Name _____ Class _____ Date _____

Reteaching 7-1

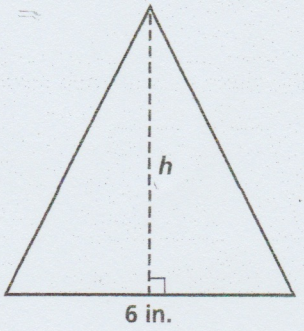
Areas of Parallelograms and Triangles

OBJECTIVE: Finding areas of triangles and parallelograms

MATERIALS: Graph paper

Example

A triangle has an area of 18 in.^{2} The length of its base is 6 in. Find its corresponding height.



Draw a sketch. Then substitute into the area formula, and solve for h.

$A = \frac{1}{2}bh$

$18 = \frac{1}{2}(6)h$ Substitute.

$18 = 3h$ Simplify.

$h = 6$

The height of the triangle is 6 in.

Exercises

Complete each exercise.

1. Use graph paper. Draw an obtuse, an acute, and a right triangle, each with an area of 12 square units. Label the base and height of each triangle.
2. Draw a different obtuse, acute, and right triangle, each with an area of 12 square units. Label the base and height of each triangle.
3. A triangle has height 5 cm and base length 8 cm. Find its area.
4. A triangle has height 11 in. and base length 10 in. Find its area.
5. A triangle has area 24 m^2 and base length 8 m. Find its height.
6. A triangle has area 16 ft^2 and height 4 ft. Find its base.
7. A triangle has area 8 in.^{2} The lengths of the base and the height are equal. Find the length of its base.
8. On graph paper draw three parallelograms, each with an area of 24 square units. Label the base and height of each parallelogram.
9. A parallelogram has area 35 in.^{2} and height 7 in. Find its base.
10. A parallelogram has area 391 cm^2 and base 17 cm. Find its height.
11. A parallelogram has area 81 ft^2. The lengths of the base and the height are equal. Find the length of its base.

Name _____ Class _____ Date _____

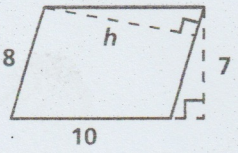
Practice 7-1

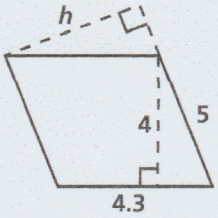
Areas of Parallelograms and Triangles

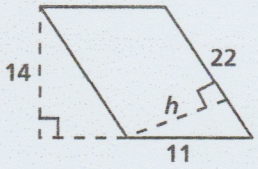
Find the area of each triangle, given the base b and the height h.

1. $b = 4, h = 4$
2. $b = 8, h = 2$
3. $b = 20, h = 6$
4. $b = 40, h = 12$
5. $b = 3.1, h = 1.7$
6. $b = 4.8, h = 0.8$
7. $b = 3\frac{1}{4}, h = \frac{1}{2}$
8. $b = 8, h = 2\frac{1}{4}$
9. $b = 100, h = 30$

Find the value of h in each parallelogram.

10. 

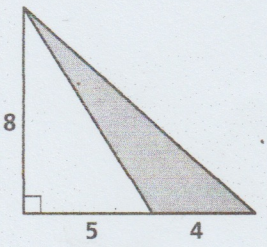
11. 

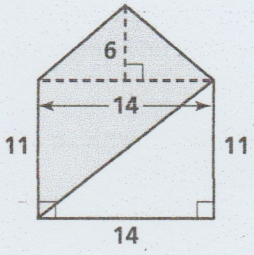
12. 

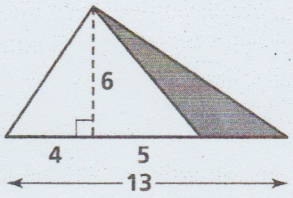
13. What is the area of $\square ABCD$ with vertices $A(-4, -6)$, $B(6, -6)$, $C(-1, 5)$, and $D(9, 5)$?

14. What is the area of $\triangle DEF$ with vertices $D(-1, -5)$, $E(4, -5)$, and $F(4, 7)$?

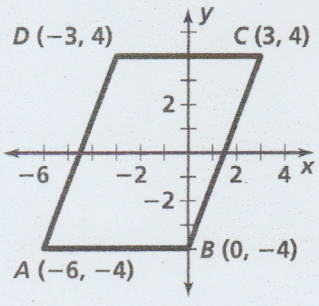
Find the area of the shaded region.

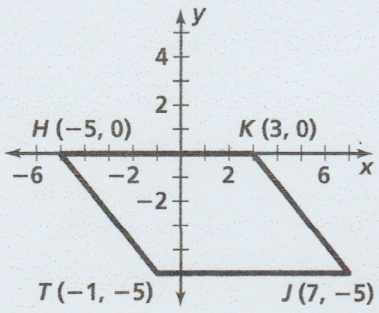
15. 

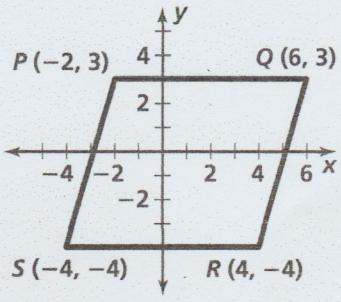
16. 

17. 

Find the area of each parallelogram.

18. 

19. 

20. 

Name _____ Class _____ Date _____

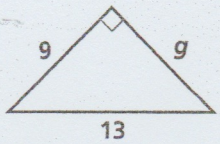
Reteaching 7-2

The Pythagorean Theorem and Its Converse

OBJECTIVE: Using the Pythagorean Theorem **MATERIALS:** Graph paper

Example

Find the value of g. Leave your answer in simplest radical form.



Using the Pythagorean Theorem, substitute g and 9 for the legs and 13 for the hypotenuse.

$a^2 + b^2 = c^2$

$g^2 + 9^2 = 13^2$ Substitute.

$g^2 + 81 = 169$ Simplify.

$g^2 = 88$ Subtract 81 from each side.

