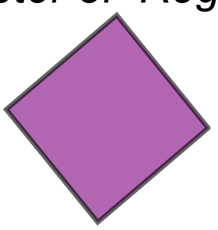
AGENDA - Unit 9 -6

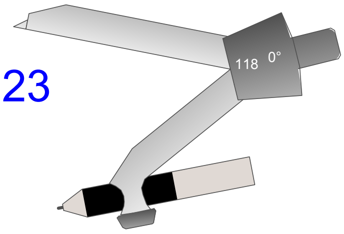
Applications of Area and Perimeter of Regular Polygons



Go over HW 9.5

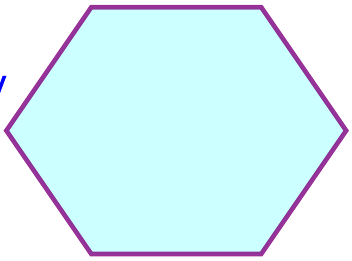
- Notes 9.6

HW - 9.6



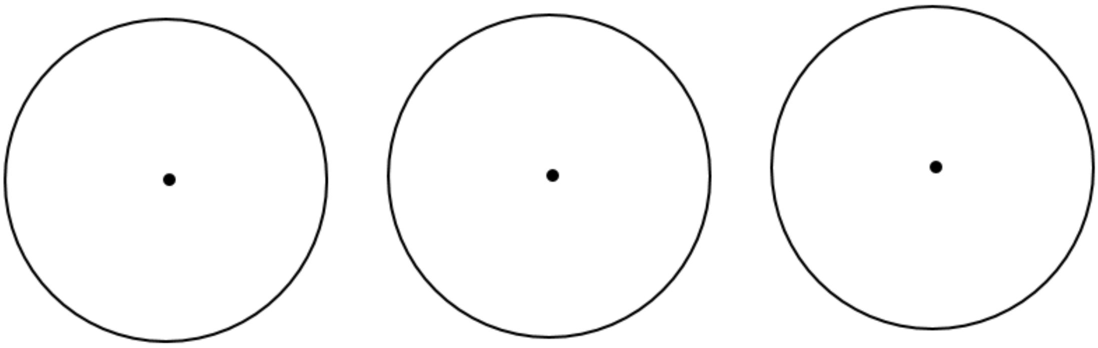
- TEXT BOOK: p. 609-611 #6, 10, 13, 23

- CR #8 - Due Today

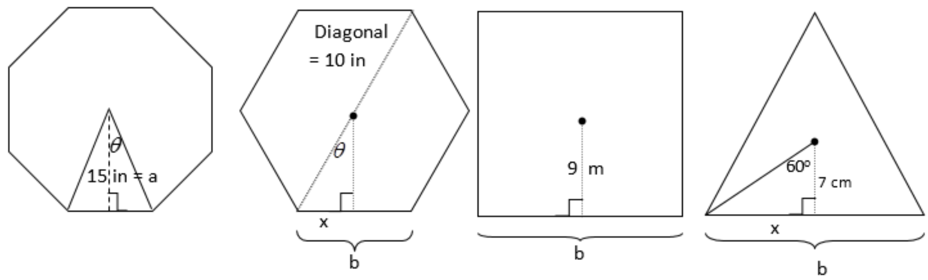


WORKSHEET 9-4R & 9-5L

1. Construct the following:
   Inscribed Regular Hexagon   Inscribed Square   Inscribed Equilateral Triangle



2. Fill in the chart with all the dimensions for each of the regular polygons using the given information:



Central Angle				
θ				
a				
x				
b = side length				

3. Look back at both the notes and the worksheet polygons – when was the height of the polygon equal to double the apothem? ____________________

4. A stop sign is a regular octagon which comes in one of two sizes.
   a. Compute the area, to the nearest tenth, of the sign that is 30 inches high (not the diagonal; the height in regular polygon with an even number of sides is equal to twice the apothem length, which is what you hopefully found in #3). USE THE INFORMATION YOU ALREADY PUT IN THE CHART IN #2.

