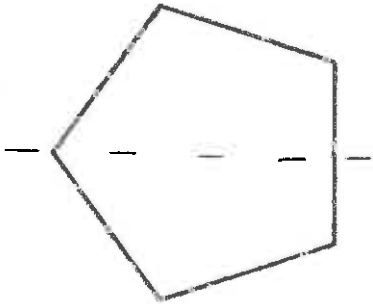


All necessary work must be shown for credit. Your work must represent the question asked. You may NOT use computers. You may use your notes or text. Your work must be neat or I will not grade your test.

I have neither received nor given help on this exam. Bon Key
(Signature) (1 point)

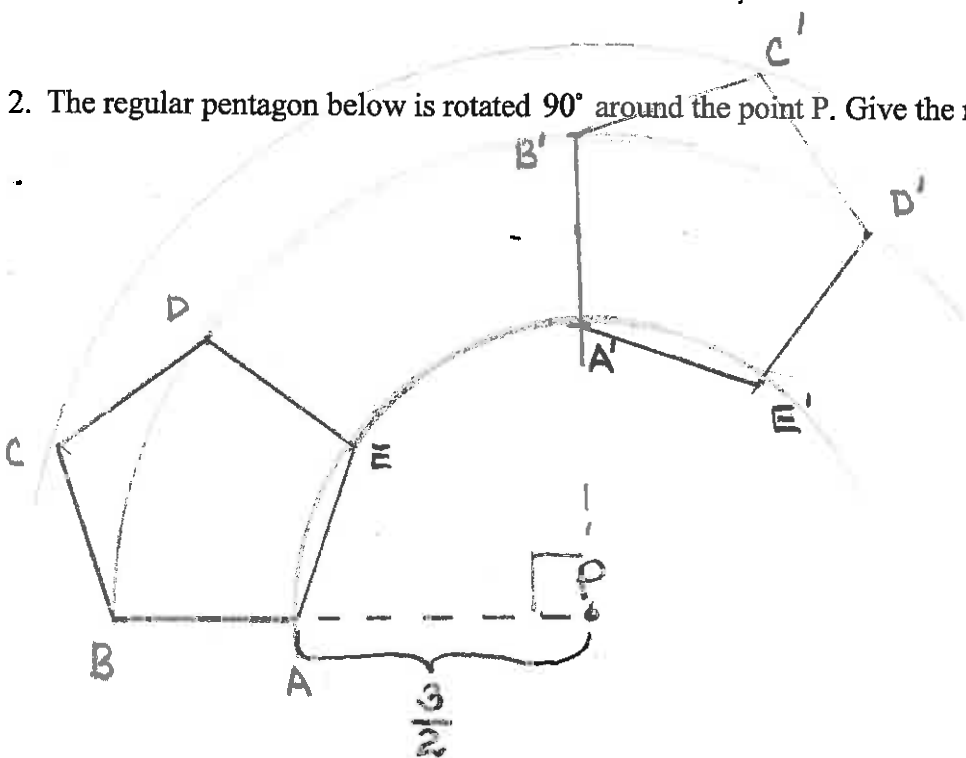
1. Give the symmetries of the regular pentagon below. (6 points)



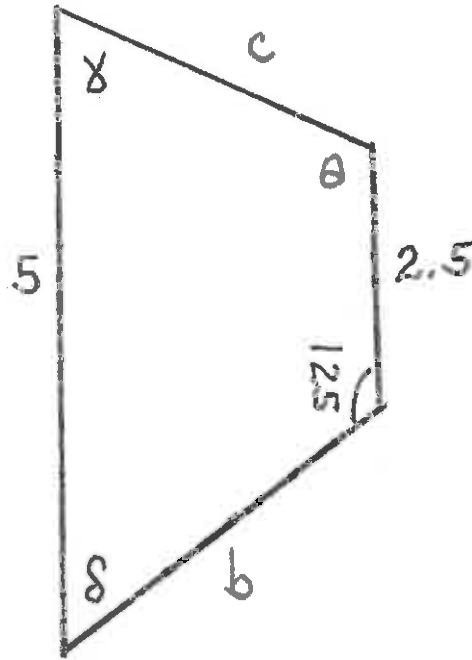
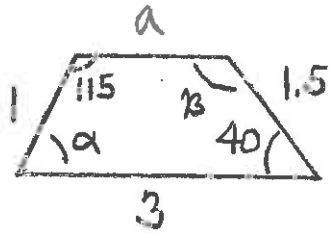
horizontal
72° rotational

$$\text{hexagon} \rightarrow \frac{360}{5} = 72^\circ$$

2. The regular pentagon below is rotated 90° around the point P. Give the resulting pentagon. (6 points)



3. The two polygons below are similar give all the missing lengths and angle measures. (12 points)
 (Bonus Point Problem – Choosing a center of vision draw a magnified polygon that is 1.5 times as large as the smaller of the two given polygons. (3 points))



$$\beta = 125 \quad \delta = 40 \quad \theta = 115 \quad \alpha = \gamma$$

$$\alpha + 115 + 125 + 40 = 360 \quad \alpha = 80$$

$$\frac{5}{3} = \frac{c}{1} \Rightarrow c = \frac{5}{3}, \quad \frac{2.5}{a} = \frac{5}{3}$$

