 **5.** 16 **6.** 9 **4.** 6 7. false **8.** true **9.** true **10.** true **11.** false **13.**  $m \angle PMO = 55; m \angle PMO = 125;$ **12.** false  $m \angle OMN = 55$ **14.**  $m \angle BOD = m \angle COE = 90;$  $m \angle BOC = m \angle COD = 45; m \angle AOB = m \angle DOE = 45$ **15.**  $m \angle BWC = m \angle CWD, m \angle AWB + m \angle BWC = 180;$  $m \angle CWD + m \angle DWA = 180; m \angle AWB = m \angle AWD$ 

### **Reteaching 2-1**

**1.–3.** Check students' work. **4.** If you hear thunder, then you see lightning; statement: false; converse: false. 5. If your pants are jeans, then they are blue; statement: false; converse: false. **6.** If you are eating a tangerine, then you are eating an orange fruit; statement: false; converse: true. 7. If a number is an integer, then it is a whole number; statement: true; converse: false. **8.** If a triangle has one angle greater than 90°, then it is an obtuse triangle; statement: true; converse: true. **9.** If  $n^2 = 64$ , then n = 8; statement: true; converse: false. **10.** If you got an A for the quarter, then you got an A on the first test; statement: false; **11.** If a figure has four sides, then it is a converse: false. square; statement: true; converse: false. **12.** If x = 144, then  $\sqrt{x} = 12$ ; statement: true; converse: true.

### **Reteaching 2-2**

**1.** If n = 15 or n = -15, then |n| = 15. If |n| = 15, then n = 15 or n = -15. **2.** If two segments are congruent, then they have the same measure. If two segments have the same measure, then they are congruent. **3.** If you live in California, then you live in the most populated state in the United States. If you live in the most populated state in the United States, then you live in California. **4.** If an integer is a multiple of 10, then its last digit is 0. If an integer's last digit is 0, then it is a multiple of 10. **5.** No; counter-examples may vary. Sample: A giraffe is a large animal. 6. Yes; two planes intersect if and only if they form a line.
7. Yes; a number is an even number if and only if it ends in 0, 2, 4, 6, or 8.
8. Yes; a triangle is a three-sided figure if and only if the angle measures sum to 180°.

## **Reteaching 2-3**

1. Law of Detachment; the police officer will give Darlene a ticket. 2. Law of Syllogism; if two planes do not have any points in common, then they are parallel. 3. Law of Detachment; Landon has a broken arm. 4. Not possible; a conclusion cannot be drawn from a conditional and its confirmed conclusion. (Brad may live in Peoria, Illinois.) 5. Law of Detachment; the circumference is  $\pi$ .

## **Reteaching 2-4**

Addition Property of Equality
 Symmetric Property of Equality
 Distributive Property
 Subtraction Property of Equality
 Multiplication Property of Equality
 Transitive Property of Equality
 4, 5, 1, 3, 2

### Reteaching 2-5

**1.-7.** 5, 2, 4, 1, 6, 3, 7 or 5, 2, 1, 4, 6, 3, 7 **8.** Sample:  $m \angle 10 + m \angle 6 = 180$  by the Angle Addition Postulate.  $m \angle 6 + m \angle 7 + m \angle 8 = 180$  by the Angle Addition Postulate.  $m \angle 10 + m \angle 6 = m \angle 6 + m \angle 7 + m \angle 8$  by the Transitive Property of Equality. Subtract from both sides, and you get  $m \angle 10 = m \angle 7 + m \angle 8$ . Because  $\angle 10$  is a right angle,  $m \angle 7 + m \angle 8 = 90$ . It is given that  $m \angle 7 = m \angle 8$ . By Substitution,  $2m \angle 8 = 90$ . Divide both sides by 2, and **9.** Sample: Because  $\angle 9$  and  $\angle 10$  form a m / 8 = 45.straight angle,  $m \angle 9 + m \angle 10 = 180$  by the Angle Addition Postulate. By the definition of supplementary angles,  $\angle 9$  and  $\angle 10$  are supplementary. **10.** Sample: Because  $\angle 10$  and  $\angle 6$  form a straight angle,  $m \angle 10 + m \angle 6 = 180$  by the Angle Addition Postulate.  $\angle 10$  is a right angle, so  $90 + m \angle 6 = 180$ . Subtract 90 from both sides, and you get  $m \angle 6 = 90$ . So  $m \angle 6$ is a right angle by the definition of right angles.