$$A_8 = \frac{bh}{2} = \frac{(12.4264)(15)}{2}$$

745.6 IN²

   b. If the entire sign is to be painted with a base coat of red paint, how many gallons of paint will need to be purchased for 50 signs? One gallon of this paint covers 400 square feet.

$$745.6\ \cancel{IN}^2 \cdot \frac{1\ FT}{12\ \cancel{IN}} \cdot \frac{1\ FT}{12\ \cancel{IN}} =$$

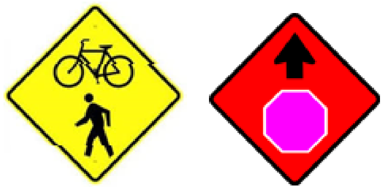
5.1778 FT²

1 SIGN =

50 SIGNS = 50( ) 258.89 FT²

$$\frac{GALLONS}{FT^2} : \frac{x}{258.89} = \frac{1}{400}$$

0.6472 GAL

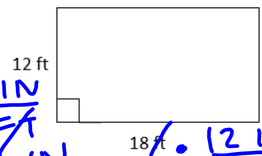


Challenge: which sign requires less metal to produce – the square sign alerting a "stop ahead" with an apothem of 11 inches or the square bike & pedestrian crossing sign with a diagonal of 30 inches? Express your answer as a percent difference from the sign with a smaller area.

9-6 Notes: Applications of Composite Figures

Applications of the figures we've been studying usually involve word problems with dimensional analysis. That is, we need to analyze the units carefully and use conversions appropriately.

1) Tom is buying tile for a 12 ft by 18 ft rectangular kitchen floor. He needs to buy 15% extra in case some of the tiles break. The tiles are squares with 4 inch sides that come in cases of 100. How many cases should he buy?



$A = bh$

$= (216\text{ IN})(144\text{ IN})$

$A_{FLOOR} = 31104\text{ IN}^2$

$12\,\cancel{FT} \cdot \frac{12\text{ IN}}{1\,\cancel{FT}} = 144\text{ IN}$

$18\,\cancel{ft} \cdot \frac{12\text{ IN}}{1\,\cancel{FT}} = 216\text{ IN}$

$A_{TILE} = bh = (4)(4) = 16\text{ IN}^2$

$\frac{\text{TOTAL AREA}}{\text{TILE AREA}} : \frac{31104\,\cancel{IN^2}}{16\,\cancel{IN^2}/\text{TILE}} = 1944\text{ TILE}$

15% MORE: $1944(0.15) = 291.6$

TOTAL: 2235.6

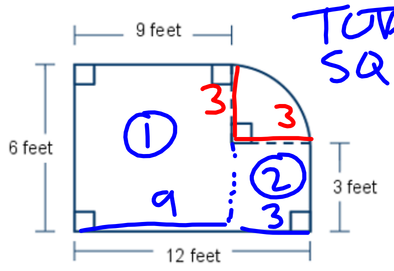
BOXES: $\frac{\text{TOTAL \#}}{\text{CASE}}$

2236 TILES

$\frac{2236\text{ TILES}}{100\text{ TILES/CASE}} = 22.36\text{ CASES}$

$\boxed{23\text{ CASES}}$

2) Carpet is to be installed in the room drawn at right. It can be ordered at $3.50 per square foot plus a $100 installation fee. How much will it cost to carpet the room?