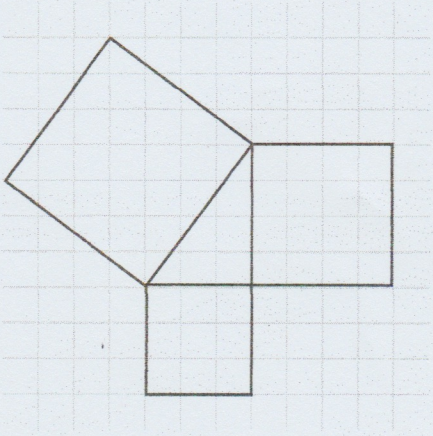
$g = \sqrt{88}$ Take the square root.

$g = \sqrt{4(22)}$ Simplify.

$g = 2\sqrt{22}$

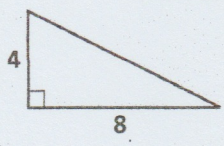
Exercises

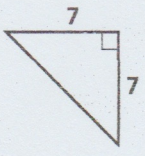
Complete each exercise.

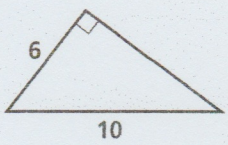


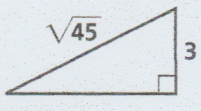
1. Draw a right triangle on graph paper so that the vertices are on the intersection of grid lines. Measure and label the lengths of the sides.
2. Construct a square on each side of the right triangle as shown.
3. Find the area of each square.
4. How does the sum of the areas of the two smaller squares compare with the area of the largest square?
5. What does this tell you about the relationship between the sides of the triangle?

Find the missing side lengths. Leave your answers in simplest radical form.

6. 

7. 

8. 

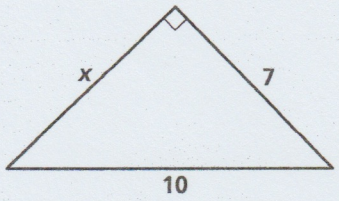
9. 

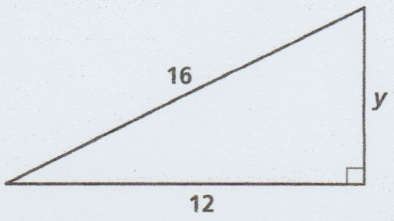
Name _____ Class _____ Date _____

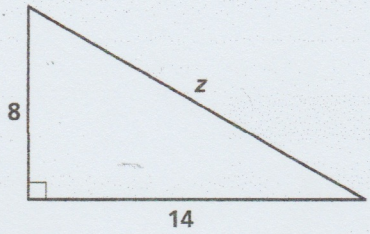
Practice 7-2

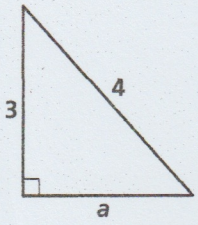
Pythagorean Theorem and Its Converse

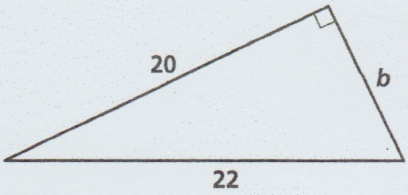
Find the value of each variable. Leave your answers in simplest radical form.

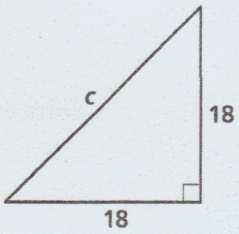
1. 

2. 

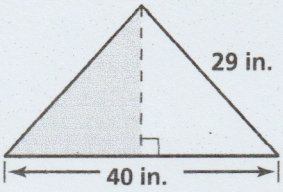
3. 

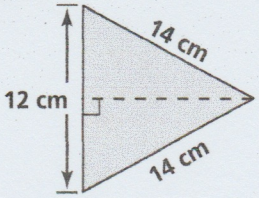
4. 

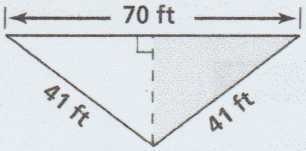
5. 

6. 

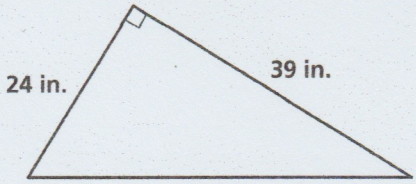
Find the area of each shaded region. Leave your answers in simplest radical form.

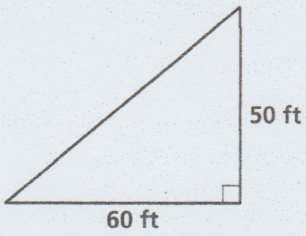
7. 

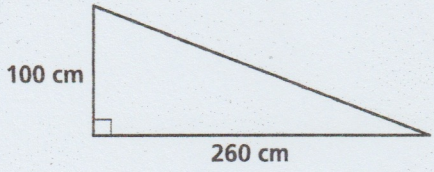
8. 

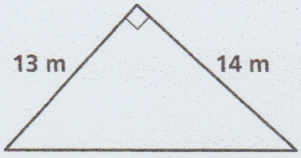
9. 

Find the length of each hypotenuse. Use your calculator, and round your answers to the nearest whole number.

10. 

11. 

12. 

13. 

The numbers represent the lengths of the sides of a triangle. Classify each triangle as *acute, obtuse,* or *right.*

14. 6, 9, 10

15. 18, 24, 30

16. 20, 100, 110

17. 7, 24, 25

18. 2, 5, 6

19. 13, 21, 24

Name _____ Class _____ Date _____

Reteaching 7-3

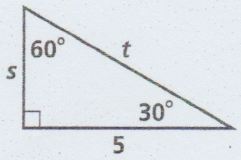
Special Right Triangles

OBJECTIVE: Using the properties of a 30°-60°-90° triangle

MATERIALS: Centimeter grid paper, ruler, protractor

Example

Find the value of each variable.



$5 = \sqrt{3}s$ In a 30°-60°-90° triangle the length of the longer leg is $\sqrt{3}$ times the length of the shorter leg.

