MEA 2013-2014
Teacher: Claudia Valle
Start Date:

Course: Geometry B
Student: ________________
Completed Date:

Unit 3: Perimeter, Circumference, and Area

Objectives: Students will understand how to recognize and find the perimeter, circumference, and areas of different polygons and circles. Students will understand how to solve real life problems involving perimeter, circumference, and area of polygons and circles.

Essential Questions: How can you find the area of regular polygons?

How can you find areas of real-life regions containing circles, parts of circles or other polygons? How can you estimate the likelihood that an event will occur?

TEKS Standards: G.3.C, G.3.E, G.5.A, G.5.B, G.7.A, G.7.B, G.8.A, G.8.C, G.11.D

Geometry

(3) Geometric structure. The student applies logical reasoning to justify and prove mathematical statements. The student is expected to:

(C) use logical reasoning to prove statements are true and find counter examples to disprove statements that are false;

(E) use deductive reasoning to prove a statement.

(5) Geometric patterns. The student uses a variety of representations to describe geometric relationships and solve problems. The student is expected to:

(A) use numeric and geometric patterns to develop algebraic expressions representing geometric properties;

(B) use numeric and geometric patterns to make generalizations about geometric properties, including properties of polygons, ratios in similar figures and solids, and angle relationships in polygons and circles;

(7) Dimensionality and the geometry of location. The student understands that coordinate systems provide convenient and efficient ways of representing geometric figures and uses them accordingly. The student is expected to:

(A) use one- and two-dimensional coordinate systems to represent points, lines, rays, line segments, and figures;

(B) use slopes and equations of lines to investigate geometric relationships, including parallel lines, perpendicular lines, and special segments of triangles and other polygons; and

(8) Congruence and the geometry of size. The student uses tools to determine measurements of geometric figures and extends measurement concepts to find perimeter, area, and volume in problem situations. The student is expected to:

(A) find areas of regular polygons, circles, and composite figures;

(C) derive, extend, and use the Pythagorean Theorem;

(11) Similarity and the geometry of shape. The student applies the concepts of similarity to justify properties of figures and solve problems. The student is expected to:

(D) describe the effect on perimeter, area, and volume when one or more dimensions of a figure are changed and apply this idea in solving problems.

Turn In:

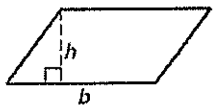
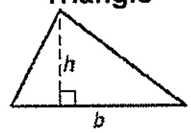
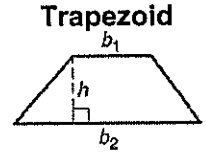
Assignment #	Activity	TEKS
15	Formulas for Triangles and Quadrilaterals	G.3.C, G.3.E, G.5.A, G.8.C
16	Formulas for Circles, and Regular Polygons	G.5.A, G.8.A, G.8.C, G.11.D
17	Composite Figures	G.8.A
18	Perimeter and Area in the Coordinate Plane	G.7.A, G.7.B, G.8.A
19	Effects of Changing Dimensions Proportionally	G.5.A, G.5.B, G.11.D
20	Geometric Probability	G.8.A
21	Unit 3 Test	G.3.C, G.3.E, G.5.A, G.5.B, G.7.A, G.7.B, G.8.A, G.8.C, G.11.D

Name ______________________ Date ______________ Class ______________

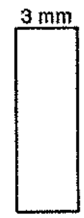
LESSON 9-1

Reteach

Developing Formulas for Triangles and Quadrilaterals

Area of Triangles and Quadrilaterals		
Parallelogram	**Triangle**	**Trapezoid**
		
$A = bh$	$A = \frac{1}{2}bh$	$A = \frac{1}{2}(b_1 + b_2)h$

Find the perimeter of the rectangle in which $A = 27$ mm^2.



Step 1 Find the height.

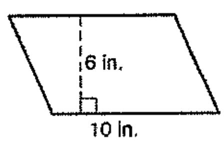
$A = bh$	Area of a rectangle
$27 = 3h$	Substitute 27 for A and 3 for b.
$9 \text{ mm} = h$	Divide both sides by 3.

Step 2 Use the base and the height to find the perimeter.

$P = 2b + 2h$	Perimeter of a rectangle
$P = 2(3) + 2(9) = 24$ mm	Substitute 3 for b and 9 for h.

Find each measurement.

1. the area of the parallelogram

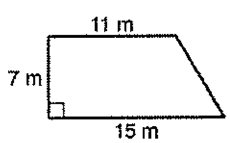


____

2. the base of the rectangle in which $A = 136$ mm^2

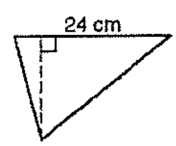
____

3. the area of the trapezoid



____

4. the height of the triangle in which $A = 192$ cm^2



____

5. the perimeter of a rectangle in which $A = 154$ in^2 and $h = 11$ in.

____

6. b_2 of a trapezoid in which $A = 5$ ft^2, $h = 2$ ft, and $b_1 = 1$ ft

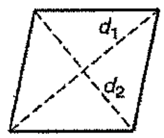
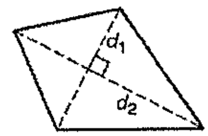
____

Name ______________________ Date ______________ Class ______________

LESSON 9-1

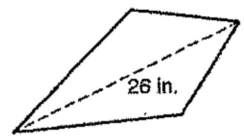
Reteach

Developing Formulas for Triangles and Quadrilaterals continued

Area of Rhombuses and Kites	
Rhombus	**Kite**
	
$A = \frac{1}{2}d_1d_2$	$A = \frac{1}{2}d_1d_2$

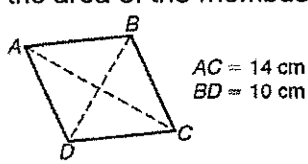
Find d_2 of the kite in which $A = 156$ in².

$A = \frac{1}{2}d_1d_2$	Area of a kite
$156 = \frac{1}{2}(26)d_2$	Substitute 156 in² for A and 26 in. for d_1.
$156 = 13d_2$	Simplify.
$12 \text{ in.} = d_2$	Divide both sides by 13.



