Honors Geometry Chapter 11 Topics

11-1 Areas of Parallelograms

- Find perimeters of parallelograms:
- Fin areas of parallelograms:

11-2 Areas of Triangles, Trapezoids, and Rhombi

- Find areas of triangles:
- Find areas of trapezoids:
- Find areas of rhombi:

11-3 Areas of Regular Polygons and Circles

- Find areas of regular polygons:
- Find areas of circles:

11-4 Areas of Irregular Figures

- Find areas of irregular figures (on the coordinate plane).

11-5 Geometric Probability

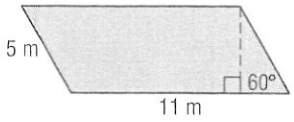
- Sector of a circle:
- Find areas of sectors:
- Segment of a circle:
- Find areas of segments:

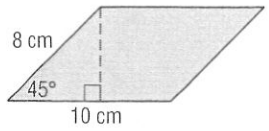
NAME _____ DATE _____ PERIOD ____

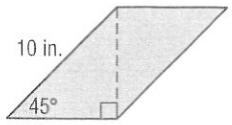
11-1 Practice

Area of Parallelograms

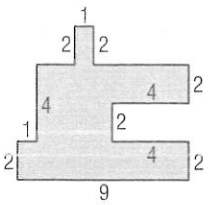
Find the perimeter and area of each parallelogram. Round to the nearest tenth if necessary.

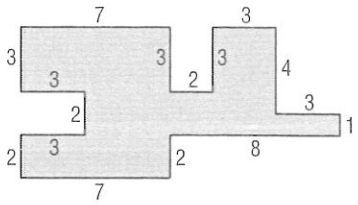
1. 

2. 

3. 

Find the area of each figure.

4. 

5. 

COORDINATE GEOMETRY Given the coordinates of the vertices of a quadrilateral, determine whether it is a *square*, a *rectangle*, or a *parallelogram*. Then find the area of the quadrilateral.

6. $C(-4, -1), D(-4, 2), F(1, 2), G(1, -1)$

7. $W(2, 2), X(1, -2), Y(-2, -2), Z(-1, 2)$

8. $M(0, 4), N(4, 6), O(6, 2), P(2, 0)$

9. $P(-5, 2), Q(4, 2), R(5, 5), S(-4, 5)$

FRAMING For Exercises 10–12, use the following information.

A rectangular poster measures 42 inches by 26 inches. A frame shop fitted the poster with a half-inch mat border.

10. Find the area of the poster.

11. Find the area of the mat border.

12. Suppose the wall is marked where the poster will hang. The marked area includes an additional 12-inch space around the poster and frame. Find the total wall area that has been marked for the poster.

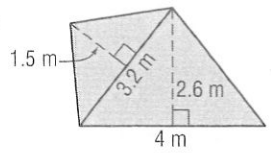
NAME _____ DATE _____ PERIOD _____

11-2 Practice

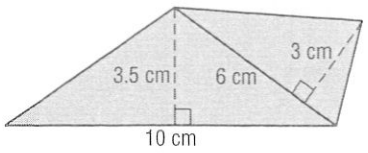
Areas of Triangles, Trapezoids, and Rhombi

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

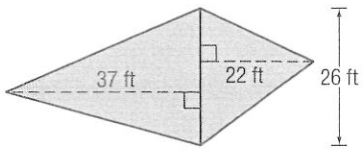
1.



2.



3.



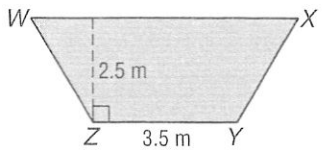
Find the area of each quadrilateral given the coordinates of the vertices.

4. trapezoid *ABCD*
$A(-7, 1)$, $B(-4, 4)$, $C(-4, -6)$, $D(-7, -3)$

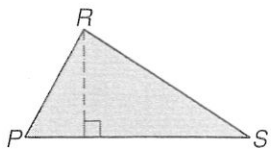
5. rhombus *LMNO*
$L(6, 8)$, $M(14, 4)$, $N(6, 0)$, $O(-2, 4)$

Find the missing measure for each figure.

