b. 30 cm

c. yes; The slopes of $\overline{EF}$ and $\overline{GH}$ are $\frac{3}{4}$, and the slopes of $\overline{FG}$ and $\overline{EH}$ are $-\frac{4}{3}$. Because $\frac{3}{4}\left(-\frac{4}{3}\right) = -1$, the sides are perpendicular.

d. a quadrilateral with four congruent sides and four right angles; no; All four sides are not congruent; $A = 50$ cm^2

1.4 Extra Practice

1. pentagon; concave
2. octagon; convex
3. octagon; concave
4. dodecagon; convex
5. 14.3 units, 6 square units
6. 12.2 units, 5 square units
7. 26 units, 30 square units
8. 12 units, 9 square units
9. 18.8 units
10. 16 units
11. 22.8 units
12. 15 square units
13. 12 square units
14. 27 square units

1.5 Explorations

1. a. 35°; acute
b. 65°; acute
c. 30°; acute
d. 110°; obtuse
e. 80°; acute
f. 45°; acute
g. 75°; acute
h. 145°; obtuse

2. a. Check students' work.
b. Check students' work.
c. yes; $180(6 - 2) = 180(4) = 720°$ and $120(6) = 720°$
d. 720°, 720°, 1080°; no; The first two hexagons split up angles in the hexagon, but the third hexagon adds six angles in the center of the hexagon.

3. Use a protractor; When the measure is greater than 0° and less than 90°, the angle is acute. When the measure is equal to 90°, the angle is right. When the measure is greater than 90° and less than 180°, the angle is obtuse. When the measure is equal to 180°, the angle is straight.

1.5 Extra Practice

1. $\angle EFG$; $\angle GFH$; $\angle EFH$
2. $\angle QRT$; $\angle TRS$; $\angle QRS$
3. $\angle LMN$; $\angle NMK$; $\angle LMK$
4. 116°
5. 22°
6. 100°, 80°
7. 18°, 72°
8. 46°, 46°
9. 70°, 140°

1.6 Explorations

1. a. $x°$ and $y°$ make a straight angle together; $y°$ and $z°$ make a straight angle together; $x°$ and $z°$ appear to be congruent.
b. 72°; 108°; 72°; 72°; 36°; $x = 180 - 108 = 72$; $y = 180 - 72 = 108$; $z = 180 - 108 = 72$; $w = 180 - 108 = 72$; $v = 180 - (72 + 72) = 36$

2. a. $a°$ and $b°$ make a right angle together, $c°$ and $d°$ make a straight angle together, $c°$ and $e°$ are congruent angles
b. 90°; 90°; 90°; $c = 180 - 90 = 90$; $d = 180 - c = 180 - 90 = 90$; $e = 180 - 90 = 90$

3. When two lines intersect, four angles and two pairs of opposite rays are formed. The angles that are next to each other have measures that add up to 180°. The angles that are across from each other are congruent and have the same measure.

4. Complementary angle measures add up to 90°; Supplementary angle measures add up to 180°; Vertical angles have the same measure.

1.6 Extra Practice

1. $\angle TOS$ and $\angle TOP$
2. $\angle LJM$ and $\angle TOP$; $\angle LJM$ and $\angle QOR$
3. 54°
4. 63°
5. $m\angle BAC = 42°$; $m\angle CAD = 48°$
6. $m\angle EFH = 55°$; $m\angle HFG = 125°$
7. $\angle 1$ and $\angle 2$; $\angle 1$ and $\angle 4$
8. $\angle 1$ and $\angle 3$; $\angle 2$ and $\angle 4$; $\angle 5$ and $\angle 8$; $\angle 6$ and $\angle 9$; $\angle 7$ and $\angle 10$
9. no; The noncommon sides of $\angle 6$ and $\angle 7$ are not opposite rays.

