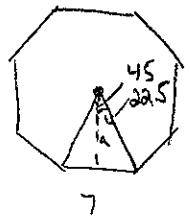
Honors Geometry
Ch11 Test Review – Harder Problems

Name Hey

1. Find the area of a regular octagon with side length 7. Round your answer to the nearest tenth.



$\tan 22.5 = \frac{3.5}{a}$

$8.4 \approx a$

$56 = P$

$A = \frac{1}{2}(8.4)(56)$

$A \approx 235.2\ u^2$

2. Which is a better buy – a paint in a 4-inch diameter can for \$10, or a paint in a 10-inch diameter can for \$30 (both cans have the same depth)?

4 in: $A = 4\pi \approx 12.56$; $\frac{\$10}{12.56} = \$0.80/in^2$

10-in: $A = 25\pi \approx 78.5$; $\frac{\$30}{78.5} \approx \$0.38/in^2$

* 10-in is better deal

3. A car wheel has a diameter of 60cm. At a speed of 80km/hour, how many times does a tire rotate per minute? 1km=1000m, 1m=100cm.

$C = \pi \cdot 60$

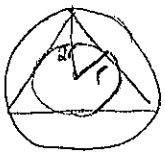
$C = 188.4\ cm = 1.884\ m$

$\frac{80000\ m}{1\ hr} \times \frac{1\ hr}{60\ min} = 1333.\overline{3}\ m/min.$

$\frac{1333.3}{1.884} = 707.7$ Rotations

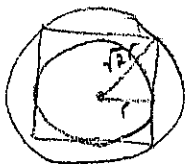
4. Find the ratio of the areas of the inscribed and circumscribed circles for:

(a) equilateral triangle,



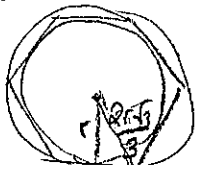
$\frac{\pi r^2}{\pi(2r)^2} = \frac{1}{4}$

(b) square



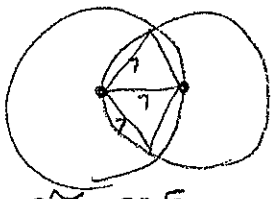
$\frac{\pi r^2}{\pi(r\sqrt{2})^2} = \frac{1}{2}$

(c) regular hexagon.



$\frac{\pi r^2}{\pi\left(\frac{2r\sqrt{3}}{3}\right)^2} = \frac{\pi r^2}{\pi\frac{12r^2}{9}} = \frac{r^2}{\frac{4r^2}{3}} = r^2 \cdot \frac{3}{4r^2} = \frac{3}{4}$

5. Two circles have radii 7cm and their centers are 7cm apart. Find the area of the region common to both circles.



$A = \frac{120}{360} \cdot \pi \cdot 7^2 = \frac{49\pi}{3}$ (1 sector)

$A = \frac{60}{360} \cdot \pi \cdot 7^2 - \frac{1}{2}(7)\left(\frac{7\sqrt{3}}{2}\right)$

$= \left(\frac{49\pi}{6} - \frac{49\sqrt{3}}{4}\right) \cdot 2 = \frac{98\pi}{6} - \frac{98\sqrt{3}}{4}$ (2 segments)

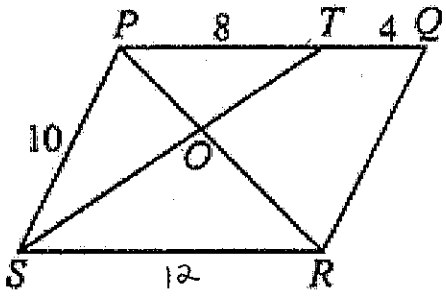
$\frac{49\pi}{3} + \frac{98\pi}{6} - \frac{98\sqrt{3}}{4}$

$\frac{196\pi}{6} - \frac{98\sqrt{3}}{4} = \boxed{\frac{98\pi}{3} - \frac{49\sqrt{3}}{2}}$

6. A regular hexagon has an area of $150\sqrt{3}cm^2$. Another regular hexagon has an area of $54\sqrt{3}cm^2$. What is the scale factor?

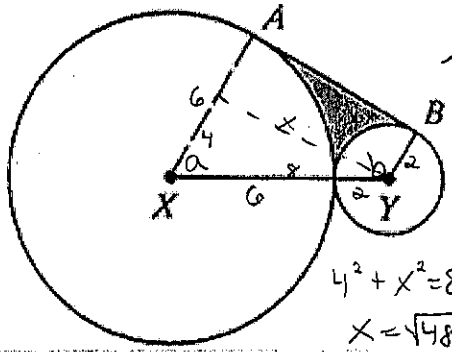
$\frac{150\sqrt{3}}{54\sqrt{3}} = \frac{150}{54} = \frac{75}{27} = \frac{25}{9} \rightarrow \boxed{\frac{5}{3}}$

7. PQRS is a parallelogram. Find the ratio of the areas of triangles PTO to RSO



$\frac{8}{12} = \frac{2}{3} \rightarrow \boxed{\frac{4}{9}}$

8. **Circles 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. (*Hint*: What kind of figure is $AXYB$? What is the measure of $\angle AXY$?)**



$A_{AXYB} = \frac{1}{2}\left(\sqrt{48}\right)(6+2)$

Trap: $A_{AXYB} = 4\sqrt{48} = 16\sqrt{3}$

Sectors: $A_1 = \frac{62.6}{360}(\pi \cdot 6^2) \approx 19.7$

$A_2 = \frac{117.4}{360}(\pi \cdot 2^2) \approx 4.1$

$\sin a = \frac{7.1}{8}$

$a \approx 62.6°$

$b = 360 - (90+90+62.6) \approx 117.4$

$4^2 + x^2 = 8^2$

$x = \sqrt{48} \approx 7.1$

$A = 16\sqrt{3} - (19.7+4.1)$

$\approx 27.7 - 23.8 \approx \boxed{3.9\ u^2}$