

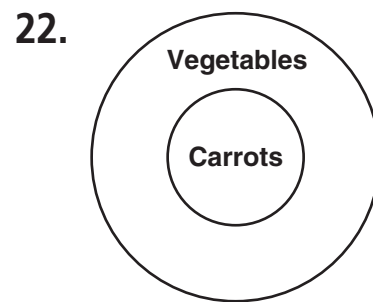
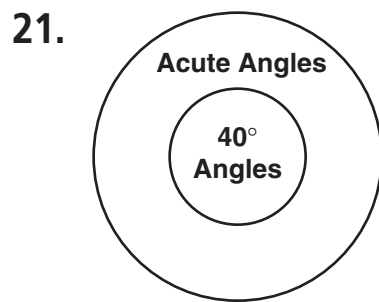
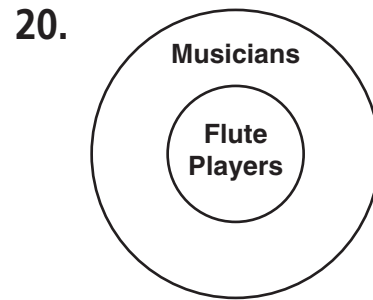
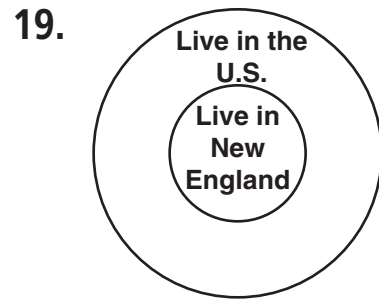
Answers for Lesson 2-1, pp. 83–86 Exercises

1. Hypothesis: You send in the proof-of-purchase.
Conclusion: They send you a get-well card.
2. Hypothesis: You want to be fit.
Conclusion: Get plenty of exercise.
3. Hypothesis: $x + 20 = 32$
Conclusion: $x = 12$
4. Hypothesis: You can see the magic in a fairy tale.
Conclusion: You can face the future.
5. Hypothesis: Somebody throws a brick at me.
Conclusion: I can catch it and throw it back.
6. Hypothesis: You can accept defeat and open your pay envelope without feeling guilty.
Conclusion: You're stealing.
7. Hypothesis: My fans think that I can do everything I say I can do.
Conclusion: They're crazier than I am.
8. Hypothesis: I could paint that flower in a huge scale.
Conclusion: You could not ignore its beauty.
9. If an object is glass, then it is fragile.
10. If $3x - 7 = 14$, then $3x = 21$.
11. If a whole number has 2 as a factor, then it is even.
12. If something is an obtuse angle, then it has a measure greater than 90.
13. If the weather is good, then a picnic is enjoyable.
14. If two lines are skew, then they do not lie in the same plane.
15. Sunday
16. Answers may vary. Sample: 9

Answers for Lesson 2-1, pp. 83–86 Exercises (cont.)

17. Mexico

18. Answers may vary. Sample: softball



23. If you grow, then you eat your vegetables.

24. If a triangle has a 90° angle, then it is a right triangle.

25. If two segments have the same length, then they are congruent.

26. If you do not get paid, then you do not work.

27. Converse: If you have a passport, then you travel from the United States to Kenya. The original conditional is true and the converse is false.

28. Converse: If the coordinates of a point are positive, then it is in the first quadrant. Both statements are true.

29. Converse: If the chemical formula for a substance is H_2O , then it is water. Both statements are true.

30. Converse: If an event is certain to occur, then the probability of the event is 1. Both statements are true.

31. Converse: If you are in Indianapolis, then you are in Indiana. The original statement is false and the converse is true.

Answers for Lesson 2-1, pp. 83–86 Exercises (cont.)

32. Converse: If two angles are congruent, then they have measure 90. The original statement is true and the converse is false.
33. If a person is an Olympian, then that person is an athlete.
34. If something is a robin, then it is a bird.
35. If something is a whole number, then it is an integer.
36. a. If x^2 is an integer divisible by 3, then x is an integer divisible by 3.
- b. The converse is false. Counterexample: If $x^2 = 3$, then $x = \sqrt{3}$ and $\sqrt{3}$ is not an integer divisible by 3.
37. A
38. If we're half the people, then we should be half the Congress.
39. If a work is great, then it is made out of a combination of obedience and liberty.
40. If a problem is well-stated, then it is half solved.
41. If $x = 18$, then $x - 3 = 15$; true.
42. If $-y$ is positive, then y is negative; true.
43. If $|x| = 6$, then $x = -6$; 6.
44. If $x^2 > 0$, then $x < 0$; 5.
45. If $x^2 = 4$, then $x = 2$; -2 .
46. If $x^3 < 0$, then $x < 0$; true.

