Chapter 11
Circumference, Area, and Volume

11.1 Circumference and Arc Length

11.2 Areas of Circles and Sectors

11.3 Areas of Polygons

11.4 Three-Dimensional Figures

11.5 Volumes of Prisms and Cylinders

11.6 Volumes of Pyramids

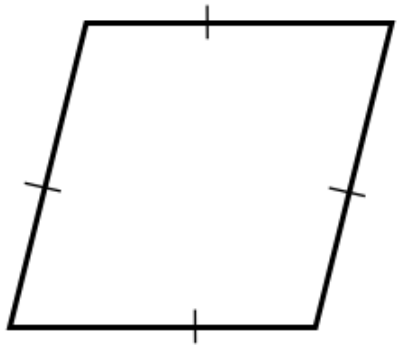
11.7 Surface Areas and Volumes of Cones

11.8 Surface Areas and Volumes of Spheres

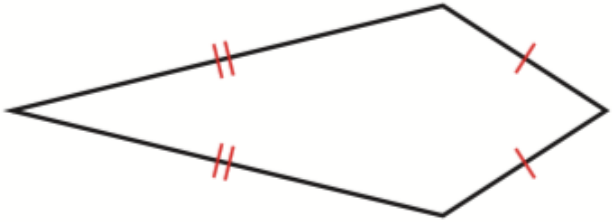
11.3 Areas of Polygons

Special Quadrilaterals

- **Rhombus**
  Name some properties:



- **Kite**
  Name some properties:



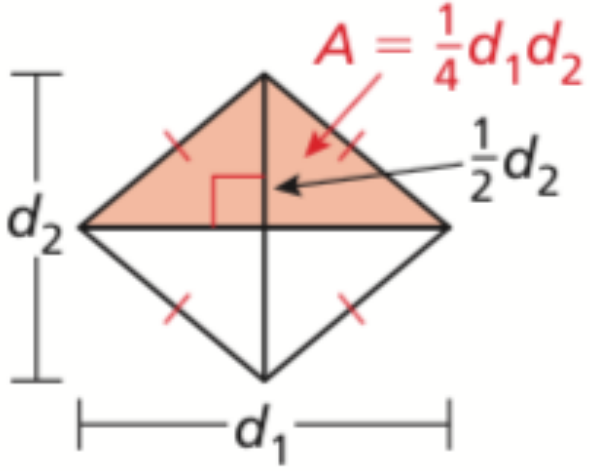
How would you calculate area?