$\frac{5}{\sqrt{3}} = s$ Divide each side by $\sqrt{3}$.

$s = \frac{5}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{5\sqrt{3}}{3}$ Rationalize the denominator.

The length of the hypotenuse is twice the length of the shorter leg.

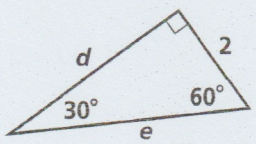
$t = 2\left(\frac{5\sqrt{3}}{3}\right) = \frac{10\sqrt{3}}{3}$

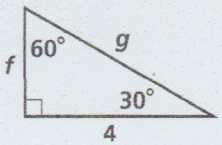
Exercises

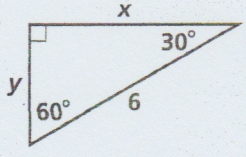
Complete each exercise.

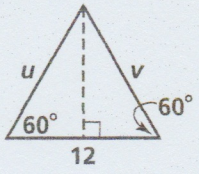
1. Draw a horizontal line segment on centimeter grid paper so that the endpoints are at the intersections of grid lines.
2. Use a protractor and a straightedge to construct a 30°-60°-90° triangle with your segment as one of its sides.
3. Use the 30°-60°-90° Triangle Theorem to calculate the lengths of the other two sides. Round to the nearest tenth.
4. Measure the lengths of the sides to the nearest tenth of a centimeter.
5. Compare your calculated results with your measured results.
6. Repeat the activity with a different segment.

For Exercises 7–10, find the value of each variable.

7. 

8. 

9. 

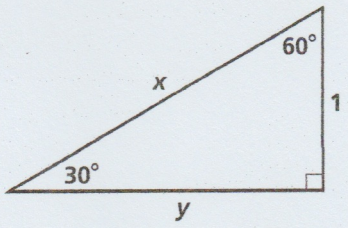
10. 

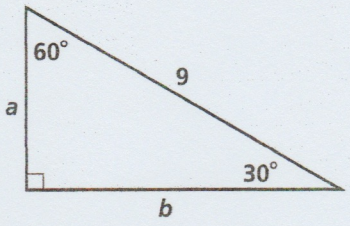
Name _____ Class _____ Date _____

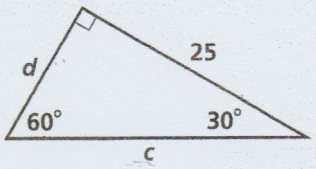
Practice 7-3

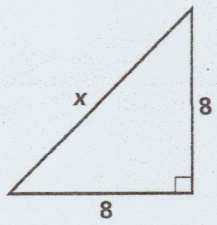
Special Right Triangles

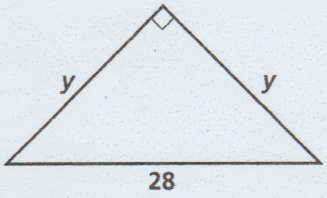
Find the value of each variable. Leave your answers in simplest radical form.

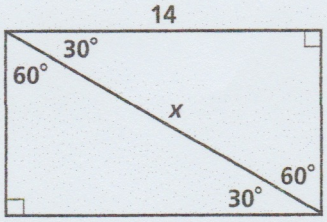
1. 

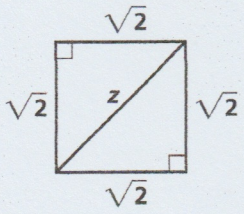
2. 

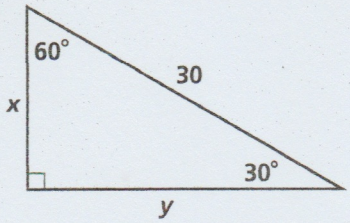
3. 

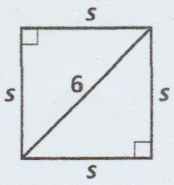
4. 

5. 

6. 

7. 

8. 

9. 

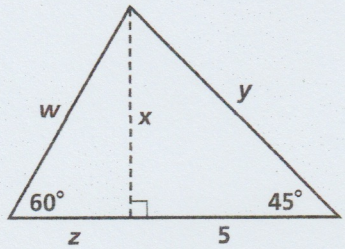
10. Find the length to the nearest centimeter of the diagonal of a square 30 cm on a side.

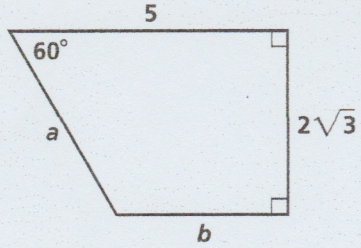
11. The hypotenuse of an isosceles right triangle is 8.4 in. Find the length of a side to the nearest tenth of an inch.

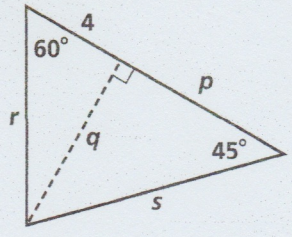
12. In a 30°-60°-90° triangle, the shorter leg is 6 ft long. Find the length to the nearest tenth of a foot of the other two sides.

13. Each side of a rhombus is 14 in. long. Two of the sides form a 60° angle. Find the area of the rhombus. Round your answer to the nearest square inch.

Algebra **Find the value of each variable. Leave your answers in simplest radical form.**

14. 

15. 

16. 

Name _____ Class _____ Date _____

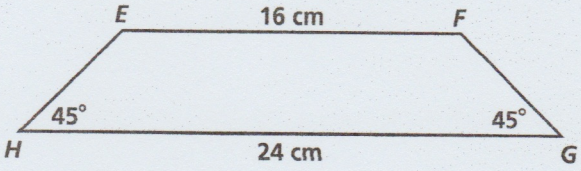
Reteaching 7-4

Areas of Trapezoids, Rhombuses, and Kites

OBJECTIVE: Finding areas of trapezoids and kites **MATERIALS:** Centimeter grid paper

Example

Find the area of trapezoid *EFGH*.