Chapter 2

Maintaining Mathematical Proficiency

1. $a_n = 6n - 1$; $a_{20} = 119$
2. $a_n = 12n + 10$; $a_{20} = 250$
3. $a_n = 13n - 26$; $a_{20} = 234$
4. $a_n = 0.5n - 5$; $a_{20} = 5$
5. $a_n = -15n + 55$; $a_{20} = -245$
6. $a_n = n - \frac{3}{2}$; $a_{20} = \frac{37}{2}$, or $18\frac{1}{2}$
7. $x = 3y + 4$
8. $x = 4y - 10$
9. $x = 5y - 2$
10. $x = -\frac{1}{9}y + 2$
11. $x = \dfrac{10y - 1}{3z + 2}$
12. $x = \dfrac{7z}{2y + 1}$

2.1 Explorations

1. a. true; Thursday always follows Wednesday.
b. false; 30° is only one example of an acute angle.
c. false; June is only one of the months that has 30 days.
d. true; All even numbers are divisible by 2 and 9 is not a perfect cube. Because both the hypothesis and conclusion are false, the conditional statement is true.

2. a. true; $\overline{AB}$ is a vertical segment, and $\overline{BC}$ is a horizontal segment. So, they are perpendicular.
b. false; $\overline{BC}$ is longer than the other two sides.
c. true; $BD = CD$ because both have endpoints that are the same distance from the origin.
d. true; $\overline{AD} \parallel \overline{BC}$ because they are both horizontal segments.
e. false; $\overline{AB}$ is vertical, but $\overline{CD}$ is not. So, they are not parallel.

3. a. true; The Pythagorean Theorem is valid for all right triangles.
b. false; Two angles are complementary when the sum of their measures is 90°.
c. false; The sum of the angle measures of a quadrilateral is always 360°.
d. true; This is the definition of collinear.
e. true; Every pair of intersecting lines forms two pairs of opposite rays and therefore two pairs of vertical angles.

4. A conditional statement is only false when a true hypothesis produces a false conclusion. Otherwise, it is true.

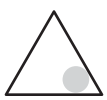
5. *Sample answer:* If the measure of an angle is greater than 0° and less than 90°, then it is an acute angle; If polygon $ABCD$ is a trapezoid, then it is a rectangle; The first statement is true because it is the definition of an acute angle. The second statement is false because trapezoids only have one pair of parallel sides, but rectangles have two pairs of parallel sides.

2.1 Extra Practice

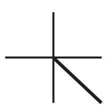
1. If $x = -1$, then $13x - 5 = -18$.
2. If a polygon is a triangle, then the sum of the measures of its interior angles is 180°.
3. conditional: If quadrilateral *ABCD* is a rectangle, then the sum of its angle measures is 360°; true
   converse: If the sum of the angle measures is 360°, then quadrilateral *ABCD* is a rectangle; false
   inverse: If quadrilateral *ABCD* is not a rectangle, then the sum of the angle measures is not 360°; false
   contrapositive: If the sum of the angle measures is not 360°, then quadrilateral *ABCD* is not a rectangle; true
4. true; The bisector symbol in the diagram indicates that $\overline{JR} \cong \overline{RK}$.
5. false; There is no right angle symbol in the diagram to indicate that $\angle JRL$ is a right angle.
6. true; $\angle MRQ$ and $\angle PRL$ are two nonadjacent angles formed by line *PQ* intersecting with line *LM*. The pair of $\angle MRQ$ and $\angle PRL$ fits the definition of vertical angles. So, $\angle MRQ$ and $\angle PRL$ are congruent.

2.2 Explorations

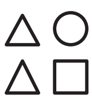
1. **a.** The circle is rotating from one vertex in the triangle to the next in a clockwise direction.