11.3 Areas of Polygons

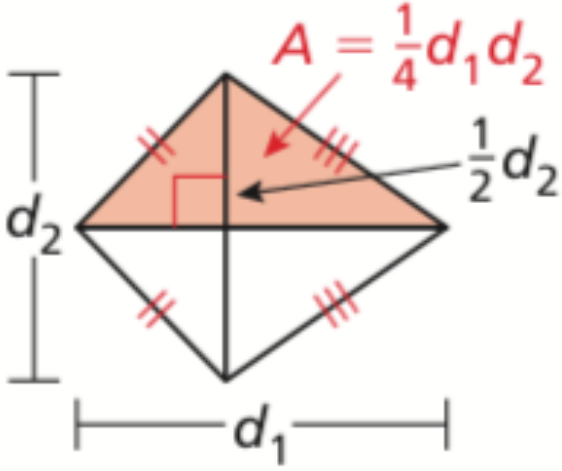
Area of Rhombus or Kite

- The area of a rhombus or kite $A = \frac{1}{2} d_1 d_2$

Rhombus



Kite



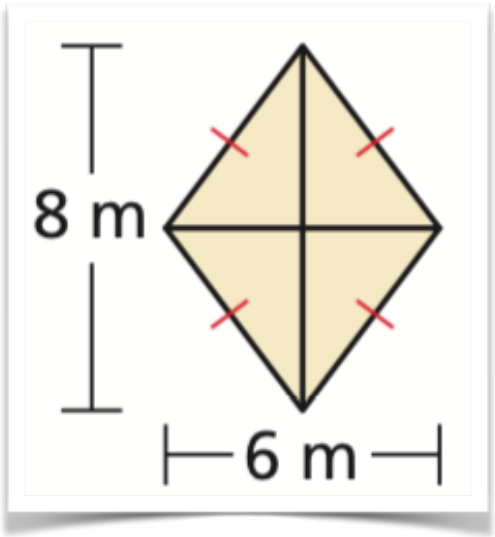
11.3 Areas of Polygons

Area of Rhombus or Kite

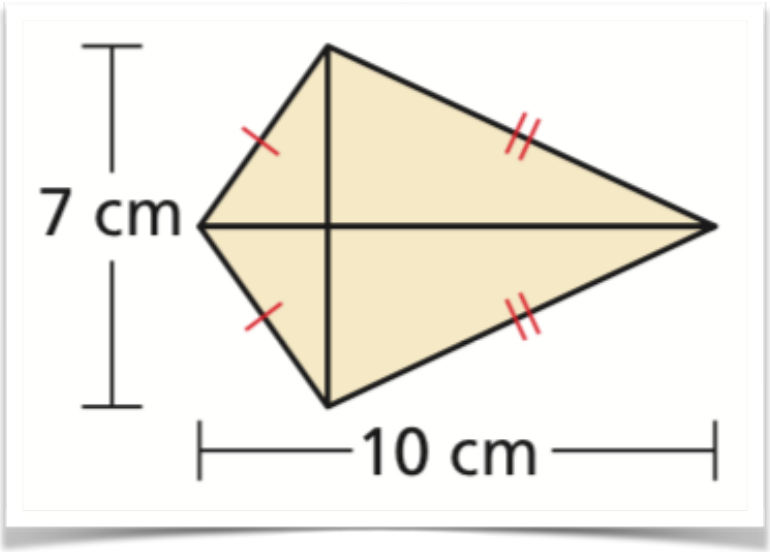
$$A = \frac{1}{2} d_1 d_2$$

- Compute each area

a)



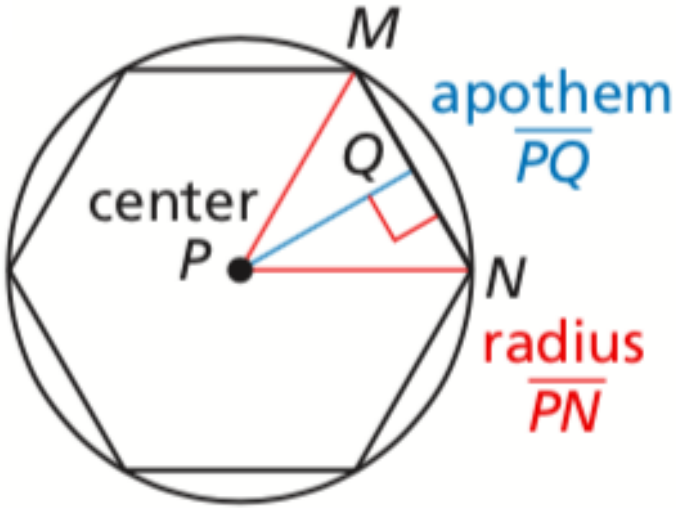
b)



11.3 Areas of Polygons

Regular Polygon

- **Center of a Regular Polygon**
  The center of the circumscribed circle.
- **Radius**
  The distance from the center to a vertex.
- **Apothem**
  The distance from the center to a side.
- **Central Angle**
  The angle formed by two consecutive radii drawn to vertices.



11.3 Areas of Polygons

Regular Polygon

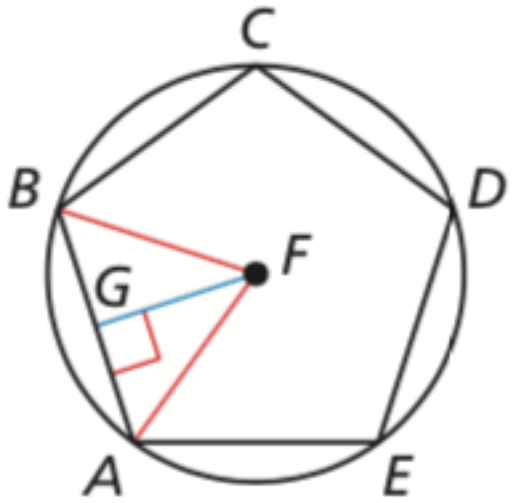
Question: What is **special** about the triangle ΔABF?

