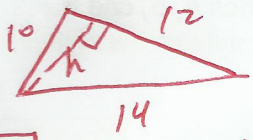
Geometry Worksheet
Heron's Formula & Circle Areas

Name KEY
Date _____ Period _____

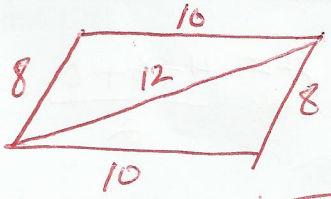
1. Given a triangle with sides 10, 12, and 14 inches long, find the length of the altitude upon the 12 inch side.



$s = 18$
$A = \sqrt{18(8)(6)(4)}$
$A = \sqrt{9 \cdot 2 \cdot 2 \cdot 4 \cdot 6 \cdot 4}$
$A = 4 \cdot 2 \cdot 3\sqrt{6}$
$A = 24\sqrt{6}$

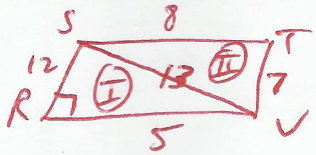
$A = \frac{bh}{2}$
$24\sqrt{6} = \frac{12h}{2}$
$h = 4\sqrt{6}$ u

2. Find the area of a parallelogram with two adjacent sides 8 inches and 10 inches long and one diagonal 12 inches long.



$s = 15$
$A = \sqrt{15(7)(5)(3)}$
$= \sqrt{15\sqrt{7}^4}$
$A_{\square} = 30\sqrt{7}$ u²

3. Find the area of quadrilateral RSTV if m∠R = 90, RS = 12, ST = 8, TV = 7, and VR = 5

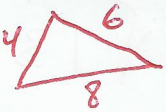


$A_I = \frac{bh}{2} = \frac{5(12)}{2}$
$A_I = 30$

$A_{II} = \sqrt{14(6)(1)(7)}$
$= \sqrt{7 \cdot 2 \cdot 2 \cdot 3 \cdot 7}$
$A_{II} = 14\sqrt{3}$

$A = 14\sqrt{3} + 30$ u²

4. Given a triangle with sides 4, 6 and 8 inches long, find the length of the altitude upon the shortest side.



$s = 9$; $A = \sqrt{9(5)(3)(1}$
$A = 3\sqrt{15}$

$A = \frac{bh}{2}$
$3\sqrt{15} = \frac{4h}{2}$
$h = \frac{3\sqrt{15}}{2}$ u

5. Find the area and circumference of a circle whose radius is 7.

$A = \pi r^2$
$A = 49\pi$ u²

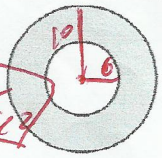
$C = 2\pi r$
$C = 14\pi$ u

6. Find the area and circumference of a circle whose diameter is 10. $r = 5$

$A = \pi r^2$
$A = 25\pi$ u²

$C = 2\pi r$
$= 10\pi$ u

7. Find the area of the region bounded by two concentric circles with radii 10 inches and 6 inches.



$A_{lg.} = 100\pi$
$A_{sm.} = 36\pi$
$100\pi - 36\pi = 64\pi$ u²

8. The size of a bicycle is determined by the diameter of the wheel. If the bicycle is a 26" bike, and the wheel turns 10,000 revolutions, how far did the bicycle travel?

$d = 26$; $r = 13$
$C = 2\pi r = 26\pi$; let $\pi \approx 3.14$
$C \approx 26(3.14) \approx 81.64$
$(10{,}000)(81.64) \approx 816400$ inches or $\approx 68{,}033$ ft.

9. In order to travel a mile (5280 ft), how many revolutions would the wheel have to make?

5280 ft = 63,360 inches
$63{,}360 \div 81.64 \approx 776$ revolutions

10. A track is formed around a football field by adding a semicircle to each end. How far will an athlete run if he makes one lap around the track (running on the inside of the lane)?

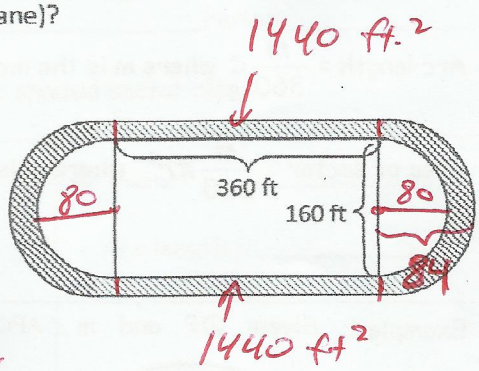
$C = 2\pi r$; $r = 80$

$C = 160\pi$

$720 + 160\pi$

OR

≈ 1222.4 ft.



11. If the track lane is to be 4 feet wide, what will the area of the lane be?

$A_{big\odot} = 7{,}056\pi$

$A_{small\odot} = 6{,}400\pi$

$Big\odot - small\odot = 656\pi$

$(2880 + 656\pi)$ ft.²

or

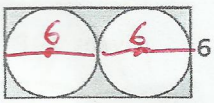
≈ 4959.84 ft.²

12. The following circles are tangent to each other and to the sides of the rectangle. Find the area of the shaded region.

$A_{\square} = 72$

$A_{2\odot} = 2(\pi r^2) = 18\pi$

$(72 - 18\pi)u^2$ or $\approx 15.48\,u^2$



13. Find the perimeter of the shaded region.

$C_{\substack{8\text{ arcs} \\ (2\odot)}} = 2(2\pi r) = 2(2)(\pi)(3) = 12\pi$

$P_{\square} = 36$

$(12\pi + 36)$ u.

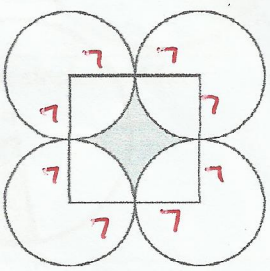
or ≈ 73.68 u.

14. The following four congruent are tangent and a square is created by joining the centers of the circles. (The side of the square has measure 14.) Find the area of the shaded region.

$A_{square} = 196$

$A_{\odot} = 49\pi$

$A_{shaded} = 196 - 49\pi\ u^2$



15. Find the perimeter of the shaded region.

$C = 2\pi r$

$C = 14\pi$ u.