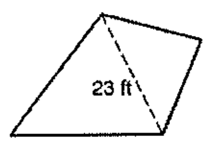
Find each measurement.

7. the area of the rhombus



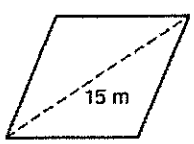
____

8. d_1 of the kite in which $A = 414$ ft²



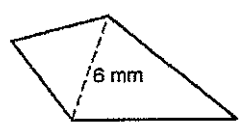
____

9. d_2 of the rhombus in which $A = 90$ m²



____

10. d_1 of the kite in which $A = 39$ mm²



____

11. d_1 of a kite in which $A = 16x$ m² and $d_2 = 8$ m

____

12. the area of a rhombus in which $d_1 = 4ab$ in. and $d_2 = 7a$ in.

____

Name ______________________ Date ______________ Class ______________

LESSON 9-1

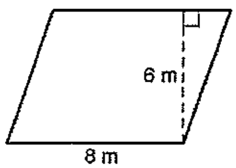
Practice A

Developing Formulas for Triangles and Quadrilaterals

In Exercises 1–5, fill in the blanks to complete each postulate or formula.

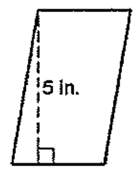
1. The area of a ________________ with base b and height h is $A = \frac{1}{2}(bh)$.
2. The area of a rhombus or a kite with diagonals d_1 and d_2 is $A =$ ________________.
3. The area of a region is equal to the sum of the ________________ of its nonoverlapping parts.
4. The area of a ________________ with base b and height h is $A = bh$.
5. The area of a trapezoid with bases b_1 and b_2 and height h is $A =$ ________________.

Use the area formula for parallelograms to find each measurement.

6. 

the area of the parallelogram

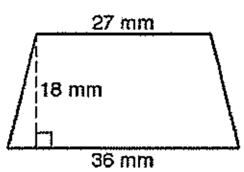
____

7. 

the base of the parallelogram in which $A = 15\text{ in}^2$

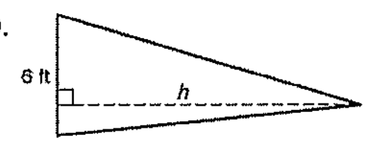
____

Use the area formulas for triangles and trapezoids to find each measurement.

8. 

the area of the trapezoid

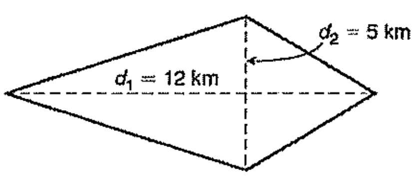
____

9. 

the height of the triangle in which $A = 90\text{ ft}^2$

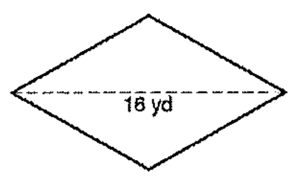
____

Use the area formula for rhombuses and kites to find each measurement.

10. 

the area of the kite

____

11. 

d_2 of the rhombus in which $A = 72\text{ yd}^2$

____

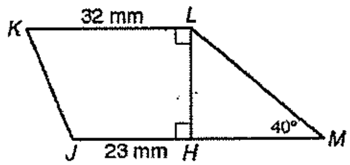
Name ______________________ Date ______________ Class ______________

LESSON 9-1

Problem Solving

Developing Formulas for Triangles and Quadrilaterals

1. The area of trapezoid *HJKL* is 385 mm^2. Find *LM* to the nearest tenth.



____

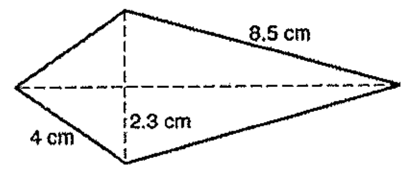
2. Samantha is buying stones for a 16 foot by 3 foot walkway. She needs to buy 10% extra for cutting stones for the corners and ends. The stones are rectangles 7 inches long and 4 inches wide and cost $0.97 each. About how much will the stones cost for her walkway?

____

3. The length of a rectangular pool is 2 feet less than twice the width. If the area of the pool is 264 ft^2, what are the dimensions of the pool?

____

4. Find the area of the kite. Round to the nearest tenth.



____

Choose the best answer.

5. A parallelogram has sides of length 30 centimeters and 18 centimeters. One of its angles measures 58°. Which is the best estimate for the area of the parallelogram?

   A 274.8 cm^2

   B 286.2 cm^2

   C 457.9 cm^2

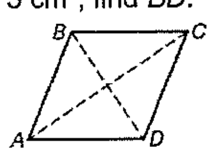
   D 540.0 cm^2

6. Jamie is cutting out 32 right triangles from fabric for her quilt. The shortest side of each triangle is 2 inches, and the longest side is 5 inches. How much fabric will she use to cut out all the triangles?

   F 146.6 in^2 H 366.6 in^2

   G 293.3 in^2 J 672 in^2

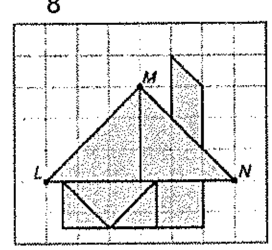
7. In rhombus *ABCD*, the length of diagonal $\overline{BD}$ is $\frac{2}{3}$ the length of diagonal $\overline{AC}$. If the area of the figure is 75 cm^2, find *BD*.



   A 7.1 cm C 10.6 cm

   B 10 cm D 15 cm

8. The house is made from 7 puzzle pieces. The pieces are triangles and parallelograms. If the area of the chimney is $\frac{1}{8}$ in^2, what is the area of $\triangle LMN$?



   F $\frac{9}{32}$ in^2 H $\frac{9}{2}$ in^2

   G $\frac{9}{16}$ in^2 J 9 in^2

Name ______________________ Date ______________ Class ______________

LESSON 9-2

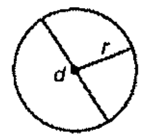
Reteach

Developing Formulas for Circles and Regular Polygons

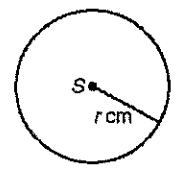
Circumference and Area of Circles

A circle with diameter d and radius r has circumference $C = \pi d$ or $C = 2\pi r$.