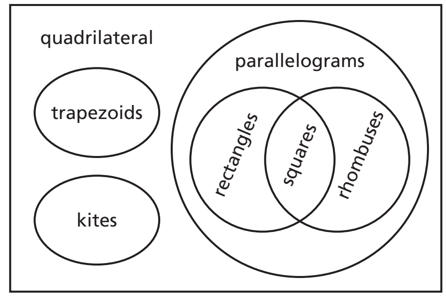
   b. The pattern alternates between a curve in an odd quadrant and a line segment with a negative slope in an even quadrant. The quadrants with a curve or a line segment follow the pattern I, IV, III, II, and the curves follow the pattern of two concave down and two concave up.



   c. The pattern alternates between the first three arrangements, then their respective mirror images.



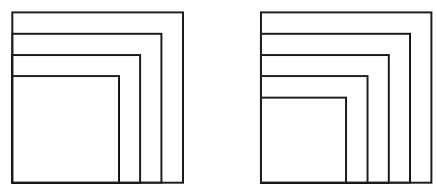
2. **a.** true; Because all of Property B is inside Property A, all items with Property B must also have Property A.
   b. false; There is a region for items that have Property A but not B.
   c. false; There is a region for items that have Property A but not C.
   d. true; There is a region for items that have Property A but not B.
   e. true; There is no intersection of the regions for Properties C and B.
   f. true; There is a region that is the intersection of Properties A and C.
   g. false; There is no intersection of the regions for Properties B and C.

3. 

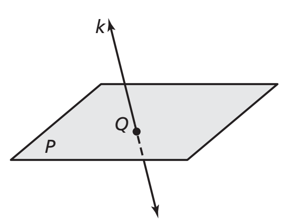
   Sample answer: If a quadrilateral is a kite, then it is not a trapezoid. If a quadrilateral is a rectangle, then it is a parallelogram. If a quadrilateral is a square, then it is a rhombus, a rectangle, and a parallelogram. If a polygon is a rhombus, then it is a quadrilateral.
4. You can look for a pattern and then use a "rule" based on that pattern to predict what will happen if the pattern continues.
5. *Sample answer:* You noticed that you did much better on your math tests when you were able to study for at least one hour the night before as opposed to when you were only able to study for less than an hour. So now you make sure that you study for at least one hour the night before a test.

2.2 Extra Practice

1. The difference between two numbers is one more than the difference between the previous two numbers; 5, -1
2. The list items are prime numbers that have alternating negative and positive signs; 11, -13
3. The list items are letters in alphabetical order with every other letter skipped; M, O
4. This is a sequence of squares, each square having one more smaller square than the previous one.



5. The sum of any two negative integers is a negative integer.
   Sample answer: $-3 + (-3) = -6$. $-41 + (-50) = -91$, $-100 + (-900) = -1000$
6. The product of three consecutive nonzero integers is an even number.
   Sample answer:
   $2 \cdot 3 \cdot 4 = 24$, $-27 \cdot (-26) \cdot (-25) = -17{,}550$,
   $99 \cdot 100 \cdot 101 = 999{,}900$
7. $\left(\frac{3}{2}\right)^2 = \frac{3}{2} \cdot \frac{3}{2} = \frac{9}{4} > \frac{3}{2}$
8. Line *k* and plane *P* can intersect at point *Q* at any angle.



9. Each angle measure of $\triangle ABC$ is 60°.
10. not possible
11. If it does not rain, then I will wear my walking shoes.

12. If $x > 1$, then $(3x)^2 > 9$.

2.3 Explorations

1. The lines appear perpendicular from all angles, including when you look at the lines from a view that is perpendicular to both lines.

2. **a.** true; They all lie in the same plane.

b. false; There is not a line shown that connects all three of them.

c. true; All three points are on $\overleftrightarrow{AH}$.

d. true; $\angle GFH$ is marked as a right angle.

e. true; These two angles are adjacent and form a straight angle.

f. false; The angles formed by these two lines are not marked. So, you do not know whether or not the lines are perpendicular.

g. false; Even though they appear to be parallel, you cannot tell for sure.

h. true; Both lines are in the same plane.

i. false; Even though they appear to be parallel, you cannot tell for sure.

j. true; They intersect at point C.

k. false; $\overleftrightarrow{EG}$ is perpendicular to $\overleftrightarrow{AH}$, and it could not be perpendicular to two different lines that intersect.

l. true; These angles form two pairs of opposite rays.

m. true; Points A, C, F, and H are all on the same line, which can be named using any two points on the line.

