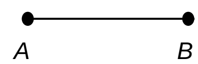
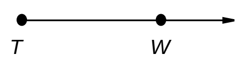
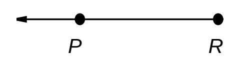
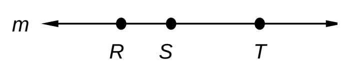
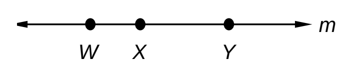
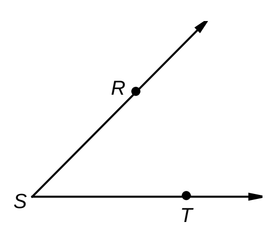
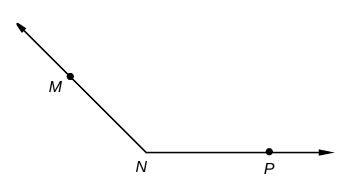
Developmental Mathematics
Chapter 6 Review

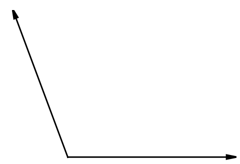
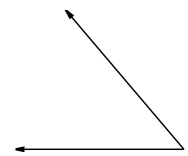
Objective [6.1a] Draw and name segments, rays, and lines. Also, identify endpoints, if they exist.

Brief Procedure	Example	Practice Exercise
To draw a segment, draw two endpoints and then draw all the points between them. A segment is named by its endpoints and is expressed using an overline.	Draw the segment with endpoints A and B. Name the segment in two ways.  The segment can be named $\overline{AB}$ or $\overline{BA}$.	1. Give a name for the segment with endpoints M and N. A. MN B. $\overline{M}$ C. $\overline{MN}$ D. $\overrightarrow{NM}$
A ray consists of a segment, say $\overline{AB}$, and all points X such that B is between A and X. It has one endpoint and extends forever in one direction. A ray is named by giving its endpoint first and then a point on the ray other than the endpoint and is expressed using an overarrow.	Draw and name the ray with endpoint T.  Since T is the endpoint we start at T and extend the ray to W and beyond.  The ray is named $\overrightarrow{TW}$.	2. Name the ray.  A. $\overline{PR}$ B. $\overline{RP}$ C. $\overrightarrow{PR}$ D. $\overrightarrow{RP}$
Two rays such as $\overrightarrow{PQ}$ and $\overrightarrow{QP}$ make up a line. A line can be named using a single lower case letter or it can be named by two points on the line, using a double-headed overarrow.	Name the line in seven different ways.  The line can be named m, $\overleftrightarrow{RS}$, $\overleftrightarrow{SR}$, $\overleftrightarrow{RT}$, $\overleftrightarrow{TR}$, $\overleftrightarrow{ST}$, or $\overleftrightarrow{TS}$.	3. Which is not a name for the line?  A. $\overleftrightarrow{XW}$ B. $\overleftrightarrow{WY}$ C. m D. $\overleftrightarrow{Wm}$

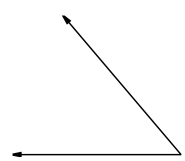
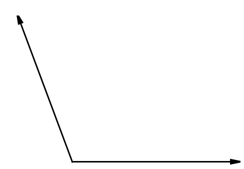
Objective [6.1b] Name a given angle in four different ways and given an angle, measure it with a protractor.

Brief Procedure	Example	Practice Exercise
Begin naming an angle by writing "angle" or "$\angle$." Then proceed by listing the names of points on its sides and the name of its vertex, with the name of the vertex given in the middle. An angle can also be named using only the vertex if no confusion results.	Name the angle in four different ways.  The angle can be named angle RST, angle TSR, $\angle RST$, $\angle TSR$, or $\angle S$. Any four of these can be used.	4. Which is not a correct name for the angle shown?  A. $\angle MNP$ B. $\angle MPN$ C. angle PNM D. $\angle N$

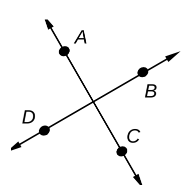
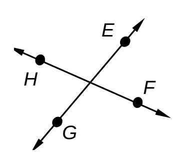
Objective [6.1b] continued

Brief Procedure	Example	Practice Exercise
To measure an angle with a protractor, place the $\triangle$ of the protractor at the vertex and line up one of the sides at $0°$, either on the inner or the outer scale. Then determine where the angle's other side crosses the scale and read the measure of the angle from that scale.	Use a protractor to measure this angle.  Place the $\triangle$ of the protractor at the vertex of the angle and line up one of the sides at $0°$. We choose the horizontal side. Since $0°$ is on the inside scale, we check where the other side of the angle crosses the inside scale. It crosses at $110°$. Thus, the measure of the angle is $110°$.	5. Use a protractor to measure this angle.  A. $50°$ B. $70°$ C. $120°$ D. $130°$

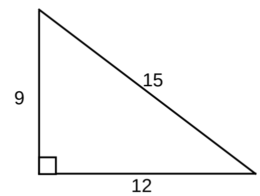
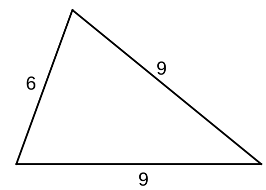
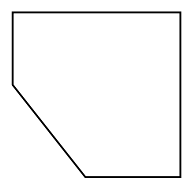
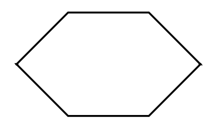
Objective [6.1c] Classify an angle as right, straight, acute, or obtuse.