A circle with radius r has area $A = \pi r^2$.



Find the circumference of circle S in which $A = 81\pi$ cm^2.



Step 1 Use the given area to solve for r.

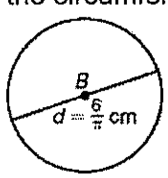
$A = \pi r^2$	Area of a circle
$81\pi \text{ cm}^2 = \pi r^2$	Substitute 81π for A.
$81 \text{ cm}^2 = r^2$	Divide both sides by π.
$9 \text{ cm} = r$	Take the square root of both sides.

Step 2 Use the value of r to find the circumference.

$C = 2\pi r$	Circumference of a circle
$C = 2\pi(9 \text{ cm}) = 18\pi \text{ cm}$	Substitute 9 cm for r and simplify.

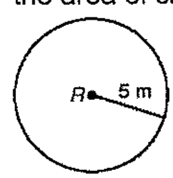
Find each measurement.

1. the circumference of circle B



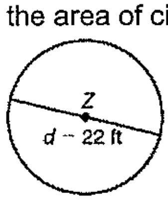
____

2. the area of circle R in terms of π



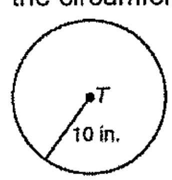
____

3. the area of circle Z in terms of π



____

4. the circumference of circle T in terms of π



____

5. the circumference of circle X in which $A = 49\pi$ in^2

____

6. the radius of circle Y in which $C = 18\pi$ cm

____

Name ______________________ Date ______________ Class ______________

LESSON 9-2

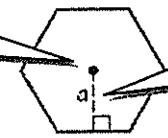
Reteach

Developing Formulas for Circles and Regular Polygons *continued*

Area of Regular Polygons

The area of a regular polygon with apothem *a* and perimeter *P* is $A = \frac{1}{2}aP$.

The **center** is equidistant from the vertices.

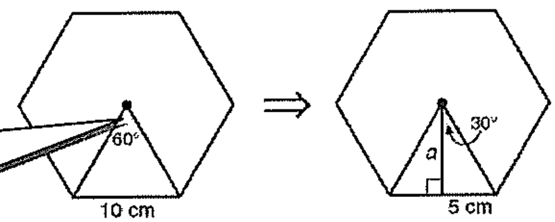


The **apothem** is the distance from the center to a side.

Find the area of a regular hexagon with side length 10 cm.

Step 1 Draw a figure and find the measure of a central angle. Each central angle measure of a regular *n*-gon is $\frac{360°}{n}$.

A **central angle** has its vertex at the center. This central angle measure is $\frac{360°}{n} = 60°$.



Step 2 Use the tangent ratio to find the apothem. You could also use the 30°-60°-90° △ Thm. in this case.

$\tan 30° = \frac{\text{leg opposite } 30° \text{ angle}}{\text{leg adjacent to } 30° \text{ angle}}$ Write a tangent ratio.

$\tan 30° = \frac{5 \text{ cm}}{a}$ Substitute the known values.

$a = \frac{5 \text{ cm}}{\tan 30°}$ Solve for *a*.

Step 3 Use the formula to find the area.

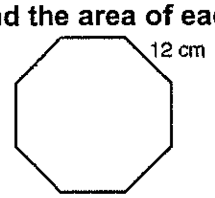
$A = \frac{1}{2}aP$

$A = \frac{1}{2}\left(\frac{5}{\tan 30°}\right)60$ $a = \frac{5}{\tan 30°}$, $P = 6 \times 10$ or 60 cm

$A \approx 259.8 \text{ cm}^2$ Simplify.

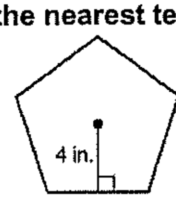
Find the area of each regular polygon. Round to the nearest tenth.

7.



____

8.



____

9. a regular hexagon with an apothem of 3 m

____

10. a regular decagon with a perimeter of 70 ft

____

Name ______________________ Date ______________ Class ______________

LESSON 9-2

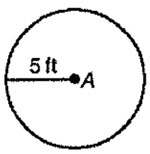
Practice A

Developing Formulas for Circles and Regular Polygons

In Exercises 1–3, fill in the blanks to complete each formula.

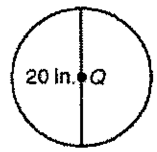
1. The area of a regular polygon with apothem a and perimeter P is $A =$ ____________.
2. A circle with diameter d has circumference $C =$ ____________.
3. A circle with radius r has area $A =$ ____________.

Use the area and circumference formulas for circles to find each measurement. Give your answers in terms of π.

4.


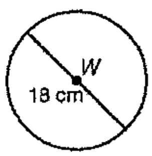
the area of $\odot A$

____

5.


the area of $\odot Q$

____

6.


the circumference of $\odot W$

____

7.

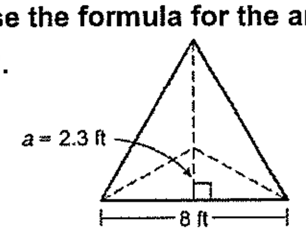

the circumference of $\odot N$

____

8. the radius of $\odot I$ in which $A = 144\pi$ meters^2 ____________
9. the diameter of $\odot L$ in which $C = 2\pi$ kilometers ____________
10. the area of $\odot P$ in which $C = 32\pi$ yards ____________
11. Emile is shopping for a new bicycle. He sees that a trick bike has 20-inch-diameter wheels, a mountain bike has 26-inch-diameter wheels, and a racing bike has 27-inch-diameter wheels. Find the area of each wheel. Round to the nearest tenth.

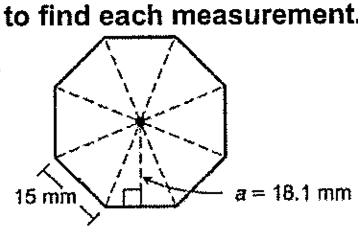
____

Use the formula for the area of a regular polygon to find each measurement.