### **Enrichment 2-1**

point 2. postulate 3. parallel
 perpendicular 5. perimeter 6. plane
 protractor 8. pentagon 9. Sample: W, L
 LXCBR 11. Sample: If LWHJP stands for *plane*, then LHXHWWPW must be *parallel* because of the repetition of the letter W. 12. Check students' work.

## **Enrichment 2-2**

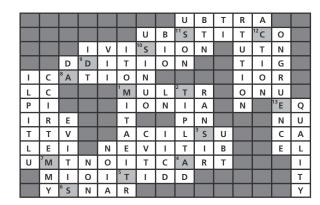
**1.** If a kitchen is well-designed, then the distance in a straight line from the center point of the sink, refrigerator, or stove to another is between 4 feet and 9 feet. If the distance in a straight line from the center point of the sink, refrigerator, or stove to another is between 4 feet and 9 feet, then the kitchen is well-designed. **2.** The statement can be written as a

biconditional because both the conditional and its converse are true. **3.** A kitchen is considered to be well-designed if and only if the distance in a straight line from the front center point of one of these three objects to another is between 4 feet and 9 feet. Additionally, the sum of the three triangle legs should be less than or equal to 26 **4.** The definition is a good definition. The terms feet. used are commonly understood. The definition is precise. The definition is reversible: If the distances in a straight line between the front center points of the sink, refrigerator, and stove are between 4 feet and 9 feet, and the sum of these distances is less than or equal to 26 feet, then the kitchen is considered to be well-designed. **5.** Yes; the distance from the sink to the refrigerator is 6.5 feet, the distance from the refrigerator to the stove is 6.25 feet, and the distance from the stove to the sink is 9 feet. The sum of these distances is less than 26 feet. **6.** Check students' work.

## **Enrichment 2-3**

**1.** *p*: one is a student at Richmond High School; *q*: one takes geometry class; r: one studies logic. **2.** If someone is a student at Richmond High School, then he or she takes geometry class. **3.** If someone takes geometry class, then he or she studies logic. **4.** All students at Richmond High School study logic. **5.** Logic can be studied in classes other than geometry, such as algebra or trigonometry. **6.** a; *p*: a figure is a square; *q*: a figure is a polygon; *r*: a figure is closed; if  $p \rightarrow q$  and  $q \rightarrow r$  then  $p \rightarrow r$ . **7.** b; *p*: a figure is a square; q: a figure is a rectangle; r: a figure has four right angles; if  $p \rightarrow q$  and  $q \rightarrow r$ , then  $p \rightarrow r$ . 8. All mathematicians enjoy puzzles. **9.** Triangles have an angle sum of 180. **10.** Mt. McKinley is 20,320 ft tall. **11.** Nolan Ryan recorded 5714 strikeouts over his career. **12.** Trapezoids are four-sided figures.

## **Enrichment 2-4**



## Enrichment 2-5

**1.** They are complementary angles; if the exterior sides of two adjacent acute angles are perpendicular, then the angles are complementary. **2.**  $\angle ECD$  **3.** They are equal; because  $\angle ACB$  and  $\angle DCB$  have equal measures, you can

use the definition of supplementary angles and the subtraction property to show that they are equal. **4.** 90 **5.** 135 **6.** 45 **7.**  $\overline{NO}$  bisects  $\overline{TP}$ ; a segment that is perpendicular to another segment at its midpoint is the perpendicular bisector of the segment.