Brief Procedure	Example	Practice Exercise
Right angle: An angle whose measure is $90°$. **Straight angle**: An angle whose measure is $180°$. **Acute angle**: An angle whose measure is greater than $0°$ and less than $90°$. **Obtuse angle**: An angle whose measure is greater than $90°$ and less than $180°$.	Classify the angle as right, straight, acute, or obtuse. Use a protractor if necessary.  The measure of the angle is greater than $0°$ and less than $90°$, so this is an acute angle.	6. Classify the angle as right, straight, acute, or obtuse.  A. Right B. Straight C. Acute D. Obtuse

Objective [6.1d] Identify perpendicular lines.

Brief Procedure	Example	Practice Exercise
If two lines intersect to form a right angle, they are perpendicular.	Determine whether the pair of lines is perpendicular. Use a protractor.  Measuring with a protractor, we find that the lines intersect to form a right angle. (In fact, they form four right angles.) Thus, the lines are perpendicular.	7. Determine whether the pair of lines is perpendicular. Use a protractor.  A. Perpendicular B. Not perpendicular

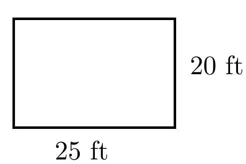
Objective [6.1e] Classify a triangle as equilateral, isosceles, or scalene, and as right, obtuse, or acute. Given a polygon of twelve, ten, or fewer sides, classify it as a dodecagon, decagon, and so on.

Brief Procedure	Example	Practice Exercise
Equilateral triangle: All sides are the same length. **Isosceles triangle**: Two or more sides are the same length. **Scalene triangle**: All sides are of different lengths. **Right triangle**: One angle is a right angle. **Obtuse triangle**: One angle is an obtuse angle. **Acute triangle**: All three angles are acute.	Classify the triangle as equilateral, isosceles, or scalene. Then classify it as right, obtuse, or acute.  All the sides are different lengths, so this is a scalene triangle. One angle is a right angle, so this is a right triangle.	8. Classify the triangle as equilateral, isosceles, or scalene. Then classify it as right, obtuse, or acute.  A. Scalene; acute B. Isosceles; acute C. Isosceles; obtuse D. Equilateral; obtuse
We can classify polygons according to the number of sides as follows. 4 sides: quadrilateral 5 sides: pentagon 6 sides: hexagon 7 sides: heptagon 8 sides: octagon 9 sides: nonagon 10 sides: decagon 12 sides: dodecagon	Classify the polygon by name.  The polygon has five sides, so it is a pentagon.	9. Classify the polygon by name.  A. Quadrilateral B. Hexagon C. Octagon D. Decagon

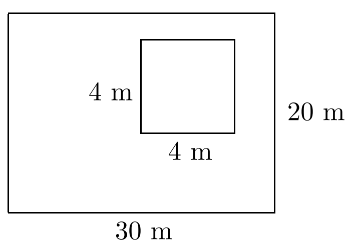
Objective [6.1f] Given a polygon of n sides, find the sum of its angle measures using the formula $(n-2)\cdot 180°$.

Brief Procedure	Example	Practice Exercise
Use the formula $(n-2)\cdot 180°$.	Find the sum of the angle measures of a nonagon. A nonagon has 9 sides. $(n-2)\cdot 180° = (9-2)\cdot 180° = 7\cdot 180° = 1260°$	10. Find the sum of the angle measures of a 16-sided polygon. A. 2160° B. 2520° C. 2880° D. 3600°

Objective [6.2a] Find the perimeter of a polygon.		
Brief Procedure	Example	Practice Exercise
Find the sum of the lengths of the sides of the polygon. Since rectangles and squares appear frequently in applications, we have special formulas to find their perimeters. The perimeter of a rectangle with length l and width w is given by $P = 2 \cdot (l + w)$, or $P = 2 \cdot l + 2 \cdot w$. The perimeter of a square with side s is given by $P = 4 \cdot s$.	Find the perimeter of a rectangle that is 4.5 ft by 2.5 ft. $P = 2 \cdot (l + w)$ $= 2 \cdot (4.5 \text{ ft} + 2.5 \text{ ft}) = 2 \cdot 7 \text{ ft}$ $= 14 \text{ ft}$	11. Find the perimeter of a square whose sides are 5 cm long. A. 10 cm B. 15 cm C. 20 cm D. 25 cm

Objective [6.2b] Solve applied problems involving perimeter.		
Brief Procedure	Example	Practice Exercise
Use the five-step problem solving process. If appropriate, use the formula for the perimeter of a rectangle or a square.	A fence is to be built around a 25 ft by 20 ft play area. How many feet of fence will be needed? If fencing sells for \$4.95 per foot, what will the fencing cost? 1. *Familiarize.* We make a drawing and let $P =$ the perimeter.  2. *Translate.* The perimeter of the play area is given by $P = 2 \cdot (l + w) = 2 \cdot (25 \text{ ft} + 20 \text{ ft})$. 3. *Solve.* We calculate the perimeter. $P = 2 \cdot (25 \text{ ft} + 20 \text{ ft})$ $= 2 \cdot (45 \text{ ft}) = 90 \text{ ft}$ Then we multiply the perimeter by \$4.95 to find the cost of the fencing: Cost = \$4.95 × Perimeter = \$4.95 × 90 ft = \$445.50. 4. *Check.* We repeat the calculations. The answers check. 5. *State.* The 90 ft of fencing that is needed will cost \$445.50.	12. A fence is to be built around a 200 m by 180 m field. If the fencing sells for \$1.85 per meter, what will the fencing cost? A. \$703 B. \$760 C. \$1215 D. \$1406