12.


the area of the regular triangle

____

13.


the area of the regular octagon

____

14. the side length of a regular nonagon in which $A = 99$ in^2 and $a = 5.5$ in. ____________

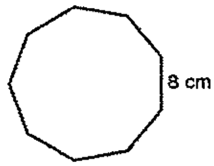
Name ______________________ Date ______________ Class ______________

LESSON 9-2

Problem Solving

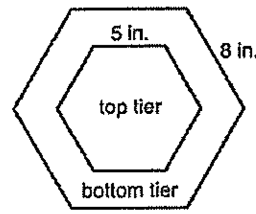
Developing Formulas for Circles and Regular Polygons

1. What is the area of the regular nonagon? Round to the nearest tenth.



____

2. The top view of a two-tiered wedding cake is shown. Each tier is a regular hexagon. What percent of the bottom tier is covered by the top tier? Round to the nearest percent.



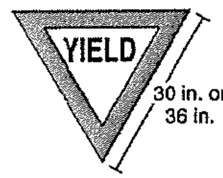
____

3. When diving and snorkeling, you should leave a "radius of approach," or a restricted area around certain animals that live in the waters where you are diving. How much greater is the restricted area around a monk seal than the restricted area around a sea turtle? Give your answer in terms of π.

Animal	Radius of Approach
sea turtle	20 ft
monk seal	100 ft

____

4. A yield sign is a regular triangle and is available in two sizes: 30 inches or 36 inches. Find how much more metal is needed to make a 36 inch sign than a 30 inch sign. Answer to the nearest percent.



____

Choose the best answer.

5. A regular hexagon has an apothem of 4.6 centimeters. Which is the best estimate for the area of the hexagon?

   A 36.7 cm^2

   B 63.5 cm^2

   C 73.3 cm^2

   D 146.6 cm^2

6. An amusement park ride is made up of a large circular frame that holds 50 riders. The circumference of the frame is about 138 feet. What is the diameter of the ride to the nearest foot?

   F 22 ft H 69 ft

   G 44 ft J 138 ft

7. A cyclist travels 50 feet after 7.34 rotations of her bicycle wheels. What is the approximate diameter of the wheels?

   A 13 in. C 26 in.

   B 24 in. D 28 in.

8. A regular pentagon has side length of 16 inches. What is the area of the pentagon to the nearest square inch?

   F 440 in^2 H 544 in^2

   G 369 in^2 J 881 in^2

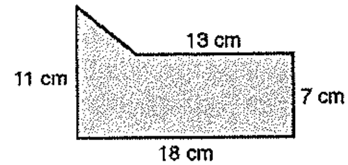
Name ______________________ Date ______________ Class ______________

LESSON 9-3

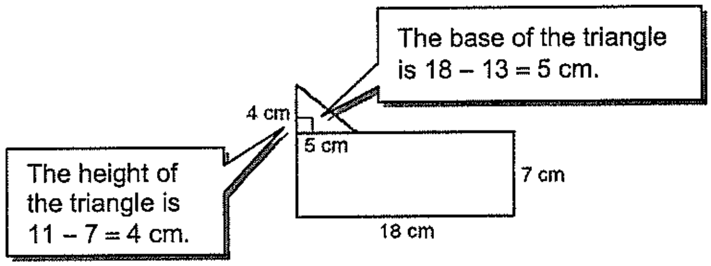
Reteach

Composite Figures

The figure at right is called a **composite figure** because it is made up of simple shapes. To find its area, first find the areas of the simple shapes and then add.



Divide the figure into a triangle and a rectangle.



area of triangle: $A = \frac{1}{2}bh$

$= \frac{1}{2}(5)(4)$

$= 10 \text{ cm}^2$

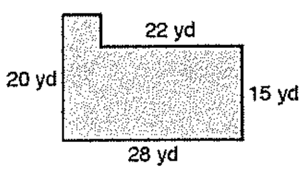
area of rectangle: $A = bh$

$= 18(7)$

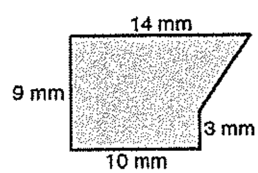
$= 126 \text{ cm}^2$

The area of the whole figure is $10 + 126 = 136 \text{ cm}^2$.

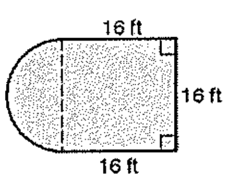
Find the shaded area. Round to the nearest tenth if necessary.

1. 

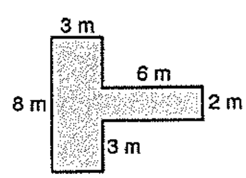
____

2. 

____

3. 

____

4. 

____

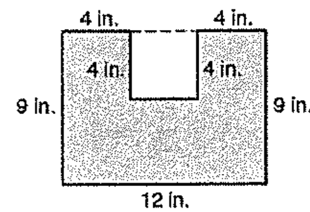
Name ______________________ Date ______________ Class ______________

LESSON 9-3

Reteach

Composite Figures continued

You can also find the area of composite figures by using subtraction. To find the area of the figure at right, subtract the area of the square from the area of the rectangle.



area of rectangle:

$A = bh$

$= 12(9)$

$= 108 \text{ in}^2$

area of square:

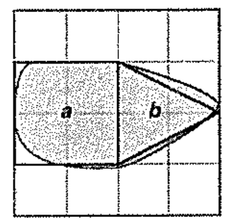
$A = s^2$

$= 4^2$

$= 16 \text{ in}^2$

The shaded area is $108 - 16 = 92 \text{ in}^2$.

You can use composite figures to estimate the area of an irregular shape like the one shown at right. The grid has squares with side lengths of 1 cm.



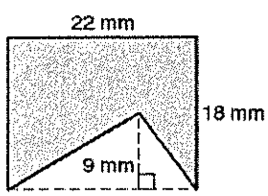
area of square *a*: $A = 2 \cdot 2 = 4 \text{ cm}^2$

area of triangle *b*: $A = \frac{1}{2}(2)(2) = 2 \text{ cm}^2$

The shaded area is about $4 + 2$ or 6 cm^2.

