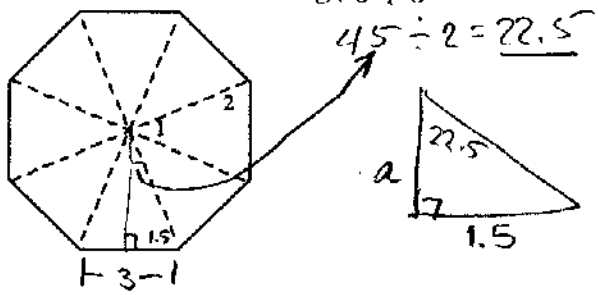
Area Worksheet II

Name Key

1. Find the area of a regular octagon with a side length of 3 ft.



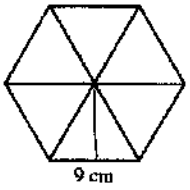
$360 \div 8 = 45$
$45 \div 2 = 22.5$

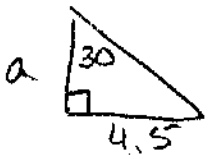
$P = 3 \cdot 8$
$P = 24$

$\frac{\tan 22.5}{1} = \frac{1.5}{a}$
$a = 1.5 \div \tan 22.5$
$a = 3.6$

$A = \frac{1}{2} Pa$
$A = \frac{1}{2}(24)(3.6)$
$A = 43.2 \text{ ft}^2$

2. You are planning to use a ceramic tile design in your new bathroom. The tiles are blue and white equilateral triangles. You decide to arrange the blue tiles in a hexagonal shape as shown. If the side of each tile measures 9 centimeters, what will be the exact area of each hexagonal shape?





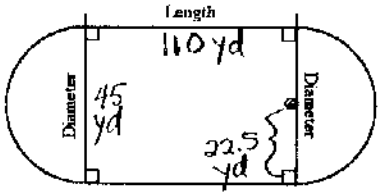
$360 \div 6 = 60$
$60 \div 2 = 30$

$\frac{\tan 30}{1} = \frac{4.5}{a}$
$a = 4.5 \div \tan 30$
$a = 7.8$

$P = 9.6$
$P = 54$

$A = \frac{1}{2} Pa$
$A = \frac{1}{2}(54)(7.8)$
$A = 210.6 \text{ cm}^2$

3. A field is to be fertilized at a cost of $.14 per square yard. The rectangular part of the field is 110 yards long and the diameter of each semicircle is 45 yards. Find the cost of fertilizing the field. Use 3.14 for π.



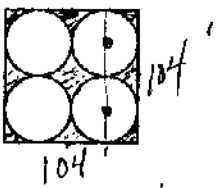
$A_{\square} = lw$
$A_{\square} = 110(45)$
$A_{\square} = 4950 \text{ yd}^2$

$A_{\odot} = \pi r^2$
$A_{\odot} = \pi(22.5)^2$
$A_{\odot} = 1589.6 \text{ yd}^2$

$A = A_{\square} + A_{\odot} = 4950 + 1589.6 = 6539.6 \text{ yd}$

$\text{Cost} = A \times .14 = 6539.6(.14) = \$915.54$

4. A rose garden is being designed as shown. The outer figure is a square with side length of 104 feet. The roses are to be planted in the four circles. The rest of the space will be covered by wood chips. What is the area of the surface that will be covered by wood chips? Explain how you find this area.



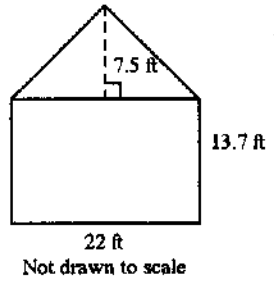
$r = 26'$

$A_{\square} = s^2$
$A = 104^2$
$A = 10816 \text{ ft}^2$

$A_{\odot} = \pi r^2$
$A_{\odot} = \pi 26^2$
$A_{\odot} = 2122.6 \text{ ft}^2$
$\times 4 \odot s$
$A_{4\odot} = 8490.4$

$A = A_{\square} - A_{4\odot s}$
$A = 10816 - 8490.4$
$A = 2325.6 \text{ ft}^2$

5. When designing a building, you must be sure that the building can withstand hurricane-force winds, which have a velocity of 73 mi/h or more. The formula $F = 0.004Av^2$ gives the force F in pounds exerted by a wind blowing against a flat surface. A is the area of the surface in square feet, and v is the wind velocity in miles per hour. How much force is exerted by a wind blowing at 82 mi/h against the side of the building shown?