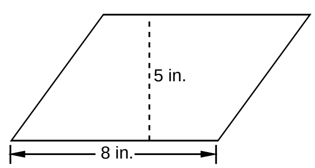
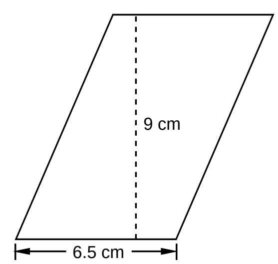
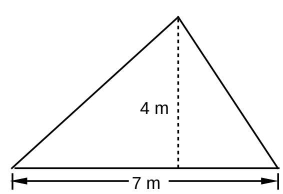
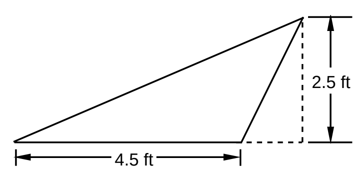
Objective [6.3a] Find the area of a rectangle or a square.		
Brief Procedure	Example	Practice Exercise
The area of a rectangle with length l and width w is given by $A = l \cdot w.$	Find the area of a rectangle that is 4.5 m by 2.3 m. $A = l \cdot w = 4.5 \text{ m} \times 2.3 \text{ m}$ $= 4.5 \times 2.3 \times \text{ m} \times \text{ m}$ $= 10.35 \text{ m}^2$	13. Find the area of a rectangle that is 8 ft by 6 ft. A. 28 ft^2 B. 36 ft^2 C. 48 ft^2 D. 64 ft^2
The area of a square with sides of length s is given by $A = s \cdot s$, or $A = s^2$.	Find the area of a square with sides of length 17 cm. $A = s \cdot s = 17 \text{ cm} \cdot 17 \text{ cm}$ $= 17 \cdot 17 \cdot \text{ cm} \cdot \text{ cm}$ $= 289 \text{ cm}^2$	14. Find the area of a square with sides of length 6.4 yd. A. 25.6 yd^2 B. 32.4 yd^2 C. 40.96 yd^2 D. 52.8 yd^2

Objective [6.3b] Solve applied problems involving areas of rectangles or squares.		
Brief Procedure	Example	Practice Exercise
Use the five-step problem solving process and the formula for the area of a rectangle or a square.	A square flower garden 4 m on a side is dug in a 30 m by 20 m lawn. How much area is left over? 1. *Familiarize.* We make a drawing.  2. *Translate.* We let $A =$ the area left over. $\underbrace{\text{Area left over}}_{\downarrow\; A} \;\overset{\text{is}}{=}\; \underbrace{\text{area of lawn}}_{\downarrow\;(30 \text{ m}) \times (20 \text{ m})} \;\overset{\text{minus}}{-}\; \underbrace{\text{area of garden}}_{\downarrow\;(4 \text{ m}) \times (4 \text{ m})}$ (continued)	15. A field measures 250 ft by 175 ft. A portion of the field measuring 180 ft by 150 ft is paved for a parking area. How much of the field is left unpaved? A. 850 ft^2 B. 16,750 ft^2 C. 27,000 ft^2 D. 43,750 ft^2

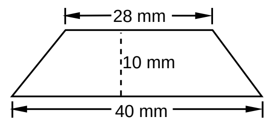
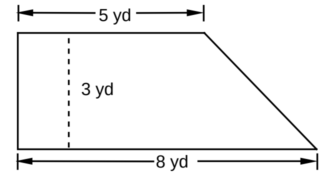
Objective [6.3b] continued

Brief Procedure	Example	Practice Exercise
	3. *Solve.* The area of the lawn is $(30\text{ m}) \times (20\text{ m})$ $= 30 \times 20 \times\ \text{m} \times\ \text{m}$ $= 600\text{ m}^2.$ The area of the garden is $(4\text{ m}) \times (4\text{ m})$ $= 4 \times 4 \times\ \text{m} \times\ \text{m}$ $= 16\text{ m}^2.$ The area left over is $A = 600\text{ m}^2 - 16\text{ m}^2 = 584\text{ m}^2.$ 4. *Check.* We repeat the calculations. The answer checks. 5. *State.* The area left over is 584 m^2.	

Objective [6.4a] Find the area of a parallelogram, a triangle, and a trapezoid.