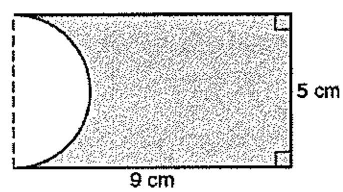
Find the shaded area. Round to the nearest tenth if necessary.

5.



____

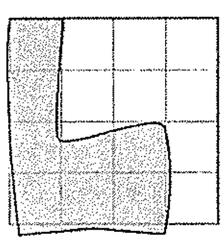
6.



____

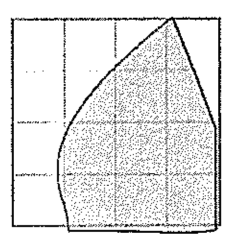
Use a composite figure to estimate each shaded area. The grid has squares with side lengths of 1 cm.

7.



____

8.



____

Name ______________________ Date ______________ Class ______________

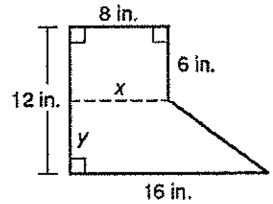
LESSON 9-3

Practice A

Composite Figures

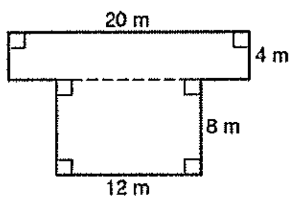
Complete Exercises 1–5 to find the area of the figure.

1. Find length *x*. ________
2. Find height *y*. ________
3. Find the area of the marked rectangle. ________
4. Find the area of the marked trapezoid. ________
5. Add to find the area of the figure. ________



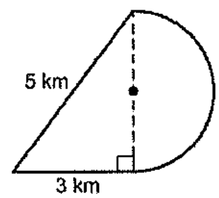
Find the area of each figure. Round to the nearest tenth if necessary.

6.



____

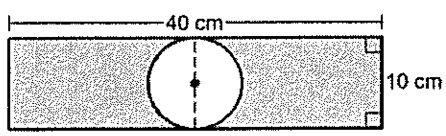
7.



____

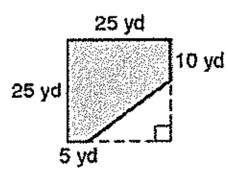
To find the shaded area, first find the area of the larger figure. Then subtract the area of the unshaded part. Round to the nearest tenth if necessary.

8.



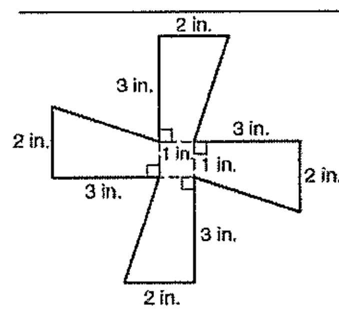
____

9.

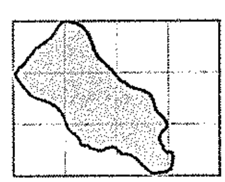


____

10. Casey plans to make a pinwheel based on the design shown in the figure. The cloth Casey will use to cover both sides of the pinwheel costs 12 cents per square inch. Find the cost of the cloth in dollars and cents. ________



The shaded shape in the figure is irregular. Complete Exercises 11 and 12 to estimate the area of the shape. The grid has squares with side lengths of 1 foot.



11. Divide the shape into parts whose areas you know how to calculate.
12. Add the area of each part to estimate the area of the irregular shape. ________

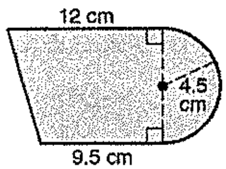
Name ______________________ Date ____________ Class ____________

LESSON 9-3

Problem Solving

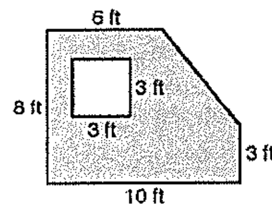
Composite Figures

1. Find the shaded area. Round to the nearest tenth.



____

2. Jessica is painting a bedroom wall shown by the shaded area below. The cost of paint is $6.90 per quart, and each quart covers 65 square feet. What is the total cost of the paint if she applies two coats of paint to the wall?

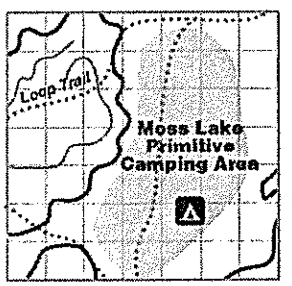


____

Choose the best answer.

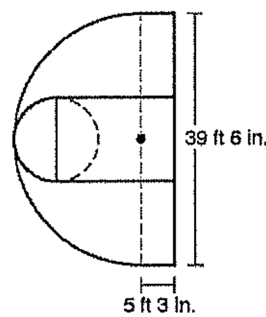
3. Enchanted Rock State Natural Area in Fredericksburg, Texas, has a primitive camping area called Moss Lake. Which is the best estimate for this area if the length of each grid square is 10 meters?

A 1600 m^2
B 3200 m^2
C 6400 m^2
D 8000 m^2

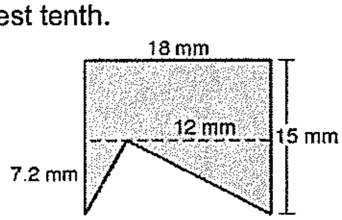


4. Find the area of the section of basketball court that is shown. Round to the nearest tenth.

F 612.7 ft^2
G 820.1 ft^2
H 1225.4 ft^2
J 2450.8 ft^2



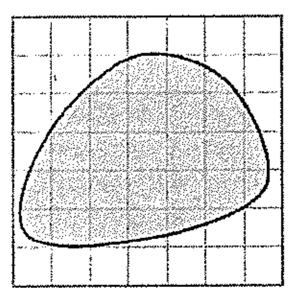
5. Find the shaded area. Round to the nearest tenth.