Solve for these angles

a) $m\angle AFB$

b) $m\angle AFG$

c) $m\angle GAF$

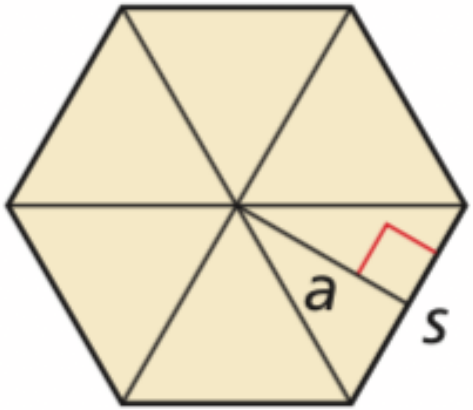


11.3 Areas of Polygons

Calculating Area

Consider the apothem, angle measures, side lengths, and any other features of a regular polygon.

With a partner, determine how you would calculate the area of a regular polygon.



11.3 Areas of Polygons

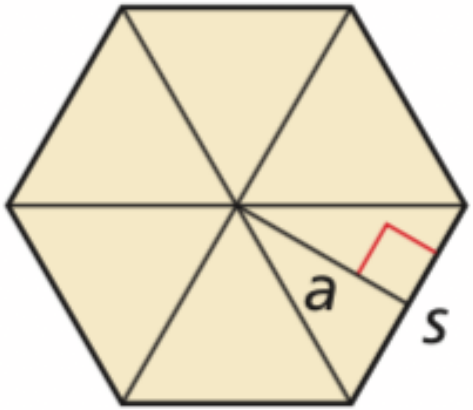
Area of a Regular Polygon

A = (Area of a one triangle) (Number of triangles)

$$A = \left(\frac{1}{2}s \cdot a\right)n$$

Area of a Regular Polygon

$$A = \frac{1}{2}a\left(n \cdot s\right) = \frac{1}{2}a \cdot P$$

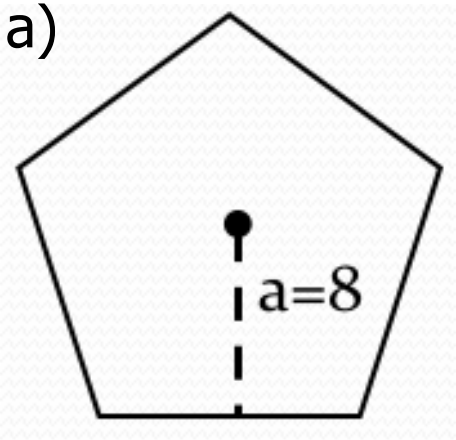


11.3 Areas of Polygons

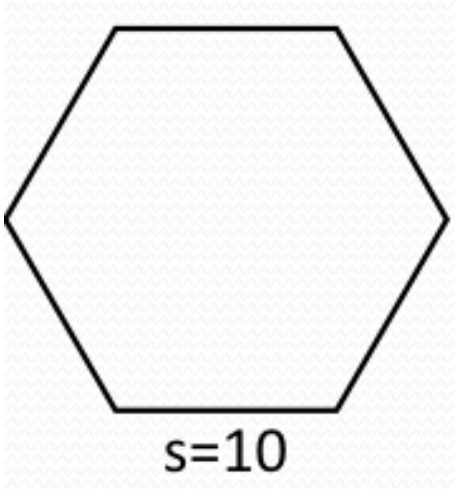
Examples

Calculate the areas of these regular polygons.

a)



b)



Area of a Regular Polygon

$A = \frac{1}{2}a\left(n \cdot s\right) = \frac{1}{2}a \cdot P$