## **Chapter Project**

Check students' work.

## ✔ Checkpoint Quiz 1

1. hypothesis: x + 4 = 10; conclusion: x = 62. hypothesis: if you want to get good grades in school; conclusion: you must study hard 3. Sample: It could be May. 4. Sample: Corn is a vegetable. 5. No; the lines must be in the same plane. 6. yes 7. not possible 8. X, Y, and Z are coplanar. 9. If you ran a good race, then your coach is happy. 10. If the car is old, then it is not efficient.

## ✔ Checkpoint Quiz 2

**1.** 4x = 13 **2.**  $\angle TQM \cong \angle LTS$  **3.** Symmetric Property **4.** Substitution Property **5.** Division Property **6.** Addition Property **7.**  $\angle 1 \cong \angle 3$ ,  $\angle 2 \cong \angle 4$ ; Vertical Angles Theorem **8.**  $\angle 2 \cong \angle 3$ ,  $\angle 1 \cong \angle 4$ ; Linear Pair and Transitive Property of Equality **9.**  $\angle 1 \cong \angle 4$ ,  $\angle 2 \cong \angle 3$ ; Subtraction Property of Equality **10.**  $\angle 1 \cong \angle 2$ ,  $\angle 3 \cong \angle 4$ ; Vertical Angles Theorem

### Chapter Test, Form A

**1a.** If a polygon has three sides, then it is a triangle. **1b.** true 2a. If George lives in the United States, then he lives in Texas. **2b.** false **3a.** If two angles are congruent, then they are vertical angles. **3b.** false **4.** Addition Property of Equality 5. Transitive Property of Equality 6. Subtraction Property of Equality 7. Division Property of Equality **8.** Reflexive Property of Equality 9a. 90 **9b.** 58 **9c.** 148 **9d.** 90 **9e.** 122 9f. 148 **10.** 17 **11.** 6 **12.** 14 **13.** 11 **14.** not possible **15.** We win. **16.** If the bus is late, then we will receive a tardy penalty. 17. The sum of the measures of  $\angle A$  and  $\angle B$  is 90. 18. If a quadrilateral is a rectangle, then it has four right angles. If a quadrilateral has four right angles, then it is a rectangle. **19.** A rhombus has four congruent sides. **20.** good definition **21.** good definition 22. A bat has wings. **23a.** Distributive Property **23b.** Addition Property of Equality **23c.** Division Property of Equality **24.** 58 **25.** 43 **26.** 66 **27.** 152 **28.** 36 **29.** 60 **30.** 30

### Chapter Test, Form B

1a. If a polygon has five sides, then it is a pentagon.
1b. true 2a. If Mary lives in Minnesota, then she lives in Minneapolis. 2b. false 3a. If the sum of two angles is 180, then they are supplements. 3b. true 4. Reflexive Property of Equality 5. Substitution Property of Equality

**6.** Addition Property of Equality 7. Division Property of Equality **8.** Distributive Property 9a. 90 **9b.** 38 **9d.** 142 **9f.** 154 **9c.** 128 **9e.** 26 **10.** 50 **11.** 13.5 **12.** 4 **13.** 180 14. not **15.** Martina is quick. possible **16.** If I don't wear sunscreen while swimming, then I'll be in pain. **17.** ∠*A* and  $\angle B$  are congruent. **18.** If a quadrilateral is a parallelogram, then it has two pairs of opposite sides parallel. If a quadrilateral has two pairs of opposite sides parallel, then it is a parallelogram. **19.** A rectangle has four right angles. **20.** Two congruent and adjacent angles may have the same measure and not be vertical. **21.** good definition 22. An octopus has eight legs. 23a. Division Property of Equality **23b.** Subtraction Property of Equality **23c.** Division Property of Equality **24.** 7 **25.** 23 **26.** 49 **27.** 117 **28.** 30 **29.** 102 **30.** 45

### Alternative Assessment, Form C

#### **TASK 1: Scoring Guide**

a. Sample: If it is raining, then the lawn is wet.
b. Sample: If the temperature is below 32°F, then the temperature is below freezing.

