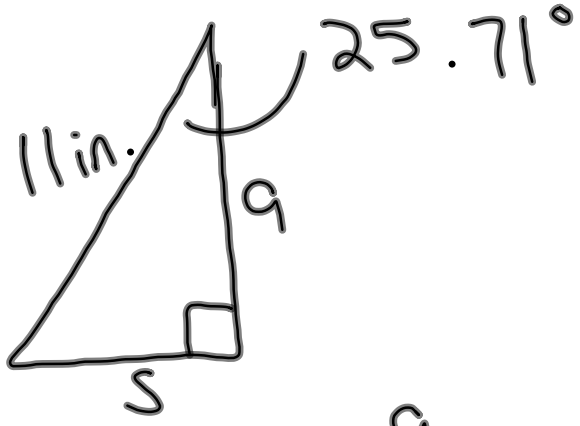
Bellwork
04/26/12

1. Find a side length and the apothem of a *heptagon* when given a radius of 11 in.



$\cos 25.71 = \frac{a}{11}$

$a = 11 \cdot \cos 25.71$

$a = 9.91$

$\sin 25.71 = \frac{s}{11}$

$s = 11 \cdot \sin 25.71$

$s = 4.77$

$S = 9.54$

Geometry
11.6b Areas of Regular Polygons
Standard(s): 2, 4

Vocabulary:

Center of a Polygon: The center of the circumscribed circle.

Radius of a Polygon: Radius of the circumscribed circle.

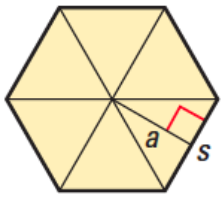
Apothem of a Polygon: The distance from the center to any side of the polygon.

Central Angle of a Regular Polygon: An angle formed by two radii drawn to consecutive vertices of the polygon.

THEOREM *For Your Notebook*

THEOREM 11.11 Area of a Regular Polygon

The area of a regular n-gon with side length s is one half the product of the apothem a and the perimeter P, so $A = \frac{1}{2}aP$, or $A = \frac{1}{2}a \cdot ns$.



$A = \frac{1}{2} a P$ ← Perimeter

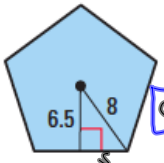
↑ apothem

1. apothem?

2. Side length?

Find the Area

Find the perimeter and the area of the polygon. Round to the nearest tenth, if necessary.



$a = 6.5$

$8^2 = s^2 + 6.5^2$

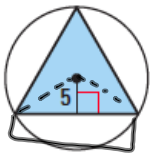
$s = 4.66$

$S = 9.33$

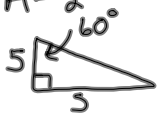
$P = 46.64$

$A = \frac{1}{2}(6.5)(46.64)$

$A = 151.57 \text{ un}^2$



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



$\frac{360}{3} = \frac{120}{a}$

$\tan 60 = \frac{s}{5}$ $\quad a = 5$

$s = 5 \cdot \tan 60$

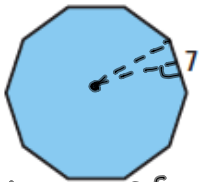
$s = 8.66$

$S = 17.32$

$P = 51.96$

$A = \frac{1}{2}(5)(51.96)$

$A = 129.90 \text{ un}^2$



$P = 7 \cdot 10 = 70$

$\frac{360}{10} = \frac{36}{2} = 18°$

$\tan 18 = \frac{3.5}{a}$

$a = \frac{3.5}{\tan 18}$

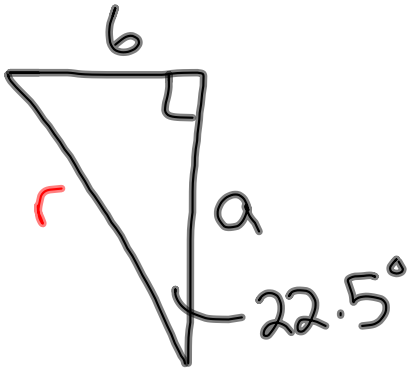
$a = 10.77$

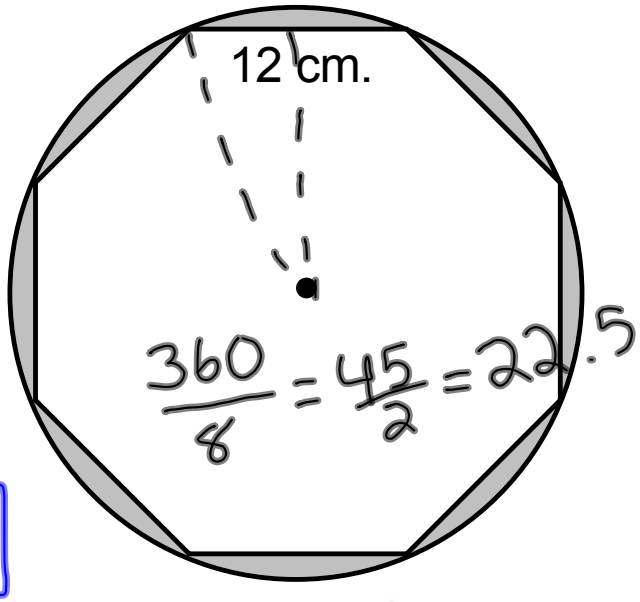
$A = \frac{1}{2}(10.77)(70)$

$A = 377.02 \text{ un}^2$

Area of Shaded Regions

Find the area of the shaded region.





