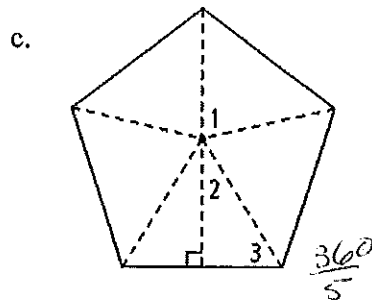
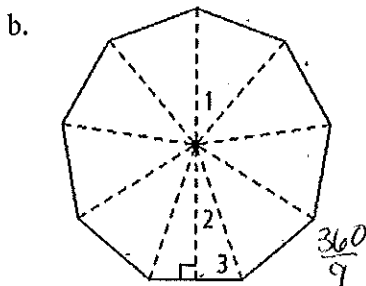
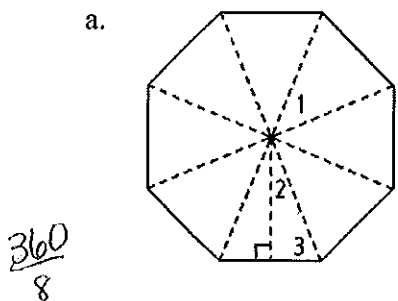


1. Each regular polygon has radii and apothem as shown. Find the measure of each numbered angle.



$m\angle 1 = 45^\circ$   $m\angle 2 = 22.5^\circ$   $m\angle 3 = 67.5^\circ$      $m\angle 1 = 40^\circ$   $m\angle 2 = 20^\circ$   $m\angle 3 = 70^\circ$      $m\angle 1 = 72^\circ$   $m\angle 2 = 36^\circ$   $m\angle 3 = 54^\circ$

2. Find the area of each regular polygon with the given apothem  $a$  and side length  $s$ .

a. pentagon,  $a = 4.9$  in.,  $s = 7.1$  in.

$A = \frac{1}{2}ap$      $p = 7.1(5)$   
 $A = \frac{1}{2}(4.9)(35.5)$      $35.5$   
 $86.975$

b. hexagon,  $a = 12.1$  ft,  $s = 14$  ft

$A = \frac{1}{2}(12.1)(84)$      $p = 14(6)$   
 $508.2$      $84$

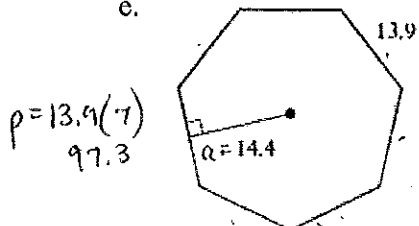
c. dodecagon,  $a = 40.6$  m,  $s = 21.7$  m

$p = (12)(21.7)$      $A = \frac{1}{2}(40.6)(260.4)$   
 $260.4$      $5286.12$

d. nonagon,  $a = 50.9$  m,  $s = 37$  m

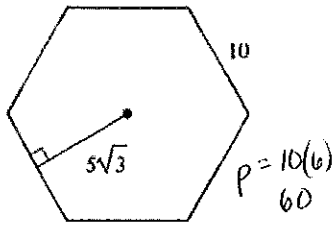
$A = \frac{1}{2}(50.9)(333)$      $p = 9(37)$   
 $8474.85$      $333$

e.



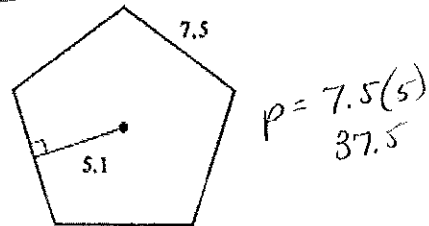
$p = 13.9(7)$      $A = \frac{1}{2}(14.4)(97.3)$   
 $97.3$      $700.56$  sq. un.

f.



$A = \frac{1}{2}(5\sqrt{3})(60)$      $p = 10(6)$   
 $A = 150\sqrt{3}$      $60$   
 or  $259.81$

g.