3. You can assume intersecting lines, opposite rays, vertical angles, linear pairs, adjacent angles, coplanar (points, lines, rays, etc.), collinear points, which point is between two other points, and which points are in the interior of an angle. You have to have a label for identifying angle measures, segment lengths, perpendicular lines, parallel lines, and congruent segments or angles.

4. *Sample answer:* $\angle ACD$ and $\angle DCF$ form a linear pair, because these angles share a vertex and a side but no common interior points and $\angle ACF$ is a straight angle. $\angle CFE$ and $\angle GFH$ are vertical angles, because $\overleftrightarrow{FG}$ and $\overleftrightarrow{FE}$ are opposite rays as well as $\overleftrightarrow{FC}$ and $\overleftrightarrow{FH}$; $\angle DCF$ is a right angle, which cannot be assumed because angle measurements have to be marked. $\overline{BC} \cong \overline{CD}$, which cannot be assumed because lengths of segments have to be labeled.

2.3 Extra Practice

1. Two Point Postulate (Post. 2.1)

2. Plane-Line Postulate (Post 2.6)

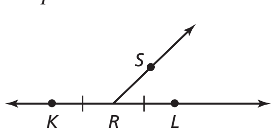
3. *Sample answer:* Through points B and C, there is exactly one line ℓ.

4. *Sample answer:* Line ℓ contains at least two points.

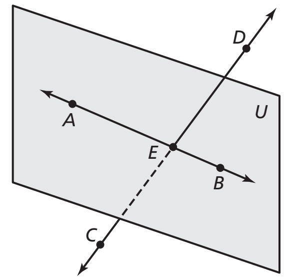
5. *Sample answer:* Plane P contains at least three noncollinear points.

6. *Sample answer:* The intersection of plane P and plane Q is line k.

7. *Sample answer:*



8. *Sample answer:*



9.	yes	**10.**	yes
11.	yes	**12.**	yes
13.	no	**14.**	yes

2.4 Explorations

1. Distributive Property; Simplify; Subtraction Property of Equality; Simplify; Subtraction Property of Equality; Simplify; Division Property of Equality; Simplify; Symmetric Property of Equality

2. The diamond represents multiplication, because $0 \times 5 = 0$; The circle represents addition, because $0 + 5 = 5$; Commutative Property of Multiplication; Commutative Property of Addition; Associative Property of Multiplication; Associative Property of Addition; Zero Property of Multiplication; Identity Property of Addition; Identity Property of Multiplication; Distributive Property

3. Algebraic properties are used to isolate the variable on one side of the equation.

4.

Equation	**Reason**
$3(x + 1) - 1 = -13$	Write the equation.
$3x + 3 - 1 = -13$	Distributive Property
$3x + 2 = -13$	Simplify.
$3x + 2 - 2 = -13 - 2$	Subtraction Property of Equality
$3x = -15$	Simplify.
$\dfrac{3x}{3} = \dfrac{-15}{3}$	Division Property of Equality
$x = -5$	Simplify.

2.4 Extra Practice

1.

Equation	**Explanation and Reason**
$3x - 7 = 5x - 19$	Write the equation; Given
$3x - 7 - 5x = 5x - 19 - 5x$	Subtract $5x$ from each side; Subtraction Property of Equality
$-2x - 7 = -19$	Combine like terms; Simplify.
$-2x - 7 + 7 = -19 + 7$	Add 7 to each side; Addition Property of Equality
$-2x = -12$	Combine constant terms; Simplify.
$x = 6$	Divide each side by -2; Division Property of Equality

2. Equation | **Explanation and Reason**

Equation	Explanation and Reason
$20 - 2(3x - 1) = x - 6$	Write the equation; Given
$20 - 6x + 2 = x - 6$	Multiply; Distributive Property
$20 - 6x + 2 - x = x - 6 - x$	Subtract x from each side; Subtraction Property of Equality
$-7x + 22 = -6$	Combine like terms; Simplify.
$-7x + 22 - 22 = -6 - 22$	Subtract 22 from each side; Subtraction Property of Equality
$-7x = -28$	Combine constant terms; Simplify.
$x = 4$	Divide each side by -4; Division Property of Equality

3.