You can draw two altitudes that divide the trapezoid into a rectangle and two congruent 45°-45°-90° triangles.

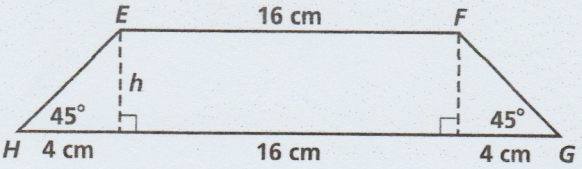
$\frac{24 - 16}{2} = \frac{8}{2} = 4$ Find the length of the base of each triangle.

Because the legs of a 45°-45°-90° triangle have the same length, $h = 4$.

$A = \frac{1}{2}h(b_1 + b_2)$ Use the formula for the area of a trapezoid.

$= \frac{1}{2} \cdot 4(16 + 24)$ Substitute.

$= 80$ Simplify.



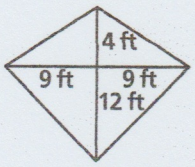
The area of trapezoid *EFGH* is 80 cm^2.

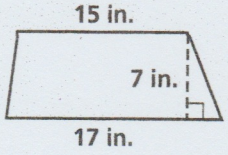
Exercises

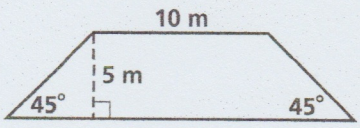
Complete each exercise.

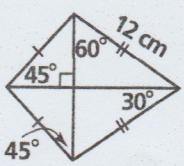
1. On centimeter grid paper, try to draw a trapezoid with area 48 cm^2.
2. Measure the bases and the height of the trapezoid.
3. Use the formula to calculate the actual area of the trapezoid.
4. Revise your figure until its area is 48 cm^2 or very close.
5. On centimeter grid paper, try to draw a kite with area 18 cm^2.
6. Measure the diagonals of the kite.
7. Use the formula to calculate the actual area of the kite.
8. Revise your figure until its area is 18 cm^2 or very close.

Find the area of each figure to the nearest tenth.

9. 

10. 

11. 

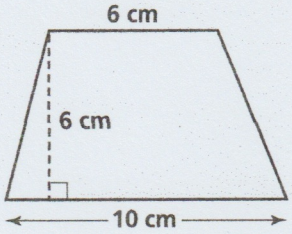
12. 

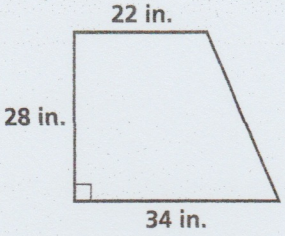
Name _____ Class _____ Date _____

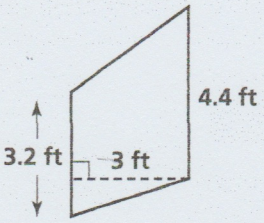
Practice 7-4

Areas of Trapezoids, Rhombuses, and Kites

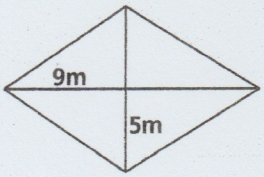
Find the area of each trapezoid.

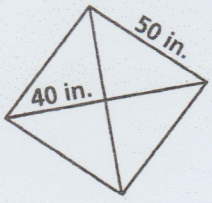
1. 

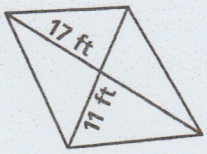
2. 

3. 

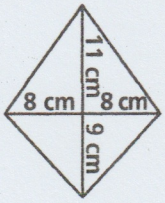
Find the area of each rhombus.

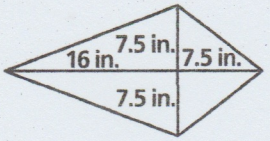
4. 

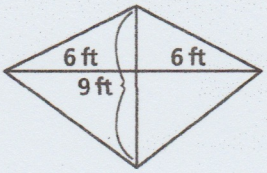
5. 

6. 

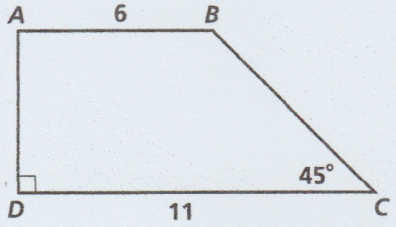
Find the area of each kite.

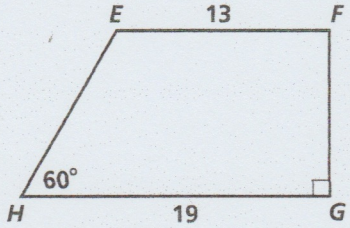
7. 

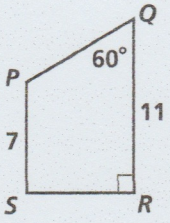
8. 

9. 

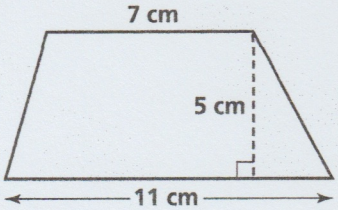
Find the area of each trapezoid. Leave your answers in simplest radical form.

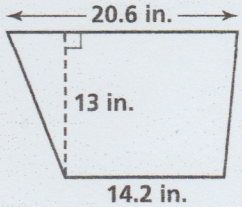
10. 

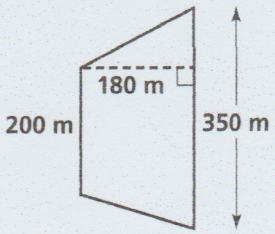
11. 

12. 

Find the area of each trapezoid to the nearest tenth.

13. 

14. 

15. 

Name _____ Class _____ Date _____

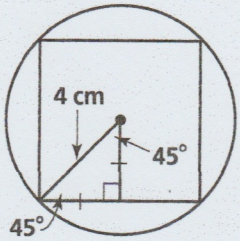
Reteaching 7-5

Areas of Regular Polygons

OBJECTIVE: Finding areas of regular polygons **MATERIALS:** Graph paper

Example

Find the area of a regular quadrilateral (square) inscribed in a circle with radius 4 cm.