**3** Student gives conditionals that meet the criteria and provides clear and accurate explanations of why the conditionals meet the criteria.

**2** Student gives examples and explanations that are generally clear but may contain errors.

1 Student makes significant errors in examples or explanations.

**0** Student makes little or no attempt.

#### **TASK 2: Scoring Guide**

Sample: The definition cannot be written as a biconditional. A school is a place where people are educated.

**3** Student gives an explanation and a definition that are accurate, clear, and complete.

**2** Student gives an explanation and a definition that are generally clear but may contain errors.

1 Student makes significant errors in explanation or definition.0 Student makes little or no attempt.

### TASK 3: Scoring Guide

**a.** Sample: If two angles have sides that are opposite rays, then they are vertical angles.  $\angle CEF$  and  $\angle GED$  are angles whose sides are opposite rays. Therefore,  $\angle CEF$  and  $\angle GED$  are vertical angles.

**b.** Sample:  $\angle CEF$  and  $\angle GED$  are vertical angles. All vertical angles are congruent. Therefore,  $\angle CEF \cong \angle GED$ .

**3** Student gives accurate and complete examples and

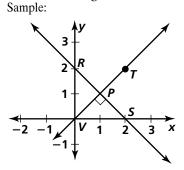
explanations of the Laws of Detachment and Syllogism.

**2** Student gives examples and explanations that are generally correct but may be unclear.

**1** Student gives examples or explanations that contain major errors.

**0** Student makes little or no attempt.

TASK 4: Scoring Guide



**a.**  $\angle$  *TPR* and  $\angle$ *RPV*;  $\angle$ *RPV* and  $\angle$ *VPS*;  $\angle$ *VPS* and  $\angle$ *SPT*;  $\angle$ *SPT* and  $\angle$ *TPR*;  $\angle$ *RPT* and  $\angle$ *VPS*;  $\angle$ *TPS* and  $\angle$ *RPV* 

**b.**  $\angle RPT$  and  $\angle VPS$ ;  $\angle TPS$  and  $\angle RPV$ 

**c.**  $\angle RPT$  is a right angle because the lines are perpendicular, so  $m \angle RPT = 90$ . Therefore, if ray *PY* bisects  $\angle RPT$ ,  $m \angle YPR = 45$ .

**3** Student draws a diagram and gives responses that indicate a thorough understanding of the definitions involved. Student shows logic in part c that is complete and accurate.

**2** Student draws a diagram and gives responses that, while basically accurate, contain some minor flaws, inaccuracies, or omissions.

**1** Student draws a diagram or gives responses that contain significant inaccuracies or omissions. Student displays flaws in logical argument in part c.

**0** Student makes little or no attempt.

### **Cumulative Review**

					<b>6.</b> C	
<b>8.</b> A	9. D	<b>10.</b> B	11. (	<b>12.</b>	D 13	В. С
<b>14.</b> 17 <b>15.</b> If a polygon has three sides, then it is a						
triangle; true. <b>16.</b> $196\pi$ m <sup>2</sup> <b>17.</b> Sample: Two						
supplementary angles are not necessarily a linear pair.						
<b>18.</b> $\overrightarrow{BC}$ <b>19.</b> Substitution Property of Equality						
<b>20.</b> (-1	,2) <b>2</b>	<b>1.</b> (-2, 2	) 22	<b>.</b> √145	<b>23.</b> 4	
<b>24.</b> 60 m	n <sup>2</sup> <b>25</b> .	380.13 c	$m^2$	<b>26.</b> Samj	ole: A mid	lpoint
must be on the segment. Any point that lies on the perpen-						
dicular bisector of a segment is equidistant from the endpoints.						

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