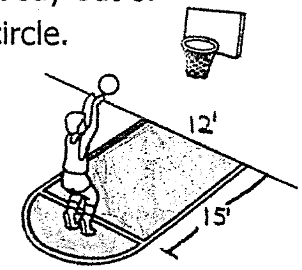
KEY

Area of Circles and Shaded Regions

1. When a basketball player is shooting a free throw, the other players must say out of the shaded region shown. This regions consists of a rectangle and semicircle. Find the area of this region to the nearest square foot. Use $\pi = 3.14$

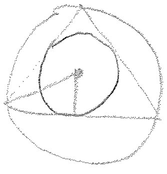


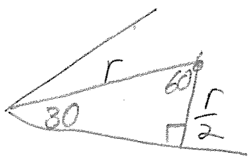
$A_{rect} + semi$

$12(15) + \frac{1}{2}\pi 6^2$

$180 + 18\pi = \boxed{\approx 237 \text{ sq. feet}}$

2. Draw an equilateral triangle and its inscribed and circumscribed circles. Find the ratio of the area of the inscribed circle to the circumscribed circle.





$A_{inscribed} : A_{circum} = \boxed{1:4}$

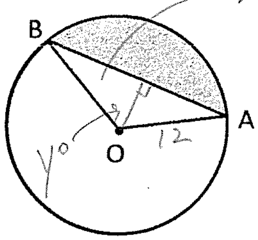
$\pi\left(\frac{r}{2}\right)^2 : \pi r^2$

$\frac{r^2\pi}{4} : r^2\pi$

3. Chord AB is 18 cm long and the radius of the circle is 12. Find the area of the shaded region. Use $\pi = 3.14$ and $\sqrt{7} = 2.646$. Round your answer to the nearest tenth.

$A_{\odot} = 144\pi$

≈ 452.16



$x^2 + 9^2 = 12^2$

$x = 3\sqrt{7}$

$A_{whole\ \triangle} = \frac{1}{2}(18)(3.7)$

$= 27\sqrt{7}$

≈ 71.442

$\sin y = \frac{9}{12} = \frac{3}{4}$

$y \approx 48.59$

$2y = 97°$

$A_{sector} = \frac{97}{360}(452.16)$

≈ 122.058

$A_{sector} - A_{\triangle} = A_{shaded}$

$122.058 - 71.442$

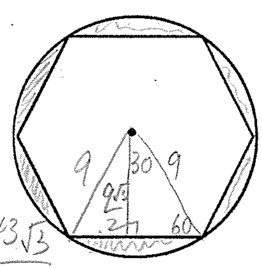
$\boxed{* 50.6 = A_{shaded}}$

4. A regular hexagon with a radius of 9 is inscribed in a circle. Find the area of the shaded region.

A_{hex} ; $a = \frac{9\sqrt{3}}{2}$

$p = 54$

$A = \frac{1}{2} \cdot \frac{9\sqrt{3}}{\cancel{2}} \cdot \frac{\cancel{(54)}^{27}}{1} = \frac{243\sqrt{3}}{2}$

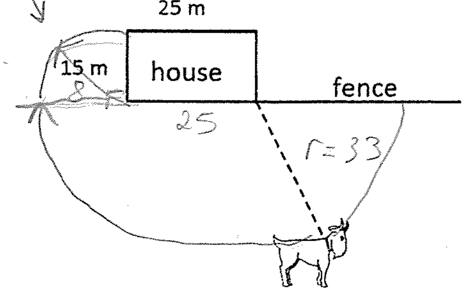


$A_{\odot} - A_{hex}$

$\boxed{81\pi - \frac{243\sqrt{3}}{2}}$

5. A goat is tied to the corner of a house on a 33 m. rope. There is a fence as shown. What is the total grazing area for the goat.

quarter of a circle



$A_{semi\ r=33} + A_{quater\ r=8} = A_{Total}$

$\pi 33^2 + \pi 8^2$

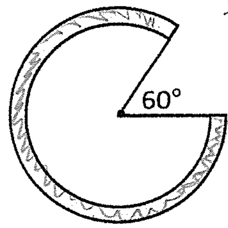
$\frac{1}{2}(1089\pi) + \frac{1}{4}(64\pi)$

$544.5\pi + 16\pi$

$\boxed{560.5\pi}$

6. The radius of the outer circle is 12. The radius of the inner circle is 9. Find the area of the shaded region.

$\frac{60}{360} = \frac{1}{6}$



$\frac{5}{6}\left(A_{outer} - A_{inner}\right) = A_{shaded}$

$\frac{5}{6}(144\pi - 81\pi)$

$\frac{5}{6} \cdot 63\pi =$

$\frac{5(63)}{6}\pi$

$\frac{105}{2}\pi \rightarrow \boxed{52.5\pi}$

7. Find the area of the shaded region. The diameter of the circle is 6.

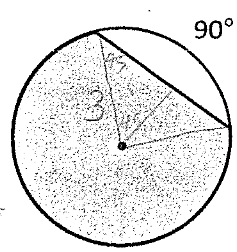
A_Δ:

$h = \frac{3\sqrt{2}}{2}$

$b = 3\sqrt{2}$

$= \frac{1}{2} 3\sqrt{2} \cdot \frac{3\sqrt{2}}{2}$

$= \frac{9}{2}$



$\frac{3}{4}(A_\odot) + A_\Delta$

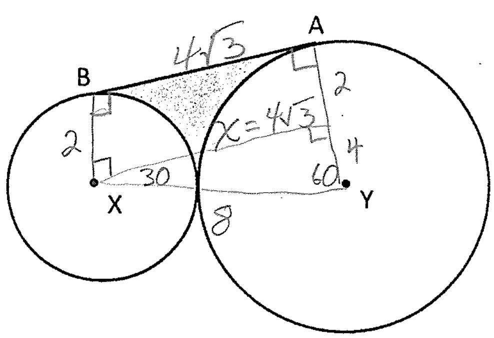
$\frac{3}{4}(9\pi) + \frac{9}{2}$

$\boxed{\frac{27\pi}{4} + \frac{9}{2}} = A_{shaded}$

8. Circle X and Y, with radii 6 and 2, are tangent to each other. $\overline{AB}$ is a common external tangent. Find the area of the shaded region.

$A_{Trap} = \frac{1}{2}(4\sqrt{3})(6+2)$

$= 16\sqrt{3}$



$A_{Trap} - A_{sm} - A_{LG} = A_{shaded}$

$16\sqrt{3} - \left(\frac{4\pi}{3} - 6\pi\right)$

$\boxed{16\sqrt{3} - \frac{22\pi}{3}}$

$A_{\substack{sm \\ sector}} = \frac{1}{3}(4\pi) = \frac{4\pi}{3}$

$A_{\substack{LG \\ sector}} = \frac{1}{6}(36\pi) = 6\pi$