Brief Procedure	Example	Practice Exercise
The area of a parallelogram with base b and height h is given by $A = b \cdot h.$	Find the area.  $A = b \cdot h$ $= 8\text{ in.} \cdot 5\text{ in.}$ $= 40\text{ in}^2$	16. Find the area.  A. 31 cm^2 B. 42.25 cm^2 C. 58.5 cm^2 D. 81 cm^2
The area of a triangle with base b and height h is given by $A = \frac{1}{2} \cdot b \cdot h.$	Find the area.  $A = \frac{1}{2} \cdot b \cdot h$ $= \frac{1}{2} \cdot 7\text{ m} \cdot 4\text{ m}$ $= \frac{7 \cdot 4}{2}\text{ m}^2 = 14\text{ m}^2$	17. Find the area.  A. 5.625 ft^2 B. 7 ft^2 C. 9.875 ft^2 D. 11.25 ft^2

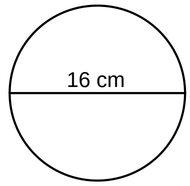
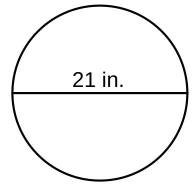
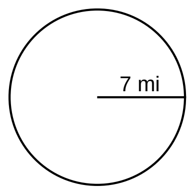
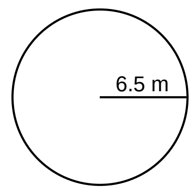
Objective [6.4a] continued

Brief Procedure	Example	Practice Exercise
The area of a trapezoid with height h and bases (parallel sides) a and b is given by $A = \frac{1}{2} \cdot h \cdot (a+b) = h \cdot \frac{a+b}{2}.$	Find the area.  $A = \frac{1}{2} \cdot h \cdot (a+b)$ $= \frac{1}{2} \cdot 10 \text{ mm} \cdot (28+40) \text{ mm}$ $= \frac{10 \cdot 68}{2} \text{ mm}^2 = \frac{2 \cdot 5 \cdot 68}{2 \cdot 1} \text{ mm}^2$ $= \frac{2}{2} \cdot \frac{5 \cdot 68}{1} \text{ mm}^2$ $= 340 \text{ mm}^2$	18. Find the area.  A. 19.5 yd^2 B. 24 yd^2 C. 39 yd^2 D. 40 yd^2

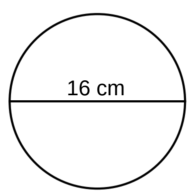
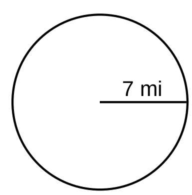
Objective [6.4b] Solve applied problems involving areas of parallelograms, triangles, and trapezoids.

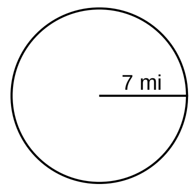
Brief Procedure	Example	Practice Exercise
Use the five-step problem solving process and the formula for the area of a parallelogram, a triangle, or a trapezoid.	A square piece of plywood has sides of length 6 ft. A parallelogram with base 3 ft and height 1.5 ft is cut from the piece. How much area is left over? 1. *Familiarize.* We will use the formulas for the area of a square and the area of a parallelogram. Let A = the area left over. 2. *Translate.* $\underbrace{\text{Area of square}}_{6 \text{ ft} \cdot 6 \text{ ft}} - \underbrace{\text{area of parallelogram}}_{3 \text{ ft} \cdot 1.5 \text{ ft}} = \underbrace{\text{area left over}}_{A}$ 3. *Solve.* The area of the square is $6 \text{ ft} \cdot 6 \text{ ft} = 36 \text{ ft}^2.$ The area of the parallelogram is $3 \text{ ft} \cdot 1.5 \text{ ft} = 4.5 \text{ ft}^2.$ The area left over is $A = 36 \text{ ft}^2 - 4.5 \text{ ft}^2 = 31.5 \text{ ft}^2.$ 4. *Check.* We repeat the calculations. The answer checks. 5. *State.* The area left over is 31.5 ft^2.	19. A rectangular piece of canvas measures 10 ft by 3 ft. A triangular piece with base 4 ft and height 1.8 ft is cut from the canvas. How much area is left over? A. 3.6 ft^2 B. 7.2 ft^2 C. 26.4 ft^2 D. 30 ft^2

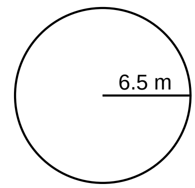
Objective [6.5a] Find the length of a radius of a circle given the length of a diameter, and find the length of a diameter given the length of a radius.

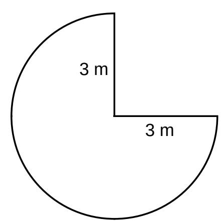
Brief Procedure	Example	Practice Exercise
The radius of a circle with diameter d is given by $r = \frac{d}{2}$.	Find the length of a radius of this circle.  $r = \frac{d}{2} = \frac{16 \text{ cm}}{2} = 8 \text{ cm}$ The radius is 8 cm.	20. Find the length of a radius of this circle.  A. 10.5 in. B. 18 in. C. 32 in. D. 42 in.
The diameter of a circle with radius r is given by $d = 2 \cdot r$.	Find the length of a diameter of this circle.  $d = 2 \cdot r = 2 \cdot 7 \text{ mi} = 14 \text{ mi}$ The diameter is 14 mi.	21. Find the length of a diameter of this circle.  A. 3.25 m B. 12.5 m C. 13 m D. 42.25 m

Objective [6.5b] Find the circumference of a circle given the length of a diameter or a radius.

