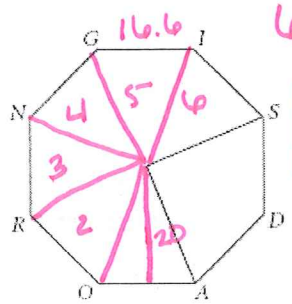
Name: Key

Area of Regular Polygons Homework

Find the area of the shaded figure.

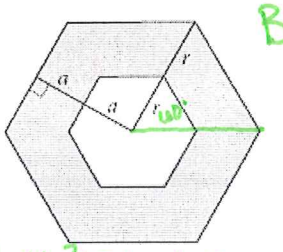
1. Find the area of the shaded region of the regular octagon ROADSIGN. The apothem measures 20 cm. Segment GI=16.6cm. Round to the nearest square centimeter.



$6\frac{1}{2}16.6\times 20$

$\boxed{A=996cm^2}$

2. Find the area of the shaded regular hexagonal donut. The apothem and sides of the smaller hexagon are half as long as the apothem and sides of the larger hexagon. a=6.9cm and r=8cm.

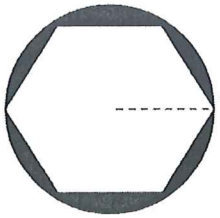


Big − little

$A=6\frac{1}{2}16^2\sin 60-6\frac{1}{2}8^2\sin 60$

$\boxed{A\approx 498.8cm^2}$

3.



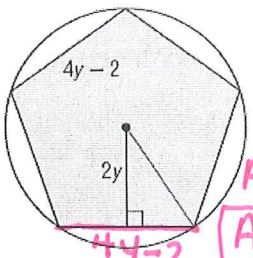
A = circle − hexagon

$A=\pi 7^2-6\frac{1}{2}7\cdot 7\sin 60$

$A=49\pi-127.3$

$\boxed{A\approx 26.64m^2}$

4. Find the polynomial for the area of the shaded region



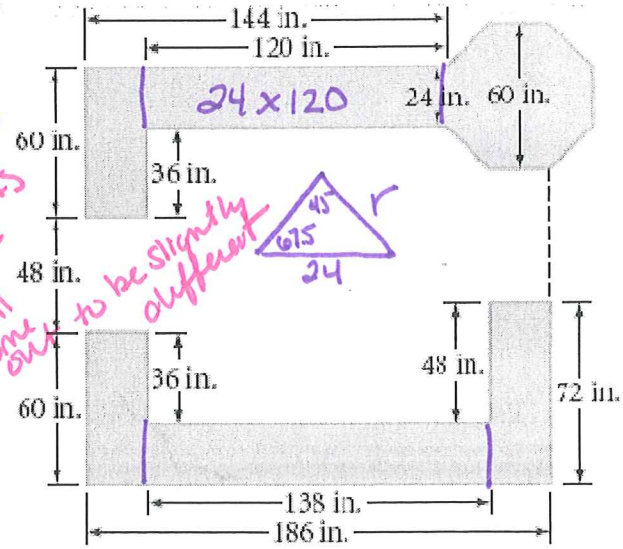
$A=5\frac{1}{2}b\cdot h$

$A=5\frac{1}{2}(4y-2)2y$

$A=2.5(8y^2-4y)$

$\boxed{A=20y^2-10y}$

5. *Application* An interior designer created the kitchen plan shown. The countertop will be constructed of colored concrete. What is its total surface area? If concrete countertops 1.5 inches thick cost $85 per square foot, what will be the total cost of this countertop?



r = 31.36

$A=8\frac{1}{2}(31.36)^2\sin 45+24\times 120+60\times 24+60\times 24+138\times 24+72\times 24$

B/c of big #s if you use $8\frac{1}{2}b\cdot h$ it will come out to be slightly different

$\boxed{A=13581.62in^2}$

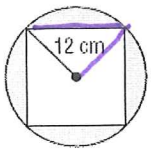
convert to sq. feet = ÷144 = 94.32ft²

94.32 × $85 = subtotal = $8,017.20

tax included: $8498.23

Find the area of the shaded region, round to the nearest tenth.

6.

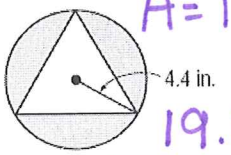


$A = \pi 12^2 - 4\frac{1}{2} 12 \cdot 12 \sin 90$

$A = 144\pi - 288$

$A \approx 164.4\ cm^2$

7.

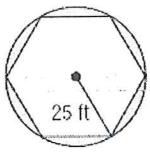


$A = \pi 4.4^2 - 3\frac{1}{2}(4.4)^2 \sin 120$

$19.36\pi - 25.1$

$A = 35.7\ in^2$

8.



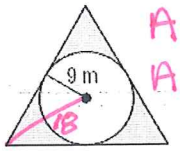
Circle − hexagon

$\pi 25^2 - 6\frac{1}{2} 25^2 \sin 60$

$625\pi - 1623.79$

$A \approx 339.7\ ft^2$

9.



$A = \triangle - \bigcirc$

$A = 3\frac{1}{2} 18^2 \sin 120 - \pi 9^2$

$= 420.89 - 81\pi$

$A = 166.4\ m^2$

10. A display case in a jewelry store has a base in the shape of a regular octagon. The length of each side of the base is 10 inches. The owners of the store plan to cover the base in black velvet.

a. Find the area of the base of the display case.

$\frac{\sin 45}{10} = \frac{\sin 67.5}{r}$

$r = 13.07 =$

$A = 8\frac{1}{2}(13.07)^2 \sin 45$

$A = 483.2\ in^2$

if students used $r = 13$ then $A = 478.0\ in^2$

b. Find the number of square yards of fabric needed to cover the base.

w/ $A = 483.2\ in^2$

$\div 1{,}296$

$= .37\ yd^2$

$1yd = 3ft$
$36in$

$1yd^2 = 1296\ in^2$

$1yd = 3ft$
$= 36in$

If $A = 478\ in^2$

$\div 1296$

$= .368$

$= .37\ yd^2$

11. Ricardo designs a square pool with surrounding pool deck according the plan shown. The outer edge of the deck is a regular dodecagon with side length 20 ft.

Followtherd steps

a. What is the area of the pools surface?

Not as helpful as apothem

Find radius

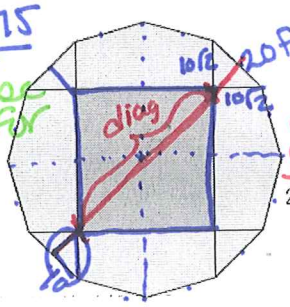
$\frac{\sin 30}{20} = \frac{\sin 75}{r}$

$r = 38.6$

use for

$d = 77.2$

or Find Apothem

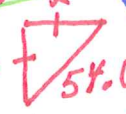


(2) diag is the doubled apothem − the 2 heights of Δ.

(3) diag of square is 2 apothem − 10 − 10

$diag = 54.6\ ft$

(4)



$x^2 + x^2 = 54.6^2$

$2x^2 = 54.6^2$

$x^2 = 1490.58$

$x = 38.6\ ft$

(5) Area of pool = b·h

38.6×38.6

$A = 1489.96\ ft^2$

b. What is the area of deck?

Area of deck

dodeca − square

$A = 12\frac{1}{2}(38.6)^2 \sin 30 - 1489.96$

$A \approx 2979.92\ ft^2$

$r = 38.6$

$\tan 75 = \frac{a}{10}$

$a \approx 37.3$ make Red go thru diag of circle