Equation	Explanation and Reason
$-5(2u + 10) = 2(u - 7)$	Write the equation; Given
$-10u - 50 = 2u - 14$	Multiply; Distributive Property
$-10u - 50 - 2u = 2u - 14 - 2u$	Subtract $2u$ from each side; Subtraction Property of Equality
$-12u - 50 = -14$	Combine like terms; Simplify.
$-12u - 50 + 50 = -14 + 50$	Add 50 to each side; Addition Property of Equality
$-12u = 36$	Combine constant terms; Simplify.
$u = -3$	Divide each side by -12; Division Property of Equality

4.

Equation	Explanation and Reason
$9x + 2y = 5$	Write the equation; Given
$9x + 2y - 9x = 5 - 9x$	Subtract $9x$ from each side; Subtraction Property of Equality
$2y = 5 - 9x$	Combine like terms; Simplify.
$y = \dfrac{5 - 9x}{2}$	Divide each side by 2; Division Property of Equality

5.

Equation	Explanation and Reason
$\frac{1}{15}s - \frac{2}{3}t = -2$	Write the equation; Given
$\frac{1}{15}s - \frac{2}{3}t + \frac{2}{3}t = -2 + \frac{2}{3}t$	Add $\frac{2}{3}t$ to each side; Addition Property of Equality
$\frac{1}{15}s = -2 + \frac{2}{3}t$	Combine like terms; Simplify.
$s = 15\left(-2 + \frac{2}{3}t\right)$	Divide each side by $\frac{1}{15}$; Division Property of Equality
$s = -30 + 10t$ or $s = 10t - 30$	Multiply; Distributive Property

6.

Equation	Explanation and Reason
$S = \pi r^2 + \pi rs$	Write the equation; Given
$S - \pi r^2 = \pi r^2 + \pi rs - \pi r^2$	Subtract πr^2 from each side; Subtraction Property of Equality
$S - \pi r^2 = \pi rs$	Combine like terms; Simplify.
$\dfrac{S - \pi r^2}{\pi r} = s$	Divide each side by πr; Division Property of Equality
$\dfrac{S}{\pi r} - r = s$ or $s = \dfrac{S}{\pi r} - r$	Rewrite the expression; Simplify.
$s \approx 3.0$ ft	

2.5 Explorations

1. Segment Addition Postulate (Post. 1.2); Transitive Property of Equality; Subtraction Property of Equality
2. $m\angle 1 = m\angle 3$; $m\angle 1 + m\angle 2$; $m\angle CBD$; $m\angle EBA = m\angle CBD$
3. You can use deductive reasoning to make statements about a given situation and use math definitions, postulates, and theorems as your reason or justification for each statement.
4.

STATEMENTS	REASONS
1. B is the midpoint of $\overline{AC}$. C is the midpoint of $\overline{BD}$.	1. Given
2. $\overline{AB} \cong \overline{BC}$, $\overline{BC} \cong \overline{CD}$	2. Definition of midpoint
3. $AB = BC$, $BC = CD$	3. Definition of congruent segments
4. $AB = CD$	4. Transitive Property of Equality

2.5 Extra Practice

1. Definition of segment bisector; Transitive Property of Equality; Definition of congruent segments; $AB = AM + BM$; Substitution Property of Equality
2. $m\angle AEB + m\angle BEC = 90°$; Angle Addition Postulate; Transitive Property of Equality; $m\angle AED + 90° = 180°$; Subtraction Property of Equality
3. Transitive Property of Angle Congruence (Thm. 2.2)
4. Symmetric Property of Segment Congruence (Thm. 2.1)
5.