Not drawn to scale

TOTAL SQ FT = $A_{RECT\,1} + A_{RECT\,2} + \frac{1}{4}A_{\odot}$

$A = bh$
$= (9)(6)$
$= 54\ FT^2$

$A = bh$
$= (3)(3)$
$= 9\ FT^2$

C
$A = \pi r^2 =$
$\boxed{R = 3}$
$\pi 3^2 = 9\pi\ FT^2$

TOTAL SQ FT $= 54 + 9 + \frac{1}{4}(9\pi)$
$= 63 + 2.25\pi = 70.0685\ FT^2$

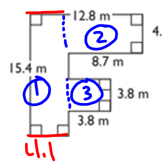
TOTAL COST = CARPET COST + INSTALL FEE

$= \frac{\$3.50}{FT^2}(70.0685\ FT^2) + \$100$

$= \boxed{\$345.24}$

3) A university wants to repaint the letter F on the football field. One 32 oz bottle of concentrate yields 2.75 gallons and covers 600 square feet for $34.95. How much will it cost to paint the letter?
Note: 1 meter = 3.28084 feet.

$12.8 - 8.7 = 4.1$



AREA F = AREA RECT 1 + RECT 2 + RECT 3

$= bh$
$= (4.1)(15.4)$
$= 63.14$

$= bh$
$= (8.7)(4.9)$
$= 42.63$

$= bh$
$= (3.8)(3.8)\ m^2$
$= 14.44$

AREA F $= 63.14 + 42.63 + 14.44 = 120.21\ m^2$

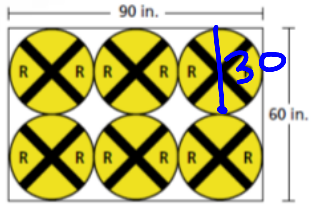
CONVERT: $120.21\ \cancel{m^2} \cdot \frac{3.28084\ FT}{1\ \cancel{m}} \cdot \frac{3.28084\ FT}{1\ \cancel{m}}$
$= 1293.9297\ldots$
$= 1293.9297\ FT^2$

BOTTLES : SQ FT $\quad \frac{1}{600} = \frac{x}{1293.9297}$
$600x = 1293.9297$
$x = \frac{1293.9297}{600}$
2.1565 BOTTLES

BUY 3

COST: 3 BOTTLES $(\$34.95/\text{BOTTLE})$
$\boxed{= \$104.85}$

4) A railroad crossing sign is a circle with a diameter of 30 in. The manufacturer can make 6 of these signs from the sheet of aluminum that is 90 in by 60 in by arranging them as shown. How much aluminum is left over once the signs have been made?



LEFTOVER = $A_{RECT} - 6A_{\odot}$

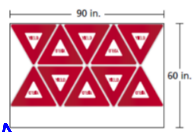
$A = bh$
$= (90)(60)$
$= 5400 \text{ IN}^2$

C
$A = \pi r^2 = \pi 15^2 = 225\pi \text{ IN}^2$
$R = 15 \text{ IN}$
$\boxed{D = 30 \text{ IN}}$

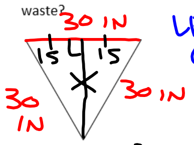
LEFTOVER $= 5400 - 6(225\pi)$
1158.8499 IN^2

$\boxed{1158.8 \text{ IN}^2}$

4) A railroad crossing sign is a circle with a diameter of 30 in. The manufacturer can make 6 of these signs from the sheet of aluminum that is 90 in by 60 in by arranging them as shown. How much aluminum is left over once the signs have been made?



The manufacturer can also make 10 yield signs that are equilateral triangles with sides 30 in long. The making of which sign results in the least amount of waste?



$a^2 + b^2 = c^2$
$15^2 + x^2 = 30^2$
$225 + x^2 = 900$
$x^2 = 675$
$x = \pm\sqrt{675}$
25.9808

LEFT OVER $= A_{RECT} - 10A_{\Delta\text{'s}}$

$A = 5400 \text{ IN}^2$

$A = \frac{bh}{2}$
$= \frac{30(\sqrt{675})}{2}$
$= 389.7114 \text{ IN}^2$

LEFT OVER $= 5400 - 10(389.7114)$
1502.8857
$\boxed{1502.9 \text{ IN}^2}$

LESS WASTE IS RR ⊙ SIGNS