$A_\Delta = \frac{1}{2}bh$ $A_\square = lw$

$A_\Delta = \frac{1}{2}(22)(7.5)$ $A_\square = (22)(13.7)$

$A_\Delta = 82.5 ft^2$ $A_\square = 301.4$

$A = A_\Delta + A_\square$

$A = 82.5 + 301.4$

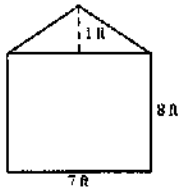
$A = 383.9 ft^2$

$F = .004 A v^2$

$F = .004(383.9)(82)^2$

$F = 10325.4$ lbs

6. The diagram shows the dimensions of the front of a storage building. What is the area of the entire front of the building?



$A_\Delta = \frac{1}{2}bh$ $A_\square = lw$

$A_\Delta = \frac{1}{2}7 \cdot 1$ $A_\square = 7 \cdot 8$

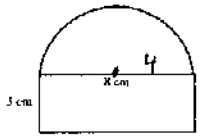
$A_\Delta = 3.5 ft^2$ $A_\square = 56 ft^2$

$A_{front} = A_\Delta + A_\square$

$3.5 + 56$

$A_{front} = 59.5 ft^2$

7. Find the area of the figure to the nearest square unit.



$A_\square = \frac{1}{2}\pi r^2$ $A_\square = lw$

$A_\square = \frac{1}{2}\pi 4^2$ $8 \cdot 3$

$A_\square = \frac{1}{2}\pi 16 = 8\pi$ $A_\square = 24$

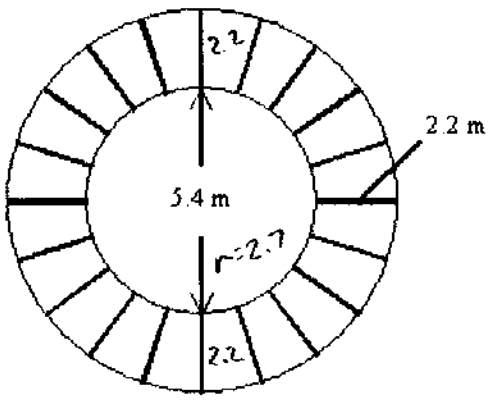
$A_\square = 25 cm^2$

$A = A_\square + A_\square$

$A = 25 + 24$

$A = 49 cm^2$

8. The figure represents the overhead view of a deck surrounding a hot tub. What is the area of the deck? Round to the nearest tenth.



$A_{Hot\ tub} = \pi r^2$

$= \pi 2.7^2$

$A_{Hot\ tub} = 22.9 m^2$

$A_{HT \& deck} = \pi r^2$

$= \pi 4.9^2$

$A_{HT + deck} = 75.4 m^2$

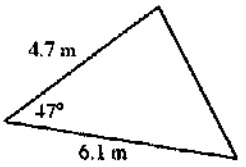
d = 9.8
r = 4.9

$A_{deck} = A_{HT + deck} - A_{HT}$

$A_{deck} = 75.4 - 22.9$

$A_{deck} = 52.5 m^2$

9. Find the area of the triangle.

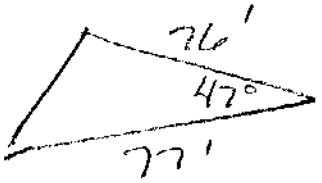


$A = \frac{1}{2}ab\sin C$

$A = \frac{1}{2}(4.7)(6.1)\sin 47$

$A = 10.5 \text{ m}^2$

10. A gardener needs to cultivate a triangular plot of land. One angle of the garden is 47°, and two sides adjacent to the angle are 77 feet and 76 feet. To the nearest tenth, what is the area of the plot of land?

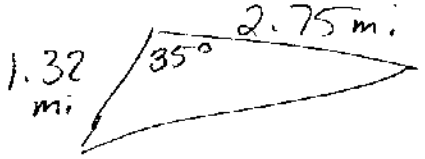


$A = \frac{1}{2}ab\sin C$

$A = \frac{1}{2}(77)(76)(\sin 47)$

$A = 2139.9 \text{ ft}^2$

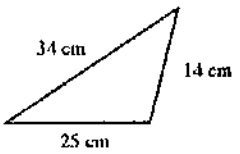
11. Divers looking for a sunken ship have defined the search area as a triangle with adjacent sides of length 2.75 miles and 1.32 miles. The angle between the sides of the triangle is 35. To the nearest hundredth, find the search area.



$A = \frac{1}{2}ab\sin C$

$A = \frac{1}{2}(1.32)(2.75)\sin 35$

$A = 1.04 \text{ mi}^2$



Drawing not to scale

12. Find the area of the triangle.

$S = \frac{a+b+c}{2}$

$S = \frac{34+14+25}{2}$

$S = \frac{73}{2} = 36.5$

$A = \sqrt{s(s-a)(s-b)(s-c)}$

$A = \sqrt{36.5(36.5-34)(36.5-25)(36.5-14)}$

$A = \sqrt{36.5(2.5)(11.5)(22.5)}$

$A = \sqrt{23610.9}$

$A = 153.7 \text{ cm}^2$