Brief Procedure	Example	Practice Exercise
The circumference of a circle with diameter d is given by $C = \pi \cdot d$. The circumference of a circle with radius r is given by $C = 2 \cdot \pi \cdot r$. The number π is about 3.14 or about $\frac{22}{7}$.	Find the circumference of this circle. Use 3.14 for π.  $C = \pi \cdot d \approx 3.14 \times 16 \text{ cm} \approx 50.24 \text{ cm}$ The circumference is about 50.24 cm.	22. Find the circumference of this circle. Use $\frac{22}{7}$ for π.  A. 14 mi B. 22 mi C. 44 mi D. 49 mi

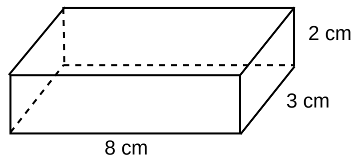
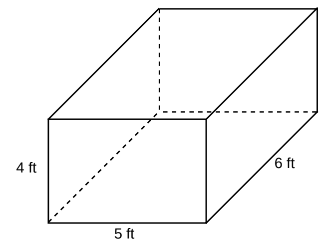
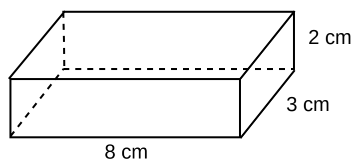
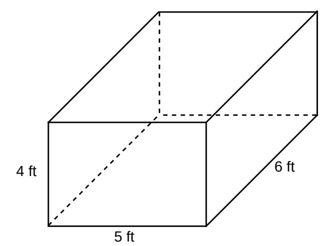
<table>
<tr><td colspan="3">Objective [6.5c] Find the area of a circle given the length of a radius.</td></tr>
<tr><td>Brief Procedure</td><td>Example</td><td>Practice Exercise</td></tr>
<tr>
<td>The area of a circle with radius r is given by
$A = \pi \cdot r \cdot r$, or $A = \pi \cdot r^2$.</td>
<td>Find the area of this circle. Use $\frac{22}{7}$ for π.


$A = \pi \cdot r \cdot r$
$\approx \frac{22}{7} \cdot 7 \text{ mi} \cdot 7 \text{ mi}$
$\approx \frac{22}{7} \cdot 49 \text{ mi}^2 \approx 154 \text{ mi}^2$</td>
<td>23. Find the area of this circle. Use 3.14 for π.


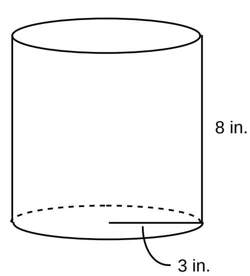
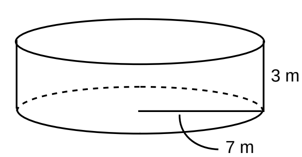
A. 13 m^2
B. 20.41 m^2
C. 98.375 m^2
D. 132.665 m^2</td>
</tr>
<tr><td colspan="3">Objective [6.5d] Solve applied problems involving circles.</td></tr>
<tr><td>Brief Procedure</td><td>Example</td><td>Practice Exercise</td></tr>
<tr>
<td>Use the formulas for the radius, diameter, circumference, and area of a circle along with any other necessary formulas from geometry.</td>
<td>Find the perimeter. Use 3.14 for π.


The perimeter is composed of three-fourths of the circumference of a circle with a radius of 3 m plus twice the radius of the circle.
Three-fourths the circumference:
$\frac{3}{4} \cdot 2 \cdot \pi \cdot r \approx \frac{3}{4} \cdot 2 \cdot 3.14 \cdot 3 \text{ m}$
$\approx \frac{3 \cdot 2 \cdot 3.14 \cdot 3}{4} \text{ m}$
$\approx 14.13 \text{ m}$
Twice the radius: $2 \cdot 3 \text{ m} = 6 \text{ m}$
Perimeter: $14.13 \text{ m} + 6 \text{ m} = 20.13 \text{ m}$
The perimeter is about 20.13 m.</td>
<td>24. Find the area of the figure in the example at the left. Use 3.14 for π.
A. 18.84 m^2
B. 21.195 m^2
C. 28.26 m^2
D. 30.145 m^2</td>
</tr>
</table>

Objective [6.6a] Find the volume and the surface area of a rectangular solid.

Brief Procedure	Example	Practice Exercise
To find the volume of a rectangular solid, substitute in the formula $V = l \cdot w \cdot h$ and carry out the calculation.	Find the volume.  $V = l \cdot w \cdot h$ $= 8 \text{ cm} \cdot 3 \text{ cm} \cdot 2 \text{ cm}$ $= 24 \cdot 2 \text{ cm}^3$ $= 48 \text{ cm}^3$	25. Find the volume.  A. 15 ft^3 B. 54 ft^3 C. 120 ft^3 D. 160 ft^3
To find the surface area of a rectangular solid, substitute in the formula $SA = 2lw + 2lh + 2wh$, or $SA = 2(lw + lh + wh)$ and carry out the calculation.	Find the surface area.  $SA = 2lw + 2lh + 2wh$ $= 2 \cdot 8 \text{ cm} \cdot 3 \text{ cm} + 2 \cdot 8 \text{ cm} \cdot 2 \text{ cm} + 2 \cdot 3 \text{ cm} \cdot 2 \text{ cm}$ $= 48 \text{ cm}^2 + 32 \text{ cm}^2 + 12 \text{ cm}^2$ $= 92 \text{ cm}^2$	26. Find the surface area.  A. 74 ft^2 B. 120 ft^2 C. 124 ft^2 D. 148 ft^2

Objective [6.6b] Given the radius and the height, find the volume of a circular cylinder.