A 183.6 mm^2
B 194.4 mm^2
C 205.2 mm^2
D 216.0 mm^2

6. Which is the best estimate for the area of the pond? Each grid square represents 4 square feet.

F 24 ft^2
G 48 ft^2
H 96 ft^2
J 120 ft



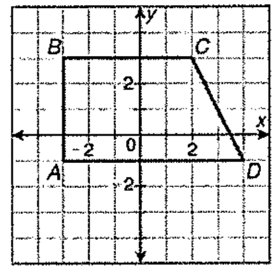
Name ______________________ Date ____________ Class ____________

LESSON 9-4

Reteach

Perimeter and Area in the Coordinate Plane

One way to estimate the area of irregular shapes in the coordinate plane is to count the squares on the grid. You can estimate the number of whole squares and the number of half squares and then add.



The polygon with vertices $A(-3, -1)$, $B(-3, 3)$, $C(2, 3)$, and $D(4, -1)$ is drawn in the coordinate plane. The figure is a trapezoid. Use the Distance Formula to find the length of $\overline{CD}$.

$$CD = \sqrt{(4-2)^2 + (-1-3)^2} = \sqrt{20} = 2\sqrt{5}$$

perimeter of $ABCD$: $P = AB + BC + CD + DA$

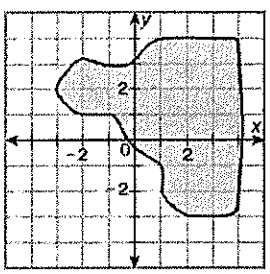
$$= 4 + 5 + 2\sqrt{5} + 7$$

$$\approx 20.5 \text{ units}$$

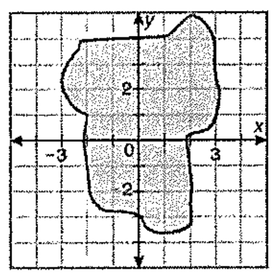
area of $ABCD$: $A = \frac{1}{2}(b_1 + b_2)(h)$

$$= \frac{1}{2}(5+7)(4) = 24 \text{ units}^2$$

Estimate the area of each irregular shape.

1. 

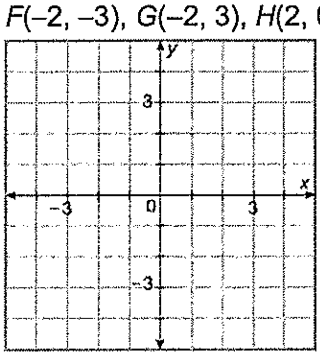
____

2. 

____

Draw and classify each polygon with the given vertices. Find the perimeter and area of each polygon.

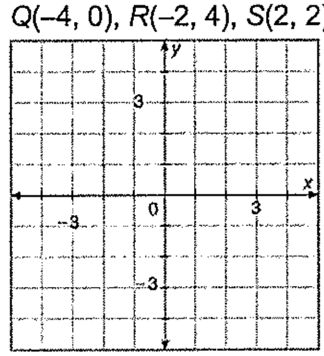
3. $F(-2, -3)$, $G(-2, 3)$, $H(2, 0)$



____

____

4. $Q(-4, 0)$, $R(-2, 4)$, $S(2, 2)$, $T(0, -2)$



____

____

Name ______________________ Date ____________ Class ____________

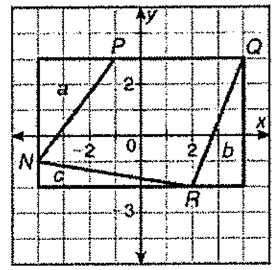
LESSON 9-4

Reteach

Perimeter and Area in the Coordinate Plane *continued*

When a figure in a coordinate plane does not have an area formula, another method can be used to find its area.

Find the area of the polygon with vertices $N(-4, -1)$, $P(-1, 3)$, $Q(4, 3)$, and $R(2, -2)$.



Step 1 Draw the polygon and enclose it in a rectangle.

Step 2 Find the area of the rectangle and the areas of the parts of the rectangle that are not included in the figure.

rectangle: $A = bh = 8 \cdot 5 = 40$ units^2

$$a\text{: } A = \frac{1}{2}bh = \frac{1}{2}(3)(4) = 6 \text{ units}^2$$

$$b\text{: } A = \frac{1}{2}bh = \frac{1}{2}(2)(5) = 5 \text{ units}^2$$

$$c\text{: } A = \frac{1}{2}bh = \frac{1}{2}(6)(1) = 3 \text{ units}^2$$

Step 3 Subtract to find the area of polygon *NPQR*.

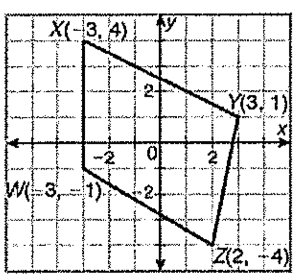
A = area of rectangle − area of parts not included in figure

$= 40 - 6 - 5 - 3$

$= 26$ units^2

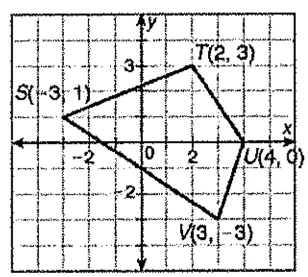
Find the area of each polygon with the given vertices.

5.



____

6.



____

7. $A(-1, -1)$, $B(-2, 3)$, $C(2, 4)$, $D(4, -1)$

____

8. $H(3, 7)$, $J(7, 2)$, $K(4, 0)$, $L(1, 1)$

____

Name ____________________ Date ____________ Class ____________

LESSON 9-4

Problem Solving

Perimeter and Area in the Coordinate Plane

1. Find the perimeter and area of a polygon with vertices $A(-3, -2)$, $B(2, 4)$, $C(5, 2)$, and $D(0, -4)$. Round to the nearest tenth.

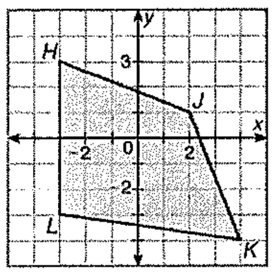
   ____

2. What are the perimeter and area of the triangle that is formed when the lines below are graphed in the coordinate plane? Round to the nearest tenth.