6. Trapezoid *WXYZ* has an area of 13.75 square meters. Find *WX*.



7. Triangle *PRS* has an area of 68 square yards. If the height of $\triangle PRS$ is 8 yards, find the base.



DESIGN For Exercises 8 and 9, use the following information.

Mr. Hagarty used 16 congruent rhombi-shaped tiles to design the midsection of the backsplash area above a kitchen sink. The length of the design is 27 inches and the total area is 108 square inches.

8. Find the area of one rhombus.

9. Find the length of each diagonal.

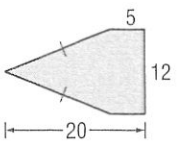
NAME _____ DATE _____ PERIOD _____

11-4 Skills Practice

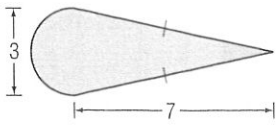
Areas of Irregular Figures

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

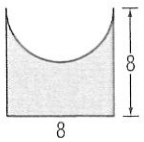
1.



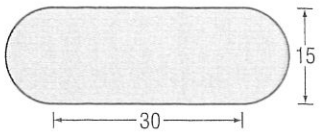
2.



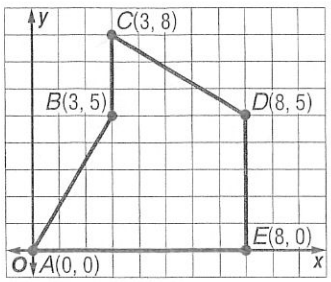
3.



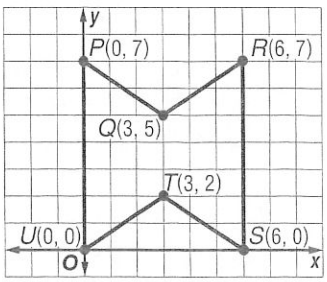
4.



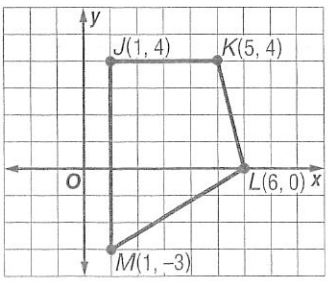
5.



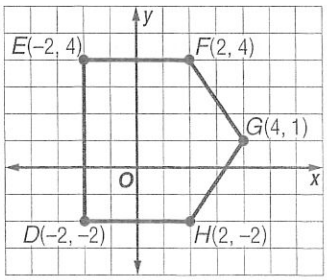
6.



7.



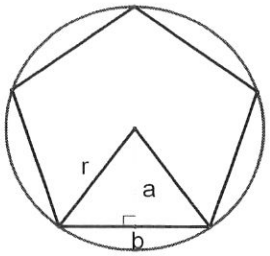
8.



Lesson 11-4

Name: _____ Date: _____

11-3 Areas of Regular Polygons and Circles



Apothem:

$a =$
$b =$
$r =$

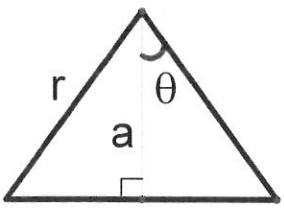
Find the area of a regular *n*-polygon in terms of *a*, *b*, and *n*:

Area of a Regular Polygon:

Example 1: Find the area of each polygon. Round to the nearest tenth.

A. A regular pentagon with a perimeter of 60 centimeters.

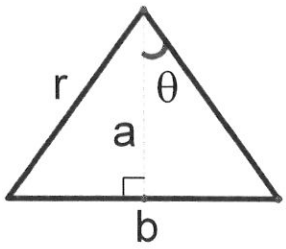
1. Draw Picture
2. Find Θ.
3. Find *a* using trig.
4. Find the area.



B. A regular triangle with a side length of 14 meters.

C. A regular hexagon with apothem of $5\sqrt{3}$ inches.

Now let's increase the number of sides in the inscribed polygon to 50!



1. Find Θ.

2. Find the exact length of the apothem, a, in terms of the radius, r.

3. Find the exact length of one side, b, in terms of the radius, r.

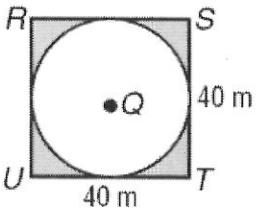
4. Find the area of the regular polygon with 50 sides in terms of r. Round to the nearest hundredth.