Draw one apothem to the base to form a 45°-45°-90° triangle. Using the 45°-45°-90° Triangle Theorem, find the length of the apothem.

$4 = \sqrt{2}a$ The hypotenuse $= \sqrt{2} \cdot$ leg in a 45°-45°-90° triangle.

$a = \frac{4}{\sqrt{2}}$ Simplify.

$a = \frac{4}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = 2\sqrt{2}$ Rationalize the denominator.

The apothem has the same length as the other leg, which is half as long as a side of the square. So the length of a side of the square is $2(2\sqrt{2})$ cm or $4\sqrt{2}$ cm. To find the square's area, use the formula for the area of a regular polygon.

$$A = \frac{1}{2}ap$$
$$= \frac{1}{2}(2\sqrt{2})(16\sqrt{2}) \qquad p = 4(4\sqrt{2}) = 16\sqrt{2}$$
$$= 32$$

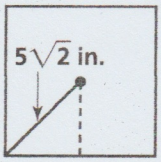
The area of the regular quadrilateral is 32 cm^2.

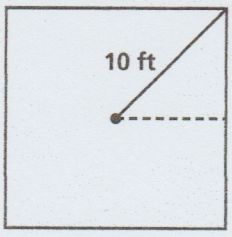
Exercises

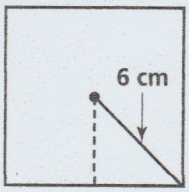
Complete each exercise.

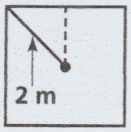
1. Draw a square on graph paper.
2. Draw and label an apothem and a radius.
3. Measure the lengths of the apothem, the radius, and a side.
4. Check that the apothem equals half the length of a side.
5. Use a calculator to check that the apothem times $\sqrt{2}$ equals the radius.

Find the area of each square.

6. 

7. 

8. 

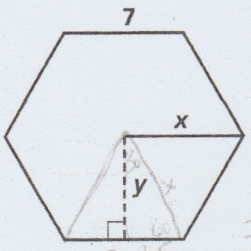
9. 

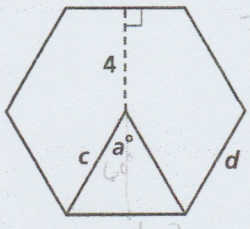
Name _____ Class _____ Date _____

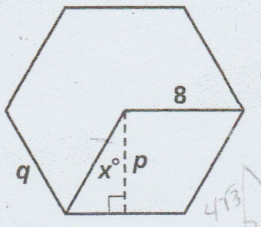
Practice 7-5

Areas of Regular Polygons

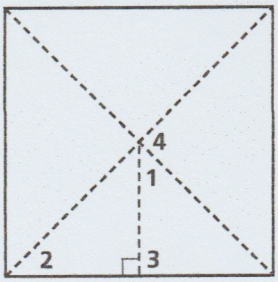
Find the values of the variables for each regular hexagon. Leave your answers in simplest radical form.

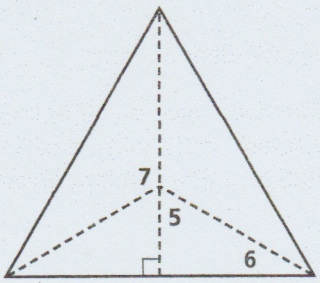
1. 

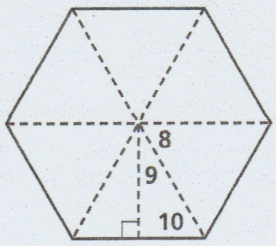
2. 

3. 

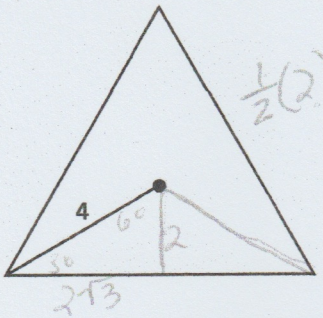
Each regular polygon has radii and an apothem as shown. Find the measure of each numbered angle.

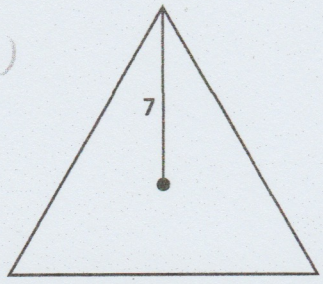
4. 

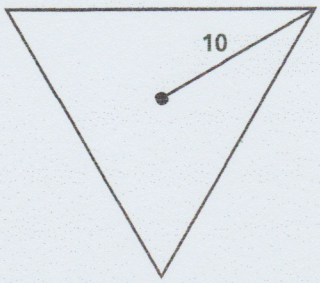
5. 

6. 

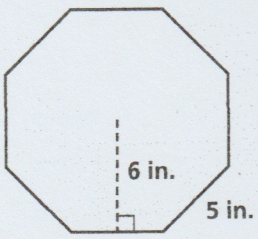
Find the area of each equilateral triangle, given the radius. Leave your answers in simplest radical form.

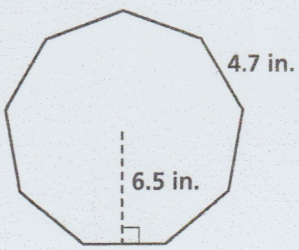
7. 

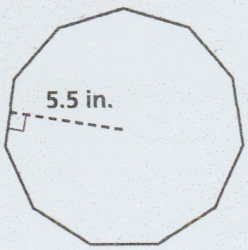
8. 

9. 

Find the area of each regular polygon to the nearest square inch.

10. 

11. 

12. 