   $y = 2x$, $y = 4$, and $y = x + 4$

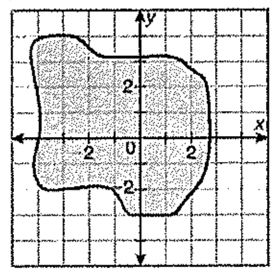
   ____

3. Find the area of polygon $HJKL$ with vertices $H(-3, 3)$, $J(2, 1)$, $K(4, -4)$, and $L(-3, -3)$.



   ____

4. The diagram represents train tracks in the children's area of a zoo. Estimate the area enclosed by the tracks. The side length of each square represents 1 meter.



   ____

Choose the best answer.

5. A graph showing the top view of a circular fountain has its center at (4, 6). The circle representing the fountain passes through (2, 1). What is the area of the space covered by the fountain?

   A $\sqrt{29}\,\pi$

   B $2\sqrt{29}\,\pi$

   C 29π

   D 58π

6. Trapezoid $QRST$ with vertices $Q(1, 5)$ and $R(9, 5)$ has an area of 12 square units. Which are possible locations for vertices S and T?

   F $S(6, 7)$ and $T(2, 7)$

   G $S(4, 7)$ and $T(2, 7)$

   H $S(6, 8)$ and $T(3, 8)$

   J $S(6, 1)$ and $T(3, 1)$

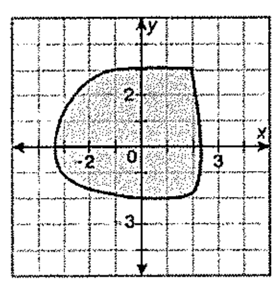
7. Which is the best estimate for the area of the rock garden? The side length of each square represents 2 feet.

   A 23 ft^2

   B 46 ft^2

   C 69 ft^2

   D 92 ft^2



Name ______________________ Date ______________ Class ______________

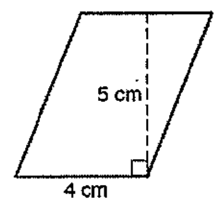
LESSON 9-5

Reteach

Effects of Changing Dimensions Proportionally

What happens to the area of the parallelogram if the base is tripled?

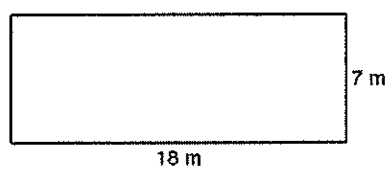
original dimensions:	triple the base:
$A = bh$	$A = bh$
$= 4(5)$	$= 12(5)$
$= 20 \text{ cm}^2$	$= 60 \text{ cm}^2$



Notice that $60 = 3(20)$. If the base is multiplied by 3, the area is also multiplied by 3.

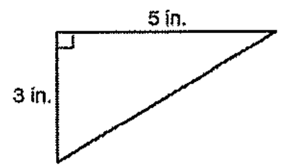
Describe the effect of each change on the area of the given figure.

1. The length of the rectangle is doubled.



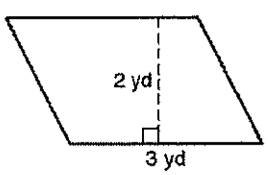
____

2. The base of the triangle is multiplied by 4.



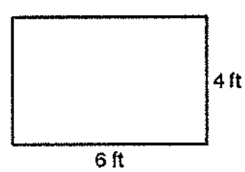
____

3. The height of the parallelogram is multiplied by 5.



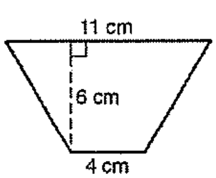
____

4. The width of the rectangle is multiplied by $\frac{1}{2}$.



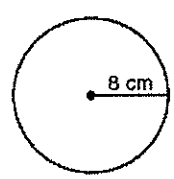
____

5. The height of the trapezoid is multiplied by 3.



____

6. The radius of the circle is multiplied by $\frac{1}{2}$.



____

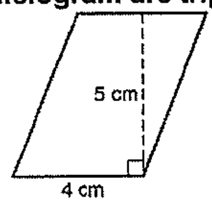
Name ________________ Date ________ Class ________

LESSON 9-5

Reteach

Effects of Changing Dimensions Proportionally continued

What happens if both the base and height of the parallelogram are tripled?



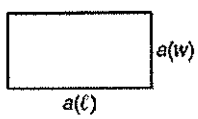
original dimensions: triple the base and height:

$A = bh$ $\quad$ $A = bh$

$= 4(5)$ $\quad$ $= 12(15)$

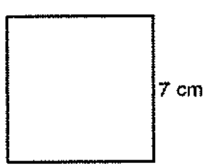
$= 20\text{ cm}^2$ $\quad$ $= 180\text{ cm}^2$

When just the base is multiplied by 3, the area is also multiplied by 3. When both the base and height are multiplied by 3, the area is multiplied by 3^2, or 9.

Effects of Changing Dimensions Proportionally		
Change in Dimensions	**Perimeter or Circumference**	**Area**
Consider a rectangle whose length ℓ and width w are each multiplied by a. 	The perimeter changes by a factor of a. $P = 2\ell + 2w$ new perimeter: $P = a(2\ell + 2w)$	The area changes by a factor of a^2. original area: $A = \ell w$ new area: $A = a^2(\ell w)$

Describe the effect of each change on the perimeter or circumference and the area of the given figure.

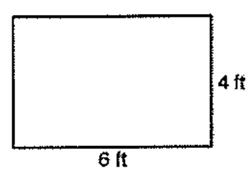
7. The side length of the square is multiplied by 6.



____

____

8. The base and height of the rectangle are both multiplied by $\frac{1}{2}$.



____

____

9. The base and height of a triangle with base 7 in. and height 3 in. are both doubled.

____

____

10. A circle has radius 5 mm. The radius is multiplied by 4.

____

____

Name ______________________ Date ______________ Class ______________

LESSON 9-6

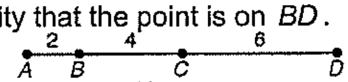
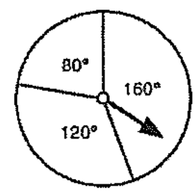
Reteach

Geometric Probability

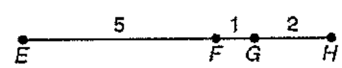
The theoretical probability of an event occurring is

$$P = \frac{\text{number of outcomes in the event}}{\text{number of outcomes in the sample space}}.$$

The **geometric probability** of an event occurring is found by determining a ratio of geometric measures such as length or area. Geometric probability is used when an experiment has an infinite number of outcomes.