$P = 12 \cdot 8 = 96 \text{ cm}$

$\tan 22.5 = \frac{6}{a}$

$a = \frac{6}{\tan 22.5}$

$a = 14.49 \text{ cm}$

$A = \frac{1}{2}(14.49)(96)$

$A = 695.29 \text{ cm}^2$

$A = r^2\pi$

$\sin 22.5 = \frac{6}{r}$

$r = \frac{6}{\sin 22.5}$

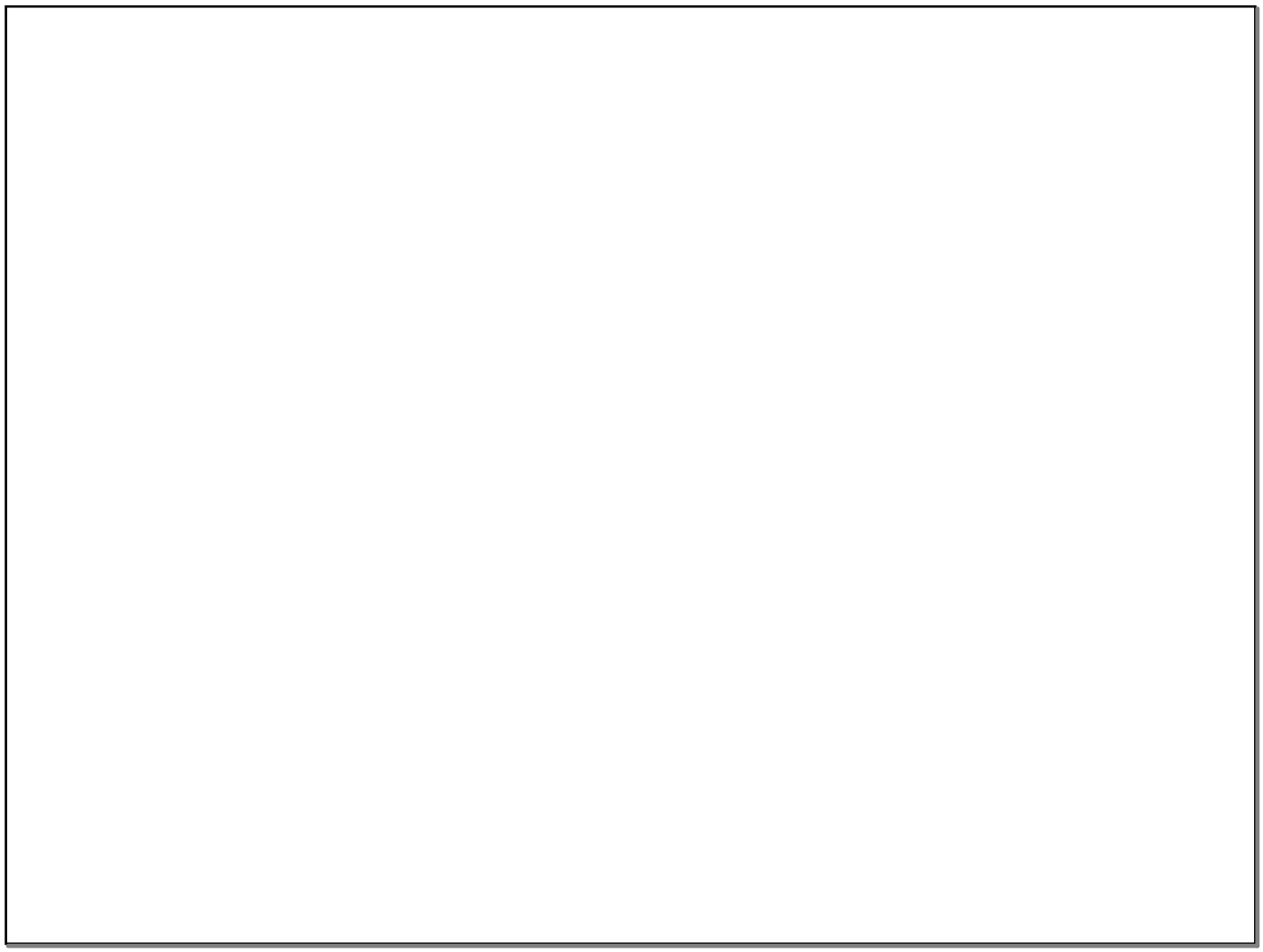
$r = 15.68$

$A = (15.68)^2\pi$

$A = 772.28 \text{ cm}^2$

$772.28 - 695.29$

$A = 76.99 \text{ cm}^2$

Homework Assignment

Pg. 765-766
#14-21, 23-28