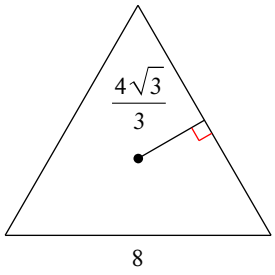
Kuta Software - Infinite Geometry Name_____

Area of Regular Polygons

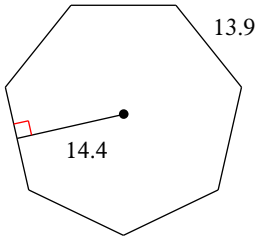
Date_____ Period____

Find the area of each regular polygon. Leave your answer in simplest form.

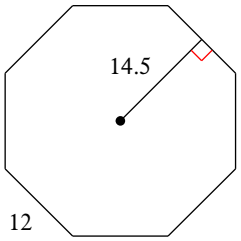
1)



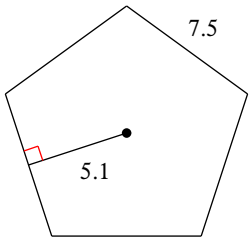
2)



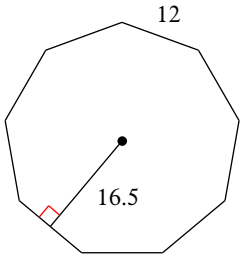
3)



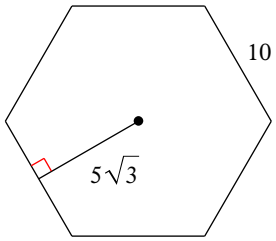
4)



5)



6)



7) pentagon
apothem = 7.3
side = 10.6

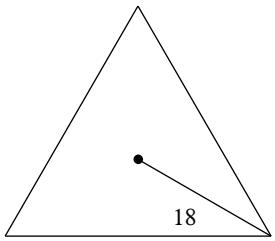
8) triangle
apothem = 14
side = $28\sqrt{3}$

9) 7-gon
apothem = 21.8
side = 21

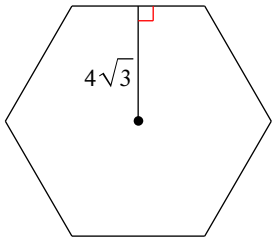
10) octagon
apothem = 14.1
side = 11.7

Use what you know about special right triangles to find the area of each regular polygon. Leave your answer in simplest form.

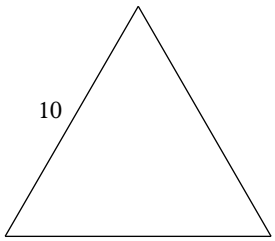
11)



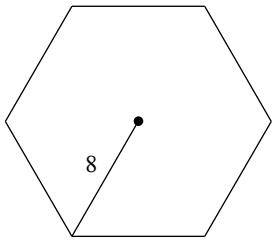
12)



13)



14)



15) quadrilateral
radius = $16\sqrt{2}$

16) hexagon
side = $\frac{16\sqrt{3}}{3}$

Critical thinking questions:

17) Find the perimeter of a regular hexagon that has an area of $54\sqrt{3}$ units².

18) Can a regular octagon have an area of 10 units²?

Name _____ Class _____ Date _____

Reteaching 7-6

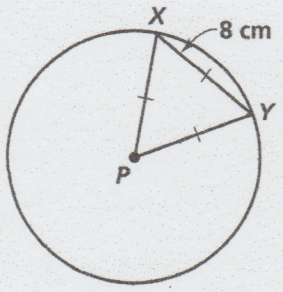
Circles and Arcs

OBJECTIVE: Finding the length of an arc

MATERIALS: Compass, protractor, string, ruler

Example

Find the length of $\overset{\frown}{XY}$. Leave your answer in terms of π.



Because $\triangle XPY$ is an equilateral triangle and therefore equiangular, $m\angle XPY = 60$. This means that $m\overset{\frown}{XY} = 60$. Because $\overline{XY} \cong \overline{PY}$, the radius of $\odot P$ is 8.

$$\text{length of } \overset{\frown}{XY} = \frac{m\overset{\frown}{XY}}{360} \cdot 2\pi r \qquad \text{Use formula for arc length.}$$

$$= \frac{60}{360} \cdot 2\pi(8) \qquad \text{Substitute.}$$

$$= \frac{8\pi}{3} \qquad \text{Simplify.}$$

The length of $\overset{\frown}{XY}$ is $\frac{8\pi}{3}$ cm.

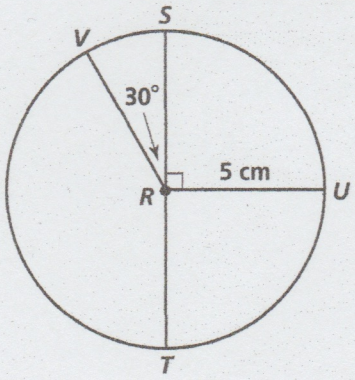
Exercises

Complete each exercise.

1. Draw a large circle with a central angle less than 180°.
2. Use a protractor to measure the central angle.
3. Use a ruler to measure the length of the radius.
4. Use the formula for arc length to find the length of the arc intercepted by the central angle.
5. Lay a piece of string along the circle. Mark the string at the endpoints of the arc. Measure the length of string between the marks using a ruler.
6. How does your calculated result compare with your measured result?

Find the length of each arc. Leave your answers in terms of π.

7. $\overset{\frown}{SV}$
8. $\overset{\frown}{UV}$
9. $\overset{\frown}{SUT}$
10. $\overset{\frown}{UTV}$
11. $\overset{\frown}{UT}$
12. $\overset{\frown}{VT}$
13. $\overset{\frown}{UVT}$

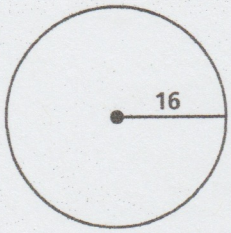


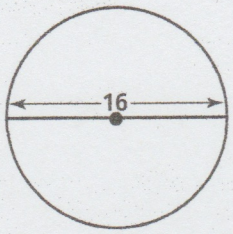
Name _____ Class _____ Date _____

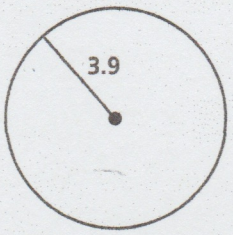
Practice 7-6

Circles and Arcs

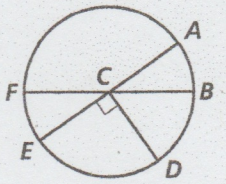
Find the circumference of each circle. Leave your answers in terms of π.