Brief Procedure	Example	Practice Exercise
The volume of a circular cylinder is the product of the area of the base B and the height h: $V = B \cdot h$, or $V = \pi \cdot r^2 \cdot h$.	Find the volume of the circular cylinder. Use 3.14 for π.  $V = B \cdot h = \pi \cdot r^2 \cdot h$ $\approx 3.14 \times 3 \text{ in.} \times 3 \text{ in.} \times 8 \text{ in.}$ $\approx 226.08 \text{ in}^3$	27. Find the volume of the circular cylinder. Use $\frac{22}{7}$ for π.  A. 66 m^3 B. 198 m^3 C. 349 m^3 D. 462 m^3

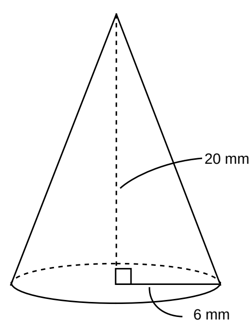
<table>
<tr><td colspan="3">Objective [6.6c] Given the radius, find the volume of a sphere.</td></tr>
<tr><th>Brief Procedure</th><th>Example</th><th>Practice Exercise</th></tr>
<tr>
<td>The volume of a sphere with radius r is given by

$$V = \frac{4}{3} \cdot \pi \cdot r^3.$$</td>
<td>Find the volume of a sphere with radius 21 cm. Use $\frac{22}{7}$ for π.

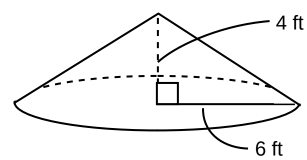
$$\begin{aligned} V &= \frac{4}{3} \cdot \pi \cdot r^3 \\ &\approx \frac{4}{3} \times \frac{22}{7} \times (21 \text{ cm})^3 \\ &\approx \frac{4 \times 22 \times 9261 \text{ cm}^3}{3 \times 7} \\ &\approx 38,808 \text{ cm}^3 \end{aligned}$$</td>
<td>28. Find the volume of a sphere with radius 5 in. Use 3.14 for π.
A. 104.67 in^3
B. 166.67 in^3
C. 392.5 in^3
D. 523.33 in^3</td>
</tr>
</table>

<table>
<tr><td colspan="3">Objective [6.6d] Given the radius and the height, find the volume of a circular cone.</td></tr>
<tr><th>Brief Procedure</th><th>Example</th><th>Practice Exercise</th></tr>
<tr>
<td>The volume of a circular cone with base radius r is one-third the product of the base area and the height:

$$V = \frac{1}{3} \cdot B \cdot h = \frac{1}{3}\pi \cdot r^2 \cdot h.$$</td>
<td>Find the volume of the circular cone. Use 3.14 for π.



$$\begin{aligned} V &= \frac{1}{3}\pi \cdot r^2 \cdot h \\ &\approx \frac{1}{3} \times 3.14 \times 6 \text{ mm} \times 6 \text{ mm} \times 20 \text{ mm} \\ &\approx 753.6 \text{ mm}^3 \end{aligned}$$</td>
<td>29. Find the volume of the circular cone. Use 3.14 for π.



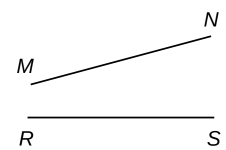
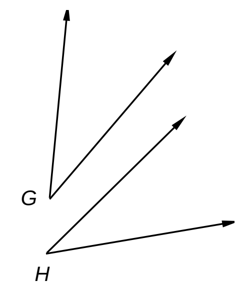
A. 150.72 ft^3
B. 452.16 ft^3
C. 602.88 ft^3
D. 904.32 ft^3</td>
</tr>
</table>

<table>
<tr><td colspan="3">Objective [6.7a] Identify complementary and supplementary angles and find the measure of a complement or a supplement of a given angle.</td></tr>
<tr><th>Brief Procedure</th><th>Example</th><th>Practice Exercise</th></tr>
<tr>
<td>Two angles are complementary if the sum of their measures is 90°. Each angle is called a complement of the other.
Two angles are supplementary if the sum of their measures is 180°. Each angle is called a supplement of the other.</td>
<td>Find the measure of a complement of an angle of 52°.

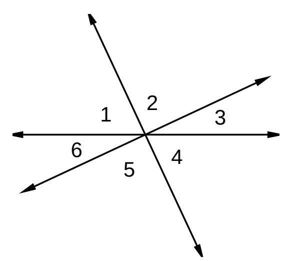
We subtract the measure of the given angle from 90° to find the measure of the complement.