Answers for Lesson 2-1, pp. 83–86 Exercises (cont.)

47. a. If you want to look good at the beach this summer, then join GoodFit Health Club.
- b. If I join GoodFit Health Club, then I will look good at the beach this summer.
- c. Answers may vary. Sample: Al's statement means that joining the club will make him look good. The ad statement does not guarantee that he will look good.
48. If a figure is a square, then it has four congruent angles; true.
49. If a figure has four congruent angles, then it is a square; false; a rectangle that is not a square.
50. If a figure has four congruent sides, then it has four congruent angles; false; a rhombus that is not square.
51. If a figure has four congruent angles and four congruent sides, then it is a square; true.
52. Answers may vary. Sample: If you had bought Treadmaster tires, you would not have had a flat tire.
53. Check students' work.
- 54–58. Answers may vary. Samples are given.**
54. If two lines intersect, then they meet in exactly one point.
55. If two planes intersect, then they meet in exactly one line.
56. If two figures are congruent, then they have equal areas.
57. If two points are given, then there is exactly one line through them.
58. If three noncollinear points are given, then there is exactly one plane that contains them.

Answers for Lesson 2-1, pp. 83–86 Exercises (cont.)

59. All integers that are divisible by 8 are divisible by 2.
60. No triangles are squares. (or No squares are triangles.)
61. Some students are musicians. (or Some musicians are students.)
62. Answers may vary. Sample: All apples are fruits; Conditional: If something is an apple, then it is a fruit. No line segments are rays; Conditional: If something is a line segment, then it is not a ray.
63. 25 statements;

		Conclusion				
		r	s	t	u	v
Hypothesis	→	r	s	t	u	v
	r	T	F	T	F	T
	s	F	T	T	F	T
	t	F	F	T	F	T
	u	T	T	T	T	T
	v	F	F	T	F	T

Answers for Lesson 2-2, pp. 90–92 Exercises

1. If two segments are congruent, then they have the same length. It is true. Two segments have the same length if and only if they are congruent.
2. If $2x - 5 = 19$, then $x = 12$. It is true. $x = 12$ if and only if $2x - 5 = 19$.
3. If a number is even, then it is divisible by 20. It is false since 4 is even but not divisible by 20.
4. If $|x| = 3$, then $x = 3$. It is false since $|-3| = 3$ also.
5. In the United States, if it is Independence Day, then it is July 4th. It is true. In the United States, it is Independence Day if and only if it is July 4th.
6. If $x^2 = 100$, then $x = -10$. It is false since x can also equal 10.
7. If a line bisects a segment, then the line intersects the segment only at its midpoint. If a line intersects a segment only at its midpoint, then it bisects the segment.
8. If an integer is divisible by 100, then its last two digits are zeros. If an integer's last two digits are zeros, then it is divisible by 100.
9. If you live in Washington, D.C., then you live in the capital of the United States. If you live in the capital of the United States, then you live in Washington, D.C.
10. If two lines are parallel, then they are coplanar and do not intersect. If two lines are coplanar and do not intersect, then they are parallel.
11. If two angles are congruent, then they have the same measure. If two angles have the same measure, then they are congruent.

Answers for Lesson 2-2, pp. 90–92 Exercises (cont.)

12. If $x^2 = 144$, then $x = 12$ or $x = -12$. If $x = 12$ or $x = -12$, then $x^2 = 144$.
13. A line, segment, or ray is a perpendicular bisector of a segment if and only if it is perpendicular to the segment at its midpoint.
14. Planes are parallel if and only if they do not intersect.
15. not reversible
16. not reversible
17. A point is a midpoint of a segment if and only if it divides the segment into two congruent segments.
- 18–23. Answers may vary. Samples are given.**
18. No; it is not reversible; a mouse is a counterexample.
19. No; it is not reversible; a cat is a counterexample.
20. No; it is not precise; a ray or pt. could be part of a line.
21. No; it is not reversible; skew lines are not parallel.
22. No; it is not reversible; a stop sign is a counterexample.
23. good definition
24. No; a straight angle has a measure that is greater than 90, but it is not an obtuse angle.
25. Answers may vary. Sample: An acute angle is an angle whose measure is between 0 and 90. The terms are clearly understood. It is precise and it is reversible.
26. A line is parallel to a plane if and only if it does not intersect the plane.
27. Answers may vary. Sample: Two angles are a linear pair if and only if they are adjacent and supplementary.
28. No; $\angle 1$ and $\angle 2$ are not suppl.
29. Yes; $\angle 1$ and $\angle 2$ share a side and a vertex, and are suppl.