1. 

2. 

3. 

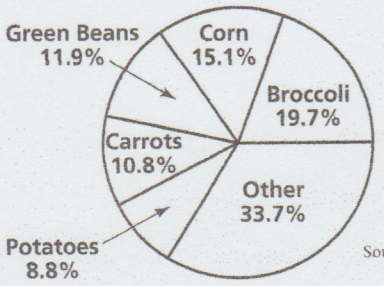
In $\odot C$, $\overline{EA}$ and $\overline{FB}$ are diameters. Identify the following.



4. two major arcs
5. two minor arcs
6. two semicircles
7. a pair of adjacent arcs
8. an acute central angle
9. an obtuse central angle

A market research survey found that adults' favorite vegetables are as shown below. Find the measure of the central angle for each of the following vegetables. Give your answers to the nearest degree.

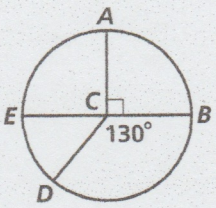
10. potatoes
11. green beans
12. corn
13. carrots
14. broccoli



Source: *USA Today*

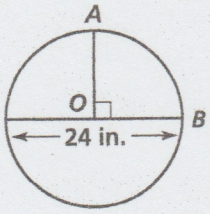
Find the measure of each arc in $\odot C$.

15. $\overset{\frown}{AE}$
16. $\overset{\frown}{ED}$
17. $\overset{\frown}{DBA}$
18. $\overset{\frown}{AED}$
19. $\overset{\frown}{ABD}$
20. $\overset{\frown}{BD}$

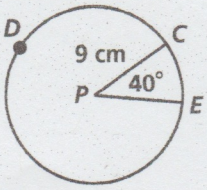


Find the length of each arc. Leave your answers in terms of π.

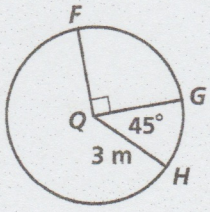
21. $\overset{\frown}{AB}$



22. $\overset{\frown}{CDE}$



23. $\overset{\frown}{FH}$



Name _____ Class _____ Date _____

Reteaching 7-7

Areas of Circles and Sectors

OBJECTIVE: Computing the areas of circles **MATERIALS:** Graph paper

Example

Find the area of a circle with circumference 24π cm. Leave your answers in terms of π.

Use the formula for circumference, and solve for d.

$$C = \pi d$$
$$24\pi = \pi d$$
$$d = 24$$

Because the radius is half the diameter, $r = 12$ cm.

$$A = \pi r^2$$
$$= \pi \cdot 12^2$$
$$= 144\pi$$

The area of the circle is 144π cm^2.

Exercises

Complete each exercise.

1. On graph paper, draw a circle whose center is at the intersection of grid lines.
2. Find and label the length of a radius.
3. Estimate the area of the circle by counting the number of squares and parts of squares in the circle.
4. Calculate the area of the circle using the formula. Round your answer to the nearest tenth.
5. How does your calculated result compare with your estimated result?
6. Repeat the activity with a different size circle.

Compute the area of the circle. Leave your answers in terms of π.

7. circle with radius 5 ft
8. circle with radius 2 in.
9. circle with diameter 16 m
10. circle with diameter 9 ft
11. circle with circumference 36π cm
12. circle with circumference 16π in.

In $\odot Q$, sector PQR has an area of 27.2π cm^2 and $m\widehat{PR} = 50°$.

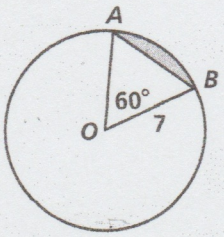
13. What is the length of the radius to the nearest centimeter?
14. What is the area of the circle to the nearest square centimeter?

Name _____ Class _____ Date _____

Practice 7-7

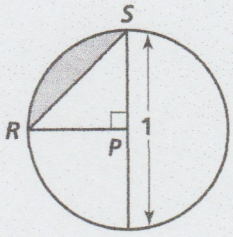
Areas of Circles and Sectors

The radius of $\odot O$ is 7. Find the area of each of the following. Leave your answers in terms of π.



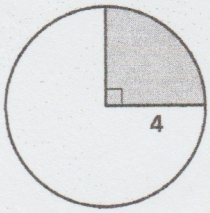
1. $\odot O$
2. $\triangle AOB$
3. sector AOB
4. the shaded segment

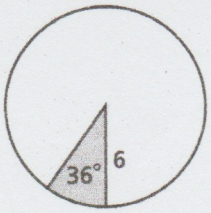
The radius of $\odot P$ is $\frac{1}{2}$. Find the area of each of the following. Leave your answers in terms of π.

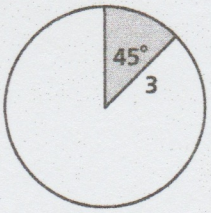


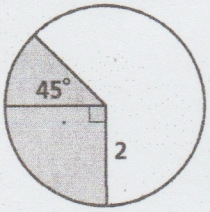
5. $\odot P$
6. $\triangle RPS$
7. sector RPS
8. the shaded segment

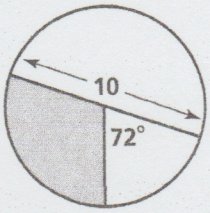
Find the area of each shaded sector of a circle. Leave your answers in terms of π.

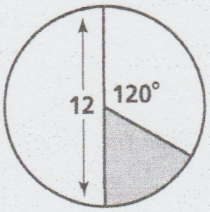
9. 

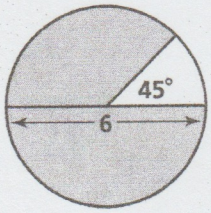
10. 