STATEMENTS	REASONS
1. M is the midpoint of $\overline{RT}$.	1. Given
2. $\overline{RM} \cong \overline{MT}$	2. Definition of midpoint
3. $RM = RS + SM$	3. Segment Addition Postulate
4. $\overline{MT} \cong \overline{RM}$	4. Symmetric Property of Segment Congruence
5. $MT = RS + SM$	5. Substitution Property of Equality

2.6 Explorations

1. B; A; C; D
2. E; A or D; C; F; A or D; B

3. Use boxes and arrows to show the flow of a logical argument.
4. The flowchart proof, unlike the two-column proof, allows you to show explicitly which statement leads to which, but the two-column proof has a uniform, predictable shape and style and has each statement right below the previous one to allow for easy comparison. Both allow you to provide a logic argument and justification for why something is true.

2.6 Extra Practice

1. Definition of supplementary angles; $m\angle ACB + m\angle ACD = m\angle EGF + m\angle ACD$; $\angle EGF$ and $\angle ACD$ are supplementary; Definition of supplementary angles; Definition of congruent angles

STATEMENTS	REASONS
1. $\angle ACB$ and $\angle ACD$ are supplementary. $\angle EGF$ and $\angle ACD$ are supplementary.	1. Given
2. $m\angle ACB + m\angle ACD = 180°$ $m\angle EGF + m\angle ACD = 180°$	2. Definition of supplementary angles
3. $m\angle ACB + m\angle ACD = m\angle EGF + m\angle ACD$	3. Transitive Property of Equality
4. $m\angle ACB = m\angle EGF$	4. Subtraction Property of Equality
5. $\angle ACB \cong \angle EGF$	5. Definition of congruent angles

Chapter 3

Maintaining Mathematical Proficiency

1. $m = -\frac{5}{3}$
2. undefined
3. $m = \frac{3}{2}$
4. $m = -\frac{4}{5}$
5. $m = 0$
6. $m = -\frac{1}{3}$
7. $y = \frac{3}{5}x - 8$
8. $y = \frac{1}{3}x + 4\frac{1}{3}$
9. $y = 5x - 11$

3.1 Explorations

1. **a.** zero
   b. one
   c. infinitely many
2. **a.** intersecting; They intersect at point *B*.
   b. parallel; They are coplanar and will never intersect.
   c. coincident; Points *E*, *I*, and *H* are collinear.
   d. skew; They are not coplanar and will never intersect.
   e. skew; They are not coplanar and will never intersect.
   f. parallel; They both lie on plane *ABG*, which is not drawn, and they will never intersect.
3. **a.** $\angle 1$ and $\angle 3$, $\angle 2$ and $\angle 4$, $\angle 5$ and $\angle 7$, $\angle 6$ and $\angle 8$; Two pairs of opposite rays are formed by each of these pairs of angles.
   b. $\angle 1$ and $\angle 2$, $\angle 2$ and $\angle 3$, $\angle 3$ and $\angle 4$, $\angle 1$ and $\angle 4$, $\angle 5$ and $\angle 6$, $\angle 6$ and $\angle 7$, $\angle 7$ and $\angle 8$, $\angle 5$ and $\angle 8$; One pair of opposite rays is formed by each of these pairs of angles.
4. Parallel lines are coplanar and never intersect. Intersecting lines are coplanar and intersect at exactly one point. Coincident lines are coplanar and share all the same points because they are the same line. Skew lines are not coplanar and never intersect.
5. *Sample answer:* $\overleftrightarrow{DH}$ and $\overleftrightarrow{CG}$ are parallel because they are coplanar and will never intersect. $\overleftrightarrow{BF}$ and $\overleftrightarrow{AB}$ are intersecting because they intersect at point *B*. $\overleftrightarrow{FG}$ and $\overleftrightarrow{AE}$ are skew because they are in different planes and will never intersect.