5. What does this look like and why does this make sense?

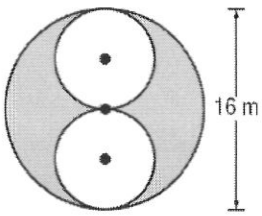
Area of a Circle:

Example 2: Find the area of each shaded region. Assume that all polygons are regular. Round to the nearest tenth.

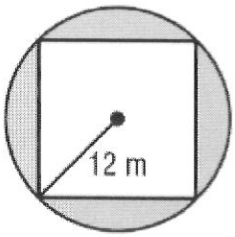
A.



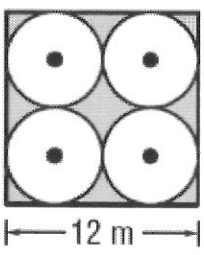
B.



C.



D.

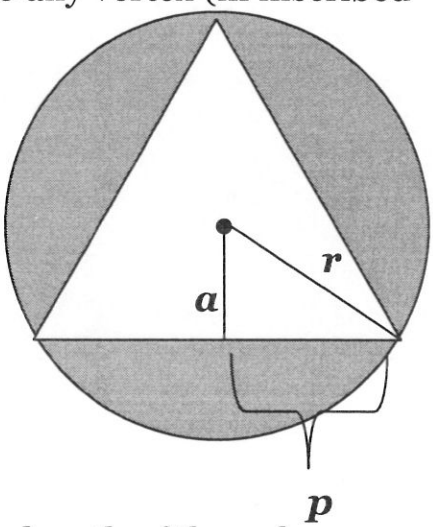


Neel's Apothem Formulas

Spending too much time on those pesky area-of-a-polygon problems? Well, it's your lucky day.

These formulas work for any regular polygon (even a polygon that isn't inscribed.)

In the below formulas,
- A = the area of the polygon
- a = the length of the apothem
- q = the number of sides of the polygon
- p = the length of half a side of the polygon (or, Perimeter ÷ 2q)
- r = the distance from the center of the polygon to any vertex (in inscribed polygons, this is the radius of the circle)



So the basic formula is:

$$A = a \times p \times q$$

Use this if you know the area but have to find one of the other measures.

Use this formula if you know the perimeter or side length of the polygon:

$$A = \frac{p^2 \times q}{\tan(180 \div q)}$$

Use this formula if you know the length of the apothem of the polygon:

$$A = a^2 \times q \times \tan(180 \div q)$$

Use this formula if you know the length of the radius:

$$A = r^2 \times q \times \sin(180 \div q) \times \cos(180 \div q)$$

Examples: Find the area of each polygon. Round to the nearest tenth.

1. A regular pentagon with a side length of 10 inches.

2. A square with a radius of $\frac{15\sqrt{2}}{2}$ inches.

3. A regular octagon with perimeter of 80 inches.

4. A regular pentagon with an apothem of 7.5 meters.

NAME _____ DATE _____ PERIOD _____

11-3 Skills Practice

Areas of Regular Polygons and Circles

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

1. a pentagon with a perimeter of 45 feet

2. a hexagon with a side length of 4 inches

3. a nonagon with a side length of 8 meters

4. a triangle with a perimeter of 54 centimeters

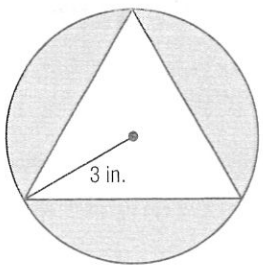
Find the area of each circle. Round to the nearest tenth.

5. a circle with a radius of 6 yards

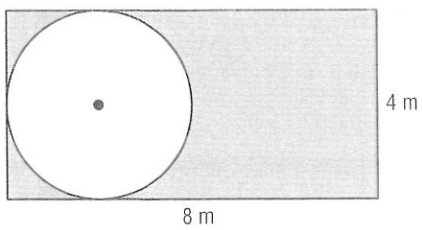
6. a circle with a diameter of 18 millimeters

Find the area of each shaded region. Assume that all polygons are regular. Round to the nearest tenth.

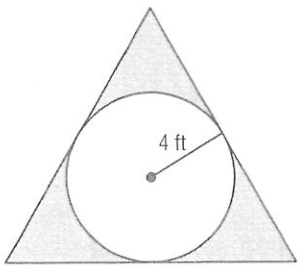
7.