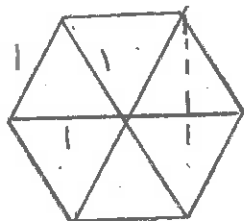
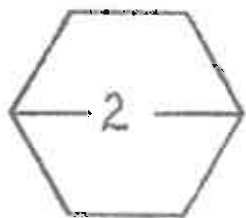
$$2.5 = a \frac{5}{3}$$

$$\frac{b}{1.5} = \frac{5}{3}$$

$$\frac{3 \cdot 2.5}{5} = a = 1.5$$

$$b = \frac{5}{3} \cdot 1.5 = \frac{7.5}{3} = 2.5$$

4. The regular polygon below is used to tile an 8×10 rectangular region. Show how this is done by giving the number of full regular polygon that will be needed. (You may have to cut some of the tile. Count these carefully.) (12 points)



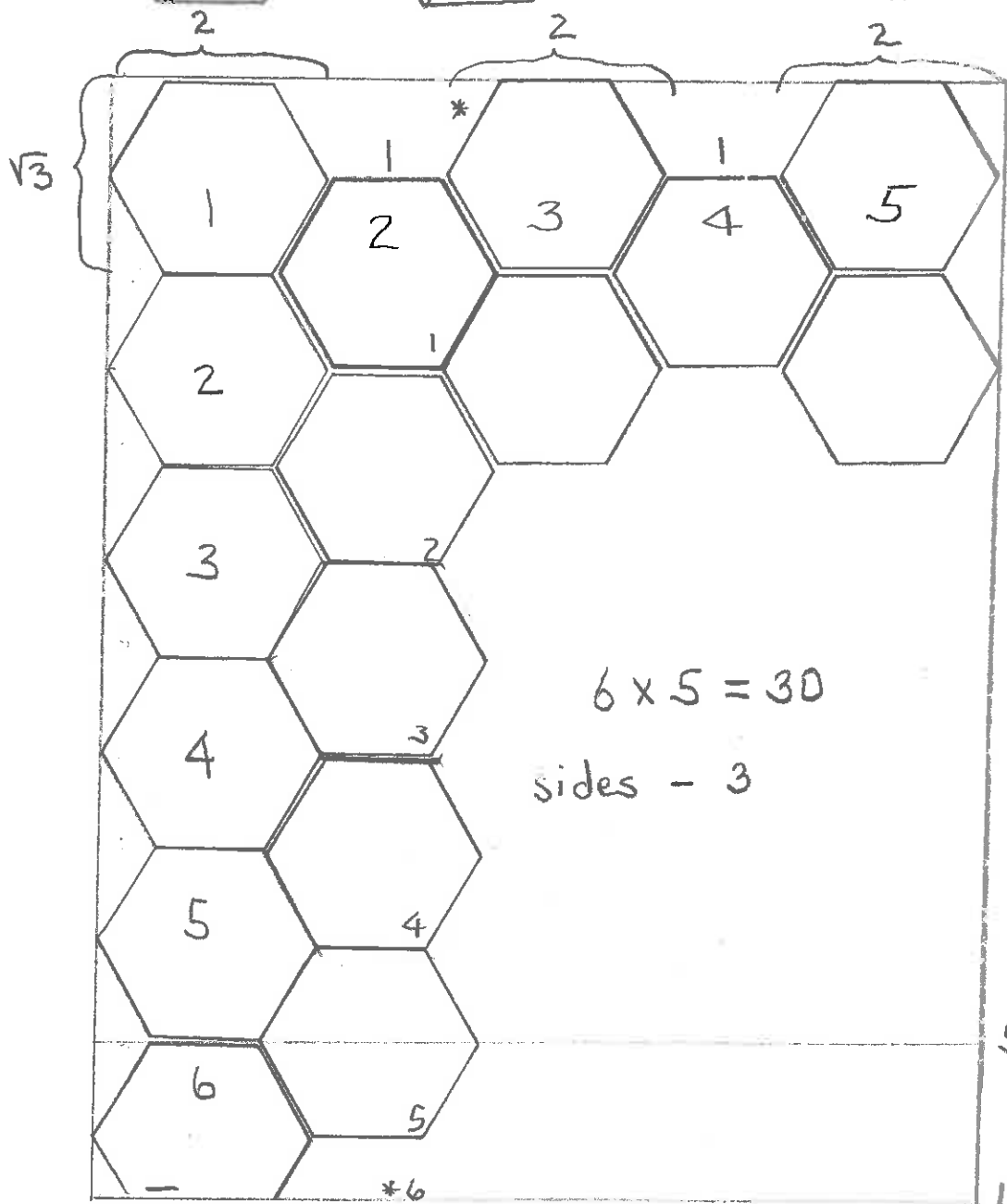
$$h^2 + \left(\frac{1}{2}\right)^2 = 1^2$$