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Answers for Lesson 2-2, pp. 90–92 Exercises (cont.)

- 30. No; $\angle 1$ and $\angle 2$ do not share a vertex.
- 31. No; $\angle 1$ and $\angle 2$ do not share a side, and are not suppl.
- 32. D
- 33. good definition
- 34. V is a counterexample.
- 35. L is a counterexample.
- 36. good definition
- 37. good definition
- 38. Angles are congruent if and only if they have equal measure.
- 39. The sum of the digits of an integer is divisible by 9 if and only if the integer is divisible by 9.
- 40. A number is a whole number if and only if it is a nonnegative integer.
- 41. If $\angle A$ and $\angle B$ are right angles, then $\angle A$ and $\angle B$ are supplementary angles.
- 42. If $\angle A$ and $\angle B$ are supplementary angles, then $\angle A$ and $\angle B$ are right angles.
- 43. $\angle A$ and $\angle B$ are right angles if and only if $\angle A$ and $\angle B$ are supplementary angles.
- 44. $\angle A$ and $\angle B$ are supplementary angles if and only if $\angle A$ and $\angle B$ are right angles.
- 45. $\angle A$ and $\angle B$ are right angles if and only if $\angle A$ and $\angle B$ are adjacent angles.
- 46. $\angle A$ and $\angle B$ are adjacent angles if and only if $\angle A$ and $\angle B$ are supplementary angles.

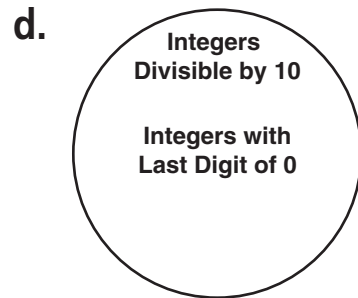
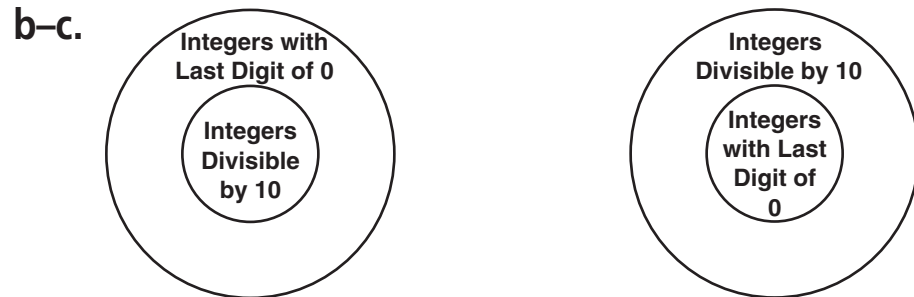
Answers for Lesson 2-2, pp. 90–92 Exercises (cont.)

47.

Instrument	Amy	Bob	Carla
Drums		x	x
Guitar	x		x
Keyboard	x	x	

Amy plays the drums. Bob plays the guitar. Carla plays the keyboard.

48. a. If an integer is divisible by 10, then its last digit is 0. If an integer's last digit is 0, then it is divisible by 10.



- e. Answers may vary. Sample: The two circles coincide.
 f. Answers may vary. Sample: A good definition may be written as a biconditional because either of the coinciding circles of its Venn diagram can be the hypothesis of a conditional, and the other can be the conclusion.

49. Answers may vary. Sample: If the two hats in front of Alan were blue, he would know he was wearing red. Ben can tell from Alan's response that there are 1 or 2 red hats in front of Alan. Since Ben can't tell his hat color, Cal's hat must be red.

