

All necessary work must be shown for credit. You may NOT use computers, notes or texts. All of your team members must help. You cannot have more than 3 team members. Each team member's printed name must be on the left and the written name must be on the right. Your signature means you only worked with team members on this problem.

- | | |
|----------|----------|
| 1. _____ | 1. _____ |
| 2. _____ | 2. _____ |
| 3. _____ | 3. _____ |
| 4. _____ | 4. _____ |

All of the team members above are to work on the following problems together.

1. Draw a circle of radius 1. Draw a regular hexagon inside the circle touching the circle and a regular hexagon outside the circle touching the circle. Give the area, perimeter and area to perimeter ratio of both regular hexagons. What can you say about the perimeter (circumference) and area of a circle of radius 1?

Inside

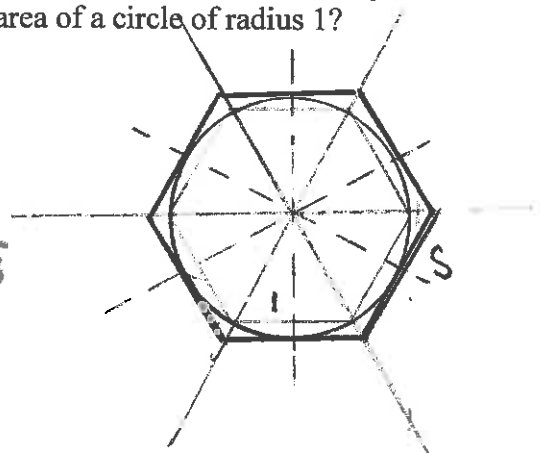
$$\left(\frac{1}{2}\right)^2 + h^2 = 1$$

$$h^2 = \frac{3}{4}$$

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

$$6 < P_c < 4\sqrt{3}$$

$$\frac{3\sqrt{3}}{2} < A_c < 2\sqrt{3}$$



$$P = 6$$

$$A = 6\left(\frac{1}{2}h\right) = 3h = \frac{3\sqrt{3}}{2}$$

$$\frac{A}{P} = \frac{\frac{3\sqrt{3}}{2}}{6} = \frac{3\sqrt{3}}{12} = \frac{\sqrt{3}}{4}$$

$$\frac{A}{P} = \frac{2\sqrt{3}}{4\sqrt{3}} = \frac{1}{2}$$

Outside:

$$\left(\frac{s}{2}\right)^2 + 1 = s^2$$

$$1 = \frac{3}{4}s^2$$

$$s^2 = \frac{4}{3}$$

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

$$P = 6s = \frac{12}{\sqrt{3}} = \frac{12\sqrt{3}}{3} = 4\sqrt{3}$$

$$A = 6\left(\frac{1}{2}s\right) = 3s = \frac{6}{\sqrt{3}} = \frac{6\sqrt{3}}{3} = 2\sqrt{3}$$

2. Draw a regular pentagon. Using your protractor and ruler draw a regular pentagon that is 1.5 times as large using proportional triangles.