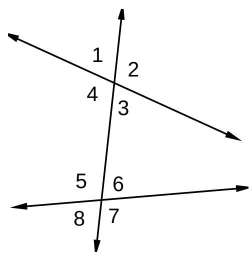
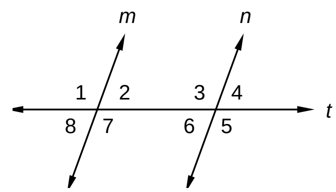
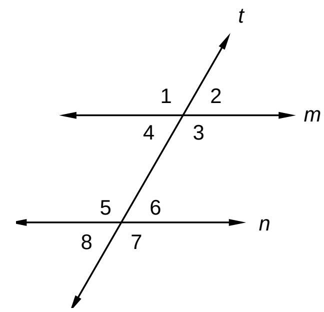
$$90° - 52° = 38°$$</td>
<td>30. Find the measure of a supplement of an angle of 74°.
A. 6°
B. 16°
C. 106°
D. 116°</td>
</tr>
</table>

Objective [6.7b] Determine whether segments are congruent and if angles are congruent.

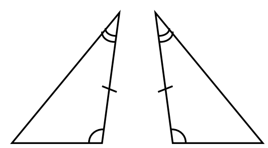
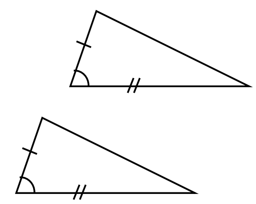
Brief Procedure	Example	Practice Exercise
To determine whether two segments or two angles are congruent, measure them. If two segments have the same length, they are congruent. If two angles have the same measure, they are congruent.	Determine if the segments are congruent. Use a ruler.  When we measure the segments with a ruler, we find that they have the same length. Thus, they are congruent.	31. Determine if the angles are congruent. Use a protractor.  A. Congruent B. Not congruent

Objective [6.7c] Use the Vertical Angle Property to find the measures of angles.

Brief Procedure	Example	Practice Exercise
The Vertical Angle Property states that vertical angles are congruent, so the measures of vertical angles are the same.	In the figure, $m\angle 1 = 55°$ and $m\angle 3 = 35°$. Find $m\angle 4$.  Since $\angle 1$ and $\angle 4$ are vertical angles, they have the same measure so $m\angle 4 = 55°$.	32. In the figure at the left, find $m\angle 5$. A. 35° B. 55° C. 90° D. 100°

Objective [6.7d] Identify pairs of corresponding angles, interior angles, and alternate interior angles and apply properties of transversals and parallel lines to find measures of angles.		
Brief Procedure	Example	Practice Exercise
 Corresponding angles: $\angle 1$ and $\angle 5$ $\angle 2$ and $\angle 6$ $\angle 3$ and $\angle 7$ $\angle 4$ and $\angle 8$ Interior angles: $\angle 3$, $\angle 4$, $\angle 5$, and $\angle 6$ Alternate interior angles: $\angle 3$ and $\angle 5$ $\angle 4$ and $\angle 6$ Properties of Parallel Lines 1. If a transversal intersects two parallel lines, then the corresponding angles are congruent. 2. If a transversal intersects two parallel lines, then the alternate interior angles are congruent. 3 In a plane, if two lines are parallel to a third line, then the two lines are parallel to each other. 4. If a transversal intersects two parallel lines, then the interior angles on the same side of the transversal are supplementary. 5. If a transversal is perpendicular to one of two parallel lines, then it is perpendicular to the other.	If $m \parallel n$ and $m\angle 7 = 110°$, find the measures of the other angles.  $m\angle 3 = 110°$, using Property 2; $m\angle 5 = 110°$, using Property 1; $m\angle 6 = 180° - 110° = 70°$, using Property 4; $m\angle 1 = 110°$, since $\angle 7$ and $\angle 1$ are vertical angles; $m\angle 8 = 70°$,using Property 1 and $m\angle 6 = 70°$; $m\angle 2 = 70°$, since $\angle 8$ and $\angle 2$ are vertical angles; $m\angle 4 = 70°$, since $\angle 6$ and $\angle 4$ are vertical angles.	33. If $m \parallel n$ and $m\angle 2 = 60°$, find $m\angle 7$.  A. 60° B. 80° C. 120° D. 130°

Objective [6.8a] Identify the corresponding parts of congruent triangles and show why triangles are congruent using SAS, SSS, and ASA.

Brief Procedure	Example	Practice Exercise
When we say $\triangle ABC \cong \triangle A'B'C'$, then $\angle A \cong \angle A'$, $\angle B \cong \angle B'$, $\angle C \cong \angle C'$, $\overline{AB} \cong \overline{A'B'}$, $\overline{AC} \cong \overline{A'C'}$, and $\overline{BC} \cong \overline{B'C'}$.	Suppose $\triangle MNP \cong \triangle RST$. What are the corresponding parts? $\angle M \leftrightarrow \angle R$, $\angle N \leftrightarrow \angle S$, $\angle P \leftrightarrow \angle T$, $\overline{MN} \leftrightarrow \overline{RS}$, $\overline{MP} \leftrightarrow \overline{RT}$, and $\overline{NP} \leftrightarrow \overline{ST}$	34. Suppose $\triangle WXY \cong \triangle DEF$. Which of the following is not true? A. $\overline{XY} \cong \overline{DE}$ B. $\overline{WY} \cong \overline{DF}$ C. $\angle X \cong \angle E$ D. $\angle Y \cong \angle F$
The Side-Angle-Side (SAS) Property Two triangles are congruent if two sides and the included angle of one triangle are congruent to two sides and the included angle of the other triangle. The Side-Side-Side(SSS) Property If three sides of one triangle are congruent to three sides of another triangle, then the triangles are congruent. The Angle-Side-Angle (ASA) Property If two angles and the included side of a triangle are congruent to two angles and the included side of another triangle, then the triangles are congruent.	Which property (if any) should be used to show that the pair of triangles is congruent?  Two angles and the included side of one triangle are congruent to two angles and the included side of the other triangle, so they are congruent by the ASA Property.	35. Which property (if any) should be used to show that the pair of triangles is congruent?  A. SAS B. SSS C. ASA D. None

Objective [6.8b] Use properties of parallelograms to find lengths of sides and measures of angles of parallelograms.