3.1 Extra Practice

1. $\overleftrightarrow{BC}$ and $\overleftrightarrow{BD}$
2. $\overleftrightarrow{BG}$
3. $\overleftrightarrow{AB}$
4. plane *ABC*
5. $\overleftrightarrow{WX}$ and $\overleftrightarrow{YZ}$, $\overleftrightarrow{QR}$ and $\overleftrightarrow{UV}$
6. $\overleftrightarrow{UV}$ and $\overleftrightarrow{ST}$, $\overleftrightarrow{QR}$ and $\overleftrightarrow{ST}$
7. no; They are intersecting lines.
8. yes; There is exactly one line through *V* perpendicular to $\overleftrightarrow{ST}$.
9. $\angle 1$ and $\angle 5$; $\angle 1$ and $\angle 9$; $\angle 2$ and $\angle 6$; $\angle 2$ and $\angle 10$; $\angle 3$ and $\angle 7$; $\angle 3$ and $\angle 11$; $\angle 4$ and $\angle 8$; $\angle 4$ and $\angle 12$; $\angle 5$ and $\angle 10$; $\angle 6$ and $\angle 12$; $\angle 7$ and $\angle 9$; $\angle 8$ and $\angle 11$
10. $\angle 2$ and $\angle 7$; $\angle 3$ and $\angle 10$; $\angle 4$ and $\angle 5$; $\angle 4$ and $\angle 9$; $\angle 7$ and $\angle 12$; $\angle 8$ and $\angle 10$
11. $\angle 1$ and $\angle 12$; $\angle 2$ and $\angle 11$; $\angle 1$ and $\angle 8$; $\angle 3$ and $\angle 6$; $\angle 5$ and $\angle 11$; $\angle 6$ and $\angle 9$
12. $\angle 2$ and $\angle 5$; $\angle 3$ and $\angle 9$; $\angle 4$ and $\angle 7$; $\angle 4$ and $\angle 10$; $\angle 7$ and $\angle 10$; $\angle 8$ and $\angle 12$

3.2 Explorations

1. $m\angle 1 = m\angle 3 = m\angle 5 = m\angle 7$, $m\angle 2 = m\angle 4 = m\angle 6 = m\angle 8$, and any odd-numbered angle is supplementary to any even-numbered angle.
2. **a.** Corresponding angles are congruent when they are formed by two parallel lines and a transversal.
   b. Alternate interior angles are congruent when they are formed by two parallel lines and a transversal.
   c. Alternate exterior angles are congruent when they are formed by two parallel lines and a transversal.
   d. Consecutive interior angles are supplementary when they are formed by two parallel lines and a transversal.
3. corresponding angles, alternate interior angles, and alternate exterior angles
4. $m\angle 2 = 100°$, $m\angle 3 = 80°$, $m\angle 4 = 100°$, $m\angle 5 = 80°$, $m\angle 6 = 100°$, $m\angle 7 = 80°$, $m\angle 8 = 100°$

3.2 Extra Practice

1. $m\angle 1 = 110°$ by Alternate Interior Angles Theorem (Thm. 3.2); $m\angle 2 = 110°$ by Vertical Angles Congruence Theorem (Thm. 2.6)
2. $m\angle 1 = 63°$ by Corresponding Angles Theorem (Thm. 3.1); $m\angle 2 = 117°$ by Consecutive Interior Angles Theorem (Thm. 3.4)
3. $m\angle 1 = 95°$ by Vertical Angles Congruence Theorem (Thm. 2.6); $m\angle 2 = 95°$ by Alternate Exterior Angles Theorem (Thm. 3.3)
4. $m\angle 1 = 101°$ by Vertical Angles Congruence Theorem (Thm. 2.6); $m\angle 2 = 101°$ by Alternate Interior Angles Theorem (Thm. 3.2)
5. 98; $(x + 12)° = 110°$
   $x = 98$