$A = \frac{1}{2}(5.1)(37.5)$      $p = 7.5(5)$   
 $95.625$      $37.5$

3. Find the approximate perimeter of a regular polygon if  $a = 9$  m and  $A = 259.2$  m<sup>2</sup>.

$A = \frac{1}{2}ap$   
 $259.2 = \frac{1}{2}(9)p$   
 $259.2 = 4.5p$   
 $p = 57.6$  m

4. Find the length of each side of a regular n-gon if  $a = 80$  feet,  $n = 20$ , and  $A = 20,000$  square feet.

$A = \frac{1}{2}ap$   
 $20,000 = \frac{1}{2}(80)p$   
 $20,000 = 40p$   
 $500 = p$   
 $\text{peri.} = \frac{500}{20 \text{ sides}} = 25 \text{ ft each side}$

8

5. A stop sign is a regular octagon. Each side of the sign is 12.6 in. long. The area of the stop sign is 770 in.<sup>2</sup>. What is the length of the apothem to the nearest whole number?

$$p = \frac{8(12.6)}{100.8}$$

$$A = \frac{1}{2}(a)p$$

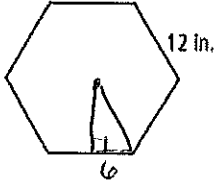
$$770 = \frac{1}{2}a(100.8)$$

$$770 = 50.4a$$

$$a = 15.27 \approx 15 \text{ in}$$

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

a.



$$p = 12(6)$$

$$72$$

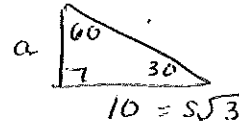
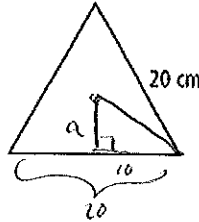
$$a = 6\sqrt{3}$$

$$A = \frac{1}{2}(6\sqrt{3})(72)$$

$$A = 216\sqrt{3} \approx$$

$$A \approx 374.12 \text{ in}^2$$

b.



$$p = 20(3)$$

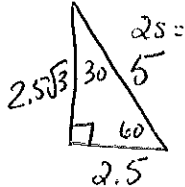
$$60$$

$$s = \frac{10\sqrt{3}}{3} = a$$

$$A = \frac{1}{2}\left(\frac{10\sqrt{3}}{3}\right)(60)$$

$$\frac{300\sqrt{3}}{3} \approx 100\sqrt{3} \approx 173.2 \text{ cm}^2$$

7. Your math teacher draws a regular hexagon with a circle circumscribed around it. The radius of the circle is 5 m. To the nearest tenth, what is the area of the hexagon?



$$a = 2.5\sqrt{3}$$

$$p = 5(6)$$

$$30$$

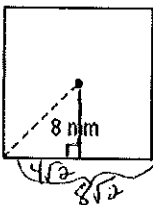
$$A = \frac{1}{2}(2.5\sqrt{3})(30)$$

$$37.5\sqrt{3}$$

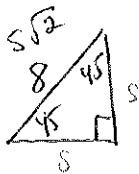
$$64.95 \approx 65.0 \text{ m}^2$$

8. Find the area of each regular polygon with the given radius or apothem. If your answer is not an integer, leave it in simplest radical form.

a.



$$p = 32\sqrt{2}$$



$$s\sqrt{2} = 8$$

$$s = \frac{8}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{8\sqrt{2}}{2}$$

$$s = 4\sqrt{2}$$

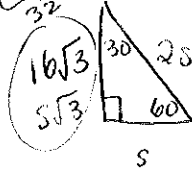
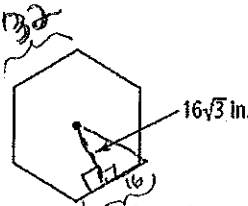
$$a = 4\sqrt{2}$$

$$p = 32\sqrt{2}$$

$$A = \frac{1}{2}(4\sqrt{2})(32\sqrt{2})$$

$$64 \cdot 2 = 128 \text{ mm}^2$$

b.



$$s = 16$$

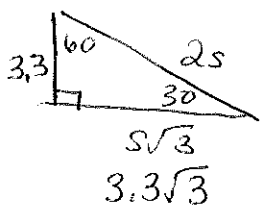
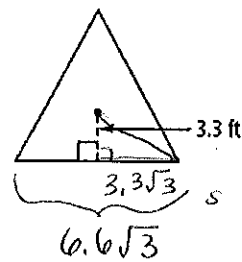
$$p = 32(6)$$

$$192$$

$$A = \frac{1}{2}(16\sqrt{3})(192)$$

$$1536\sqrt{3}$$

c.



$$p = (6.6\sqrt{3})(3)$$

$$19.8\sqrt{3}$$

$$A = \frac{1}{2}(6.6)(19.8\sqrt{3})$$

$$32.67\sqrt{3} \text{ ft}^2$$

$$\approx 56.59$$