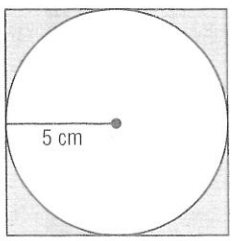
8.



9.



10.



Lesson 11-3

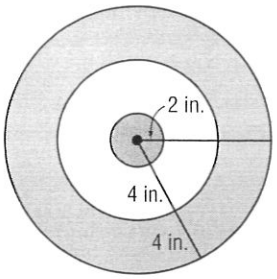
NAME _____ DATE _____ PERIOD _____

11-5 Study Guide and Intervention

Geometric Probability

Geometric Probability The probability that a point in a figure will lie in a particular part of the figure can be calculated by dividing the area of the part of the figure by the area of the entire figure. The quotient is called the **geometric probability** for the part of the figure.

Example **Darts are thrown at a circular dartboard. If a dart hits the board, what is the probability that the dart lands in the bull's-eye?**



Area of bull's-eye: $A =$

Area of entire dartboard: $A =$

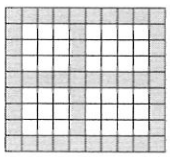
The probability of landing in the bull's-eye is

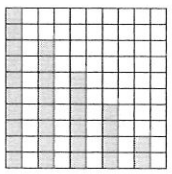
$$\frac{\text{area of bull's-eye}}{\text{area of dartboard}} =$$

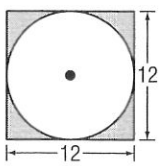
$=$

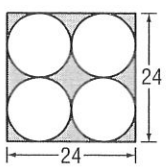
Exercises

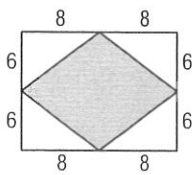
Find the probability that a point chosen at random lies in the shaded region. Round to the nearest hundredth if necessary.

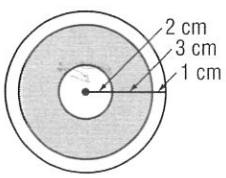
1. 

2. 

3. 

4. 

5. 

6. 

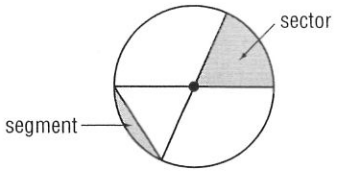
Lesson 11-5

NAME _____ DATE _____ PERIOD ____

11-5 Study Guide and Intervention *(continued)*

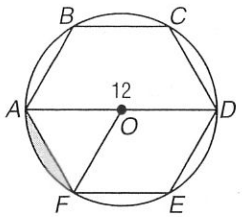
Geometric Probability

Sectors and Segments of Circles A **sector of a circle** is a region of a circle bounded by a central angle and its intercepted arc. A **segment of a circle** is bounded by a chord and its arc. Geometric probability problems sometimes involve sectors or segments of circles.



Example **A regular hexagon is inscribed in a circle with diameter 12. Find the probability that a point chosen at random in the circle lies in the shaded region.**

The area of the shaded segment is the area of sector AOF − the area of $\triangle AOF$.



Area of sector AOF =

=

=

Area of $\triangle AOF = \frac{1}{2}bh$

=

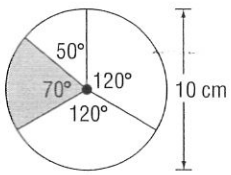
=

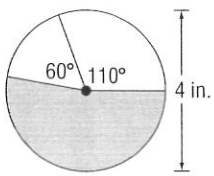
The shaded area is

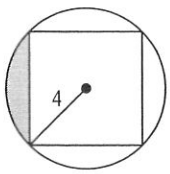
The probability is $\frac{\text{area of segment}}{\text{area of circle}}$ =

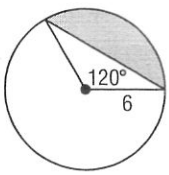
Exercises

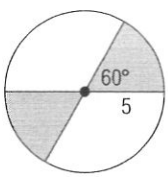
Find the probability that a point in the circle chosen at random lies in the shaded region. Round to the nearest hundredth.

1. 

2. 

3. 

4. 

5. 

6.