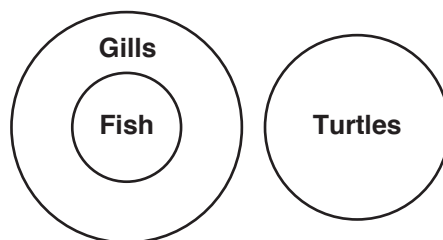
Answers for Lesson 2-3, pp. 96–98 Exercises

1. Felicia will pass the music theory course.
2. Rashid must study hard.
3. Line ℓ and line m do not intersect.
4. It is not safe for Marla to be out in the open.
5. Figure $ABCD$ has two pairs of parallel sides.
6. not possible
7. Points X , Y , and Z are collinear.
8. not possible
9. Nadine Muzerall attended the University of Minnesota.
10. If an animal is a red wolf, then it is endangered.
11. If two planes are not parallel, then they intersect in a line.
12. If you read a good book, then your time is well spent.
13. If you are studying botany, then you are studying a science.
- 14–15. Answers may vary. Samples are given.**
14. If an Alaskan mountain is over 20,300 ft high, then it is the highest in the United States. Alaska's Mt. McKinley is the highest in the United States.
15. If you live in Lubbock, then you live in the 28th state to enter the Union. Levon lives in the 28th state to enter the Union.
16. Must be true; by (E) and (A), it is breakfast time. Then by (D), Julio drinks juice.
17. Must be true; by (E) and (A), it is breakfast time. Then by (C), Curtis drinks water.
18. May be true; by (E) and (A), it is breakfast time. We don't know what Kira drinks at breakfast time.

Answers for Lesson 2-3, pp. 96–98 Exercises (cont.)

19. Is not true; by (E) and (A), it is breakfast time. By (C), Curtis drinks water and nothing else.
20. May be true; by (E), Maria drinks juice. We don't know if she also drinks water.
21. Is not true; by (A) and (E), it is breakfast time. By (D), Julio drinks juice and nothing else.
22. If something is a national park, then it is interesting; Mammoth Cave is interesting.
23. If you are in Key West, Florida, then the temperature is always above 32°F; not possible.
24. If you are a high school student, then you like music; not possible.
25. If a figure is a square, then it is a rectangle; $ABCD$ is a rectangle.
26. Answers may vary. Sample: If a student wears a hat to school, then the student must take it off indoors. Amy wears a hat to school. Then Amy must take off the hat indoors.
27. No; red cars can never park.
28. No; guys with beards cannot park on Monday.
29. yes
30. No; there is no parking Tuesday from 6:49 A.M. to 9:11 A.M.
31. yes
32. Aisha and Ramon

33. a.



b. Turtles are not in the circle of animals with gills, so a turtle is not a fish.

Answers for Lesson 2-4, pp. 105–107 Exercises

1. a. \angle Add. Post.
b. Subst. Prop.
c. Simplify.
d. Subtr. Prop. of =
e. Div. Prop. of =
2. a. Segment Add. Post.
b. Subst. Prop.
c. Distributive Prop.
d. Simplify.
e. Subtr. Prop. of =
f. Div. Prop. of =
3. a. Mult. Prop. of =
b. Distr. Prop.
c. Add. Prop. of =
4. a. Distr. Prop.
b. Subtr. Prop. of =
c. Div. Prop. of =
5. Reflexive Prop. of \cong
6. Distr. Prop.
7. Div. Prop. of =
8. Symmetric Prop. of \cong
9. Mult. Prop. of =
10. Reflexive Prop. of =
11. Subtr. Prop. of =
12. Symmetric Prop. of =
13. Sub. Prop.
14. Add. Prop. of =
15. Transitive Prop. of =
16. 15
17. $5x$
18. $YU = AB$
19. $\angle K$
20. $\angle PQR$
21. 3
22. $EF + 7$
23. $\angle XYZ \cong \angle WYT$
24. C
25. Answers may vary. Sample: \overline{LR} and \overline{RL} are different ways to name the same segment and $\angle CBA$ and $\angle ABC$ are different ways to name the same \angle .
26. C

Answers for Lesson 2-4, pp. 105–107 Exercises (cont.)