Finding Geometric Probability	
Use Length	**Use Angle Measures**
A point is chosen randomly on $\overline{AD}$. Find the probability that the point is on $\overline{BD}$.  $P = \frac{\text{all points on } \overline{BD}}{\text{all points on } \overline{AD}}$ $= \frac{BD}{AD}$ $= \frac{10}{12} = \frac{5}{6}$	Use the spinner to find the probability of the pointer landing on the 160° space.  $P = \frac{\text{all points in 160° region}}{\text{all points in circle}}$ $= \frac{160}{360}$ $= \frac{4}{9}$

A point is chosen randomly on $\overline{EH}$. Find the probability of each event.



1. The point is on $\overline{FH}$.

   ____

2. The point is not on $\overline{EF}$.

   ____

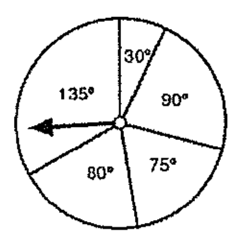
3. The point is on $\overline{EF}$ or $\overline{GH}$.

   ____

4. The point is on $\overline{EG}$.

   ____

Use the spinner to find the probability of each event.



5. the pointer landing on 135° ______________________

6. the pointer landing on 75° ______________________

7. the pointer landing on 90° or 75° ______________________

8. the pointer landing on 30° ______________________

Name ____________________ Date __________ Class __________

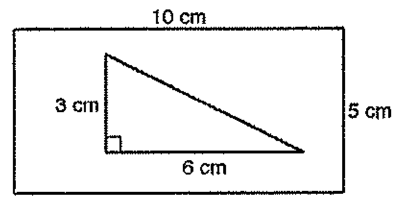
LESSON 9-6

Reteach

Geometric Probability continued

You can also use area to find geometric probability.

Find the probability that a point chosen randomly inside the rectangle is in the triangle.



area of triangle: $A = \frac{1}{2}bh$

$= \frac{1}{2}(6)(3) = 9 \text{ cm}^2$

area of rectangle: $A = bh$

$= 10(5) = 50 \text{ cm}^2$

$P = \frac{\text{all points in triangle}}{\text{all points in rectangle}}$

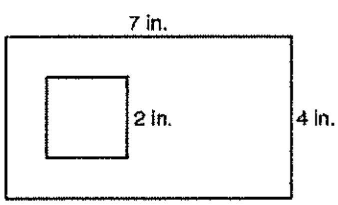
$= \frac{\text{area of triangle}}{\text{area of rectangle}}$

$= \frac{9 \text{ cm}^2}{50 \text{ cm}^2}$

The probability is $P = 0.18$.

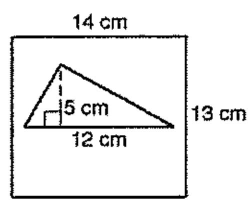
Find the probability that a point chosen randomly inside the rectangle is in each shape. Round to the nearest hundredth.

9. the square



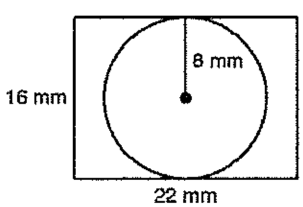
____

10. the triangle



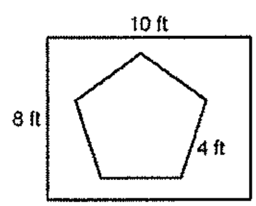
____

11. the circle



____

12. the regular pentagon



____

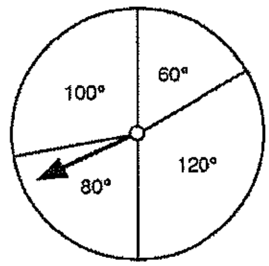
Name ______________________ Date ______________ Class ______________

LESSON 9-6

Problem Solving

Geometric Probability

Use the diagram of a spinner for Exercises 1 and 2.



1. Find the probability of the pointer landing on the 120° section.

____

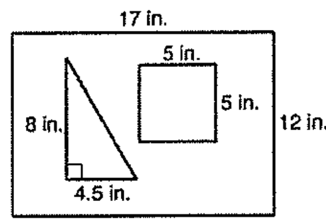
2. Find the probability of the pointer landing on the 100° section.

____

3. Between 4:00 P.M. and 6:30 P.M., a radio station gives a traffic report every 20 minutes. This report lasts 15 seconds. Suppose you turn on the radio between 4:00 P.M. and 6:30 P.M. Find the probability that a traffic report will be on.

____

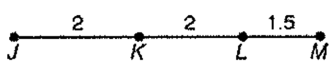
4. Find the probability that a point chosen randomly inside the rectangle is in the triangle. Round to the nearest hundredth.



____

Choose the best answer.

5. A point is chosen randomly on $\overline{JM}$. Find the probability that the point is on $\overline{JK}$ or $\overline{JL}$. Round to the nearest hundredth.



A 0.41 C 0.81

B 0.73 D 1.08

6. A train crosses at a railroad crossing 6 times a day—once every 4 hours. It takes an average of 5 minutes for the railroad gates to go down and then come up again. If you are approaching the railroad crossing, what is the probability that the gates are down?

F $\frac{1}{360}$ H $\frac{1}{48}$

G $\frac{1}{120}$ J $\frac{1}{30}$

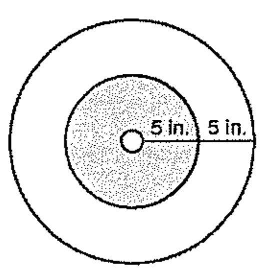
7. On the dart board, the center circle has a diameter of 2 inches. What is the probability of hitting the shaded ring? Round to the nearest hundredth.

A 0.01

B 0.29

C 0.30

D 0.45



8. What is the probability that a coin randomly tossed into the rectangular fountain lands on one of the square "islands"? The "islands" are all the same size.

F 0.03

G 0.05

H 0.15

J 0.17