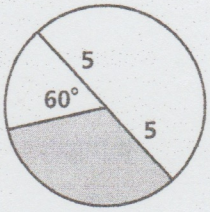
11. 

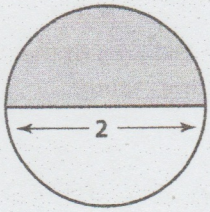
12. 

13. 

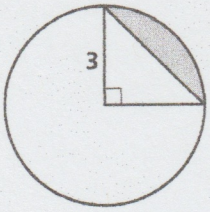
14. 

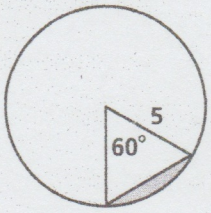
15. 

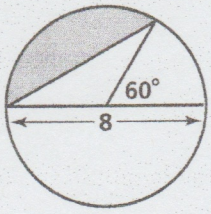
16. 

17. 

Find the area of each shaded segment of a circle. Round your answers to the nearest whole number.

18. 

19. 

20. 

Name _____ Class _____ Date _____

Reteaching 7-8

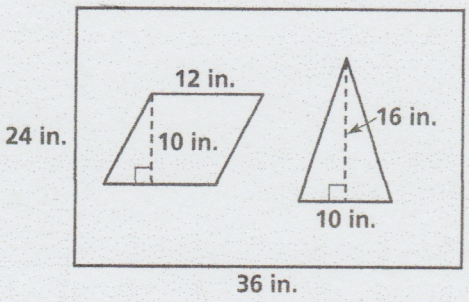
Geometric Probability

OBJECTIVE: Using geometric models to find the probability of events

MATERIALS: Tacks, 3-in. by 5-in. index card, compass

Example

If a dart lands at random on the poster at the right, what is the probability that the dart will land inside one of the polygons?



Find the sum of the areas of the polygons.

$$\begin{aligned}\text{Area of polygons} &= \text{Area of parallelogram} + \text{Area of triangle}\\ &= (12)(10) + \tfrac{1}{2}(10)(16)\\ &= 120 + 80\\ &= 200 \text{ in.}^2\end{aligned}$$

Find the total area of the poster.

$$A = (24)(36) = 864 \text{ in.}^2$$

Calculate the probability.

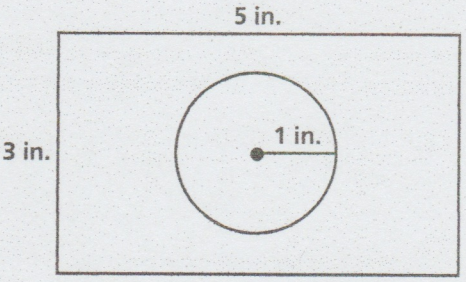
$$\begin{aligned}\text{P(polygon)} &= \frac{\text{area of polygons}}{\text{total area}}\\ &= \frac{200}{864}\\ &\approx 23\%\end{aligned}$$

Exercises

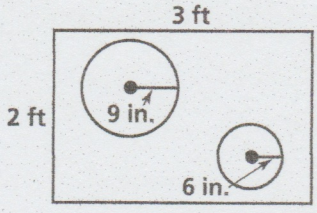
Complete each exercise.

1. Use a compass to draw a circle with radius 1 in. on an index card.
2. Calculate the probability that if a tack is dropped on the card, its tip will land in the circle.
3. Lift a tack 12 in. above the index card and drop it. Repeat this 25 times. Record how many times the tip of the tack lands on the circle. (Ignore the times that the tack bounces off the card.) Calculate the experimental probability:

$$P = \frac{\text{number of times tip landed in circle}}{25}$$



4. How do the probabilities you found in Exercises 2 and 3 compare?
5. If you repeated the experiment 100 times, what would you expect the results to be?
6. If a dart lands at random on the poster at the right, what is the probability that the dart will land in a circle?

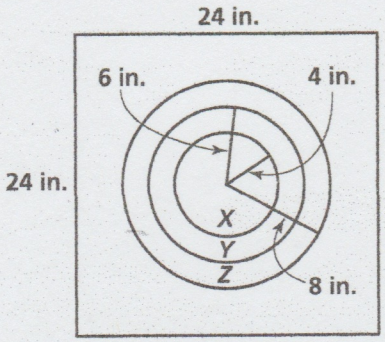


Name _____ Class _____ Date _____

Practice 7-8

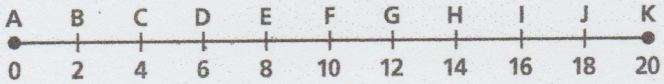
Geometric Probability

Use the dartboard at the right for Exercises 1–3.



1. If a dart hits the board, find the probability that it will land in region X.
2. If a dart hits the board, find the probability that it will land in region Y.
3. If a dart hits the board, find the probability that it will land in region Z.

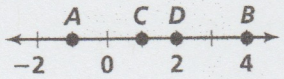
Find the probability that a point chosen at random from $\overline{AK}$ is on the given segment.

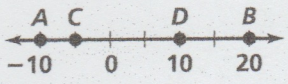


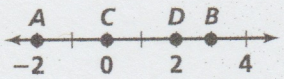
4. $\overline{CF}$
5. $\overline{BI}$
6. $\overline{GK}$
7. $\overline{FG}$
8. $\overline{AK}$
9. $\overline{AC}$

10. Roberto's trolley runs every 45 minutes. If he arrives at the trolley stop at a random time, what is the probability that he will *not* have to wait more than 10 minutes?
11. The state of Connecticut is approximated by a rectangle 100 mi by 50 mi. Hartford is approximately at the center of Connecticut. If a meteor hit the earth within 200 mi of Hartford, find the probability that the meteor landed in Connecticut.
12. A stop light at an intersection stays red for 60 seconds, changes to green for 45 seconds, and then turns yellow for 15 seconds. If Jamal arrives at the intersection at a random time, what is the probability that he will have to wait at a red light for more than 15 seconds?

In each figure, a point between A and B on the number line is chosen at random. What is the probability that the point is between C and D?

13. 

14. 

15. 

16.