11.1

Areas of Polygons
Area of a Square = _______________________

Area of a Rectangel = ____________________

Postulate 18: ________________________________

________________________________________
If we are finding the area of a shape we do not know:

- 
- 
- 
- 

3  2  4
2
10
Classify as True or False:

1. If 2 figures have the same area then they must be congruent.
2. If 2 figures have the same perimeter, they have same area.
3. If two figures are congruent they have same area.
4. Every square is a rectangle.
5. Every rectangle is a square.
6. The base of a rectangle can be any side.
Examples:

Find the Area of the rectangle.

Find the Area of the square.
11.3

Areas of Parallelograms
Triangles and Rhombuses
Formulas

Area of a Parallelogram = ________________

Area of a Triangle = ____________________

Area of a Rhombus = ____________________
Hint: file this one away.

Examples: Find the Area

1. Rhombus with Diagonals of 6 & 8.

2. Triangle with a base of 6 and height of 10.
3. Rhombus with a Perimeter of 52 and a diagonal of 24.

4. Parallelogram with sides of 10 and 20
5. Find the area of an isosceles triangle with congruent sides of 4 and a base of 2.
Find the Area:
Find the Area:
11.3

Areas of Trapezoids
What was a Trapezoid?

__________________________________

What was the median?

__________________________________

Area Trapezoid: ____________________

__________________________________
Examples:
A trapezoid has an area of 75 and a height of 5. How long is the median?

Which formula?
Examples:
Find the Area:
Examples:
11.4

Areas of REGULAR Polygons
Think of all REGULAR polygons as being inscribed in a circle.
Definitions:

Center: ______________________________

Radius: ______________________________

Central Angle: _______________________

Central Angle: _______________________

Central Angle: _______________________

Central Angle: _______________________
Area of Regular Polygon = ________________

________________________________________________________________________

What Shapes can we use this for?

________________________________________________________________________
Finding the Central Angle is important because in some polygons it will form special triangles with the Radius and Apothem (ie 45-45-90 or 30-60-90)

**Central Angle** = __________________________
Examples:

1. Find the Area of a Regular hexagon with an apothem of 6.
Complete the Chart for a Square:

<table>
<thead>
<tr>
<th></th>
<th>r</th>
<th>a</th>
<th>P</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1)</td>
<td>$5\sqrt{2}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2)</td>
<td></td>
<td>$\sqrt{3}$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Diagram: A right triangle with sides $a = 45$ and $r$ and a square with side length $\frac{1}{2} \text{ side}$.
Complete the Chart for a Triangle:

<table>
<thead>
<tr>
<th></th>
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<th>a</th>
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<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1)</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2)</td>
<td></td>
<td></td>
<td>$6\sqrt{3}$</td>
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</tr>
</tbody>
</table>

Complete the Chart for a Hexagon:

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<thead>
<tr>
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<tbody>
<tr>
<td>1)</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2)</td>
<td></td>
<td></td>
<td>$24\sqrt{3}$</td>
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</tbody>
</table>
11.5

Circumference and Areas of Circles
Formulas:
Examples:

1. The radius of circle A is 3 times the radius of circle B. Compare the circumferences of circle A to circle B.

2. Now compare the Areas of A to B
Fill out the Chart for circle M.

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<tr>
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<th>D</th>
<th>C</th>
<th>A</th>
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<tr>
<td>1)</td>
<td>15</td>
<td></td>
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<td>2)</td>
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<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3)</td>
<td></td>
<td></td>
<td>26\pi</td>
<td></td>
</tr>
<tr>
<td>4)</td>
<td></td>
<td></td>
<td></td>
<td>100\pi</td>
</tr>
</tbody>
</table>
3. The diameter of the world’s largest circle is 16m. Find the circumferences of the crust.
11.6

Arc lengths and Areas of Sectors
Formulas:
1. The radius of a circle is 3, and the central angle is 50.

Find the length of the arc:

Find the area of the sector:
2. The area of a sector of a circle is $\frac{5}{8}\pi$ and the central angle is 9 degrees. Find the radius of the circle.
Find the area of the shaded region: 120

6
11.7

Ratios of Areas
We will be comparing areas of figures by comparing ratios:

**Case 1**: Compare $\triangle ABD$ to $\triangle DBC$
We will be comparing areas of figures by comparing ratios:

Case 2: *Compare* $\triangle ABC$ to $\triangle ADC$
Case 3: If triangles are similar then: ______________________________________

Recap:
1. If **heights** the same then: ______________________________________

2. If **Bases** the same then: ______________________________________

3. If Triangles are similar then: ______________________________________
Examples:

Compare the Ratios of areas between:

$$\frac{\triangle ABC}{\triangle ADB}$$
If the scale factor of 2 similar figures is $a:b$ then:

1. the ratio of the perimeters is $\underline{a:b}$
2. The ratio of the areas is $\underline{a^2:b^2}$

If the scale factor of 2 similar figures is 3:5 then:

1. the ratio of the perimeters is $\underline{3:5}$
2. The ratio of the areas is $\underline{9:25}$
1. The diameters of 2 circles is 10 and 9. What is the ratio of their circumferences and Areas?

Ratio of Circumferences =

Ratio of Areas =


2. A pentagon with sides of 5, 7, 8, 9 and 11 has an Area of 96. Find the perimeter of a similar pentagon whose Area is 24.