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

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

$$2h = \sqrt{3} \approx 1.7$$

$$5\sqrt{3} \approx 8.5$$

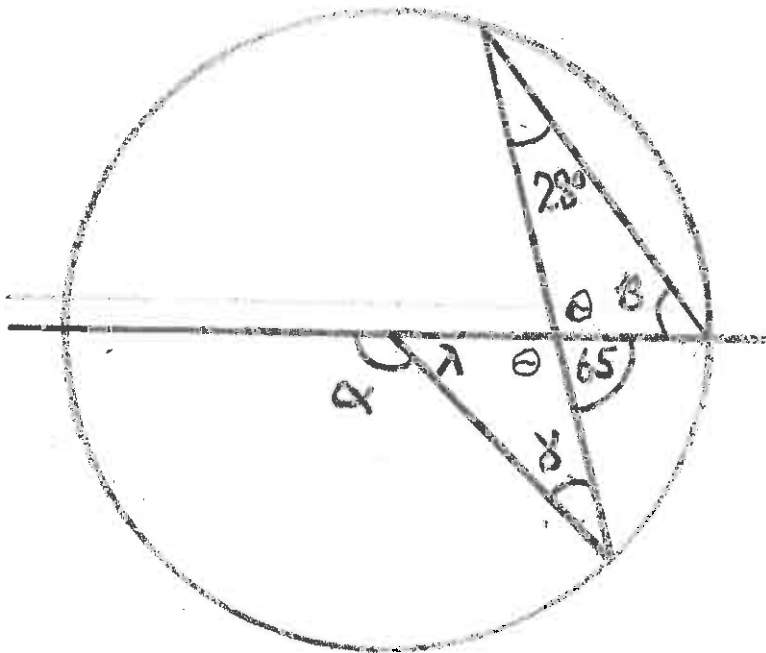


$$6 \times 5 = 30$$

sides - 3

$$5\sqrt{3} \approx 8.5$$

5. Give the missing angles in the following figure. (6 points)



$$\beta + \theta + 28 = 180$$

$$\theta + 65 = 180$$

$$\theta = 115$$

$$\beta = 180 - 28 - 115 = 37$$

$$\lambda = 56$$

$$\alpha + \lambda = 180$$

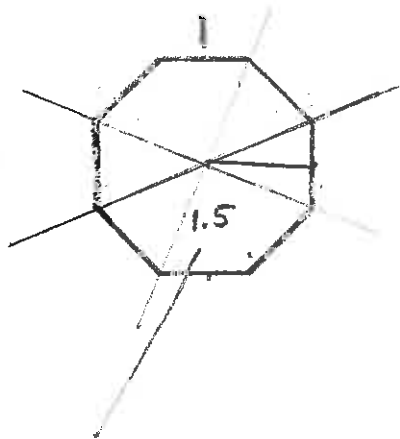
$$\alpha = 124$$

$$\lambda + \theta + \delta = 180$$

$$\delta = 180 - 56 - 115$$

$$\delta = 9$$

6. Give the area to perimeter ratio for the following regular polygon. (6 points)



$$h \approx \frac{9}{16}$$

$$P = 8$$

$$A_1 = \frac{1}{2}bh$$

$$\approx \frac{1}{2}(1)\left(\frac{9}{8}\right) \approx \frac{9}{16}$$

measure with ruler.

$$A = 8A_1 \approx \frac{9}{2}$$

$$\frac{A}{P} \approx \frac{\frac{9}{2}}{8} = \frac{9}{16}$$

$$\left(\frac{1}{2}\right)^2 + h^2 = \left(\frac{3}{2}\right)^2$$

$$h^2 = 2$$

$$h = \sqrt{2}$$

$$A \approx 8\left(\frac{1}{2}(1)\sqrt{2}\right) = 8\frac{\sqrt{2}}{2} = 4\sqrt{2}$$

$$\frac{A}{P} = \frac{4\sqrt{2}}{8} = \frac{\sqrt{2}}{2}$$