27. a. Given
b. Def. of midpoint
c. Subst. Prop. of =
d. Subtr. Prop. of =
e. Div. Prop. of =
28. a. 1. $KL + LM = KM$ (Segment Add. Post.)
2. $2x - 5 + 2x = 35$ (Subst. Prop.)
3. $4x - 5 = 35$ (Simplify.)
4. $4x = 40$ (Add. Prop. of =)
5. $x = 10$ (Div. Prop. of =)
b. 15
29. a. 1. $m\angle GFE + m\angle EFI = m\angle GFI$ (\angle Addition Post.)
2. $9x - 2 + 4x = 128$ (Subst. Prop.)
3. $13x - 2 = 128$ (Simplify.)
4. $13x = 130$ (Add. Prop. of =)
5. $x = 10$ (Div. Prop. of =)
b. 40
30. a. Given b. Def. of \angle Bisector
c. Subst. Prop. d. Subtr. Prop. of =
e. Div. Prop. of =

Answers for Lesson 2-4, pp. 105–107 Exercises (cont.)

- 31.** In the fifth step, each side is divided by $(b - a)$. But $b - a = 0$ and division by 0 is not defined.
- 32.** reflexive, symmetric, transitive **33.** transitive
- 34.** reflexive, symmetric, transitive **35.** symmetric
- 36.** reflexive, symmetric, transitive **37.** transitive

Answers for Lesson 2-5, pp. 112–115 Exercises

1. 20
2. $x = 25, y = 105$
3. 30
4. 60, 60
5. 75, 105
6. 120, 120
7.
 - a. 90
 - b. 90
 - c. Subst.
 - d. $m\angle 3$
8. Answers may vary. Sample: A thm. is proven and a post. is assumed to be true.
9. Answers may vary. Sample: scissors
10. If $m\angle 1 + m\angle 2 = 180$, and $m\angle 2 + m\angle 3 = 180$, then $m\angle 1 + m\angle 2 = m\angle 2 + m\angle 3$ by subst. Subtr. $m\angle 2$ from each side $m\angle 1 = m\angle 3$ or $\angle 1 \cong \angle 3$.
11. The two acute \sphericalangle s have measure 72. The two obtuse \sphericalangle s have measure 108.
12. 15; 25, 25
13. $x = 14, y = 15; 50, 50, 130$
14.
 - a. rt. \sphericalangle
 - b. $m\angle Y$
15. C
16. $\angle DOB \cong \angle AOC$ and $\angle DOA \cong \angle BOC$ since they are vert. \sphericalangle s.
17. $\angle EIG \cong \angle FIH$ since all rt. \sphericalangle s are \cong ; $\angle EIF \cong \angle HIG$ since they are compl. of the same \sphericalangle .
18. $\angle KPJ \cong \angle MPJ$ since they are marked \cong ; $\angle KPL \cong \angle MPL$ since they are suppl. of $\cong \sphericalangle$ s.
19. Answers may vary. Sample: $(-5, -1)$

Answers for Lesson 2-5, pp. 112–115 Exercises (cont.)

20. a. Answers may vary. B can be any point on the positive y -axis. Sample: $(0, 5)$
b. Answers may vary. Sample: $(3, -1)$
21. a. V
b. 180
c. Division
d. right
22. Suppl. of $\cong \sphericalangle$ s are \cong .
23. $m\angle A = 60, m\angle B = 30$ 24. $m\angle A = 30, m\angle B = 60$
25. $m\angle A = 120, m\angle B = 60$ 26. $m\angle A = 90, m\angle B = 90$
27. By the def. of suppl. \sphericalangle s, $m\angle 1 + m\angle 2 = 180$ and $m\angle 3 + m\angle 4 = 180$. By the Subst. Prop. $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 4$. It is given that $\angle 2 \cong \angle 4$, so $m\angle 2 = m\angle 4$. Then by the Subtr. Prop. of $=$, $m\angle 1 = m\angle 3$, or $\angle 1 \cong \angle 3$.
28. By the def. of compl. \sphericalangle s, $m\angle 1 + m\angle 2 = 90$ and $m\angle 3 + m\angle 4 = 90$. By the Subst. Prop. of $=$, $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 4$. It is given that $\angle 2 \cong \angle 4$, so $m\angle 2 = m\angle 4$. Then by the Subtr. Prop. of $=$, $m\angle 1 = m\angle 3$ or $\angle 1 \cong \angle 3$.
29. a–b. It is the bisector of both angles.
c. Sample: perpendicular; bisectors of two adjacent supplementary angles form two adjacent angles whose measures add to $\frac{1}{2}(180)$, or 90.
30. $x = 30, y = 90; 60, 120, 60$
31. $x = 35, y = 70; 70, 110, 70$
32. $x = 50, y = 20; 80, 100, 80$