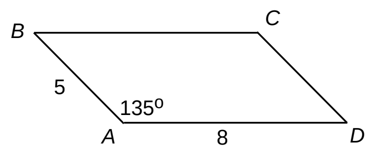
Brief Procedure

Properties of Parallelograms

1. A diagonal of a parallelogram determines two congruent triangles.
2. The opposite angles of a parallelogram are congruent.
3. The opposite sides of a parallelogram are congruent.
4. Consecutive angles of a parallelogram are supplementary.
5. The diagonals of a parallelogram bisect each other.

Example

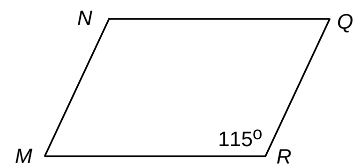
If $m\angle A = 135°$, find the measures of the other angles of parallelogram $ABCD$. Then find BC and CD.



$m\angle C = 135°$, using Property 2;
$m\angle B = m\angle D = 180° - 135° = 45°$, using Property 4;
$BC = 8$ and $CD = 5$, using Property 3.

Practice Exercise

36. For the parallelogram below, find $m\angle M$.



A. 55°
B. 65°
C. 75°
D. 115°

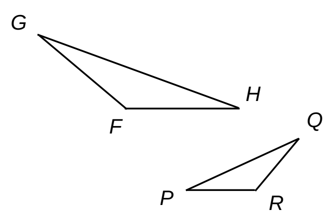
Objective [6.9a] Identify the corresponding parts of similar triangles and determine which sides of a given pair of triangles have lengths that are proportional.

Brief Procedure

To identify the corresponding parts of similar triangles, match corresponding vertices and proceed as in the example at the right. We can write a proportion using ratios of pairs of corresponding sides.

Example

$\triangle FGH$ and $\triangle RQP$ are similar. Name their corresponding sides and angles and determine which sides are proportional.

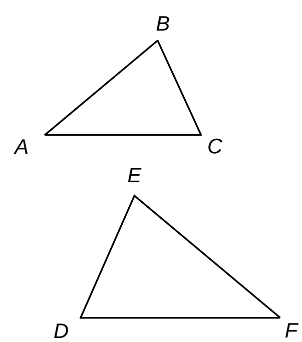


The corresponding vertices are F and R, G and Q,and H and P. Then we have $\overline{FG} \leftrightarrow \overline{RQ}$, $\overline{GH} \leftrightarrow \overline{QP}$, $\overline{FH} \leftrightarrow \overline{RP}$, $\angle F \leftrightarrow \angle R$, $\angle G \leftrightarrow \angle Q$, $\angle H \leftrightarrow \angle P$.
We also have

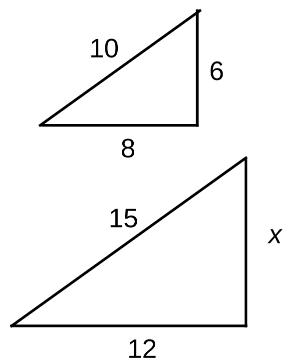
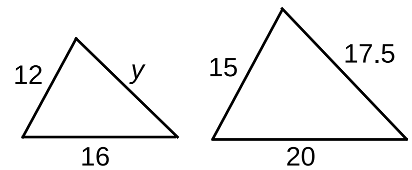
$$\frac{FG}{RQ} = \frac{GH}{QP} = \frac{FH}{RP}.$$

Practice Exercise

37. For the similar triangles below, which statement is not true?



A. $\dfrac{BC}{AB} = \dfrac{DE}{EF}$
B. $\dfrac{AB}{AC} = \dfrac{EF}{DF}$
C. $\dfrac{BC}{AC} = \dfrac{DE}{DF}$
D. $\dfrac{AC}{AB} = \dfrac{DF}{DE}$

Objective [6.9b] Find lengths of sides of similar triangles using proportions.		
Brief Procedure	Example	Practice Exercise
Write and solve a proportion involving ratios of corresponding sides of the triangles.	The triangles below are similar. Find the missing length x.  The ratio of 6 to x is the same as the ratio of 8 to 12 (and also as the ratio of 10 to 15). We write and solve a proportion. $\frac{6}{x} = \frac{8}{12}$ $6 \cdot 12 = x \cdot 8$ $\frac{6 \cdot 12}{8} = x$ $9 = x$ The missing length is 9. (We could also have used the proportion $\frac{6}{x} = \frac{10}{15}$ to find x.)	38. The triangles below are similar. Find the missing length y.  A. 10.5 B. 13.5 C. 14 D. 15