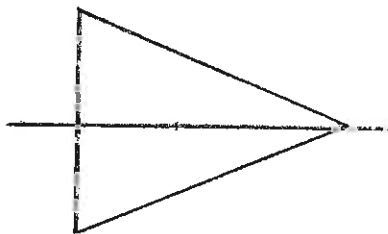


All necessary work must be shown for credit. You may NOT use computers, notes or texts.

I have neither received nor given help on this exam. Don Key
(Signature) (2 points)

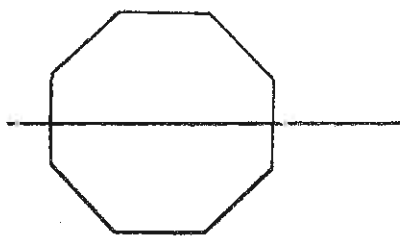
1. Give all the symmetries of the following objects. (6 points each)

(a)



horizontal symmetry
(NOT an equilateral triangle)
If you think it is equilateral
measure. (120° rotation)

(b)



horizontal symmetry
vertical symmetry
 45° symmetry

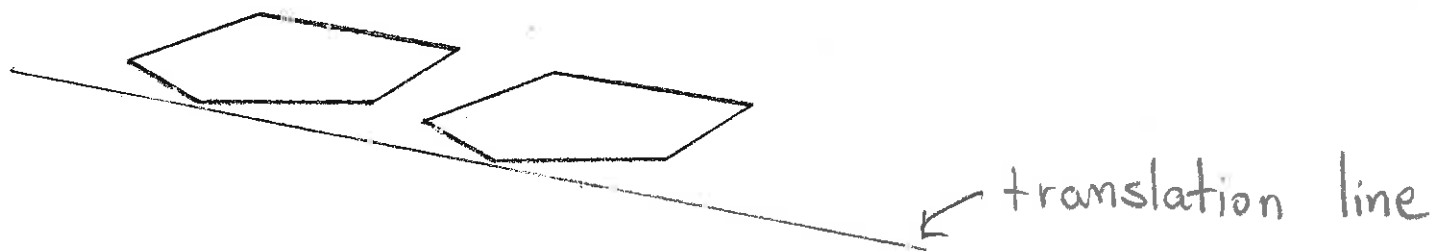
(c)



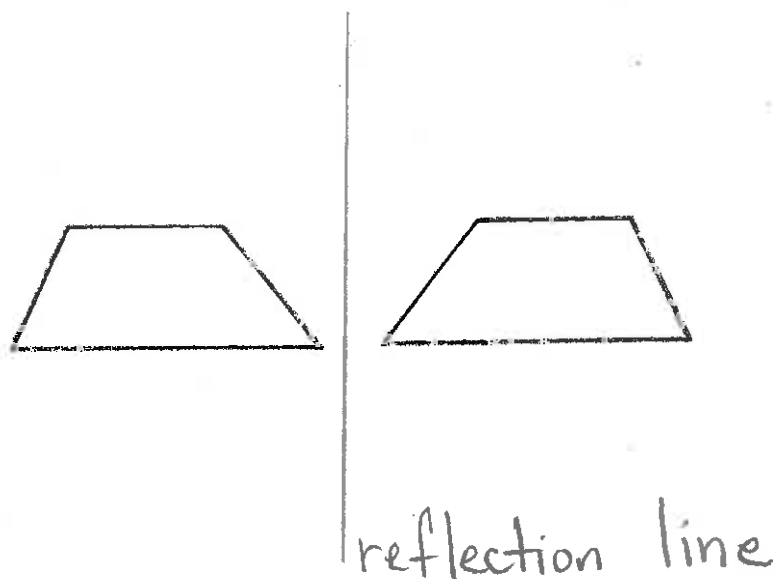
180° symmetry

2. The second figure is a rigid motion of the first. Indicate whether it is a translation, rotation or reflection of the first figure. If it is a translation, give the line it is translated along. If it is a rotation, give the degrees. If it is a reflection give the line it is reflected through. (6 points each)

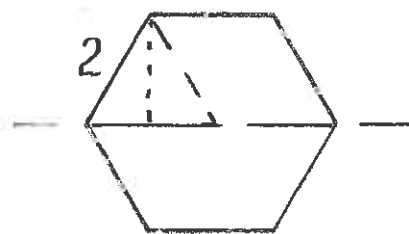
(a)



(b)



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



$$P = 6(2) = 12$$

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

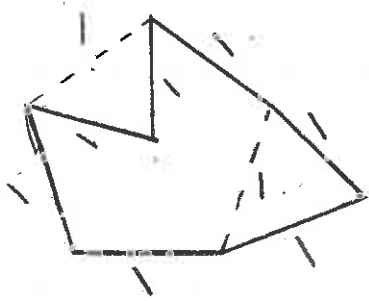
$$h^2 + 1^2 = 2^2$$

$$h^2 = 3 \quad h = \sqrt{3}$$

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

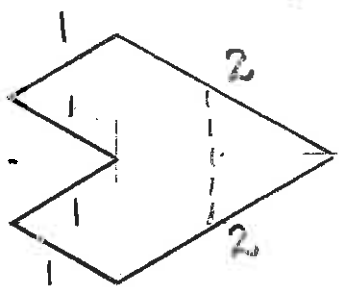
4. Explain why or why not the following tile can tessellate the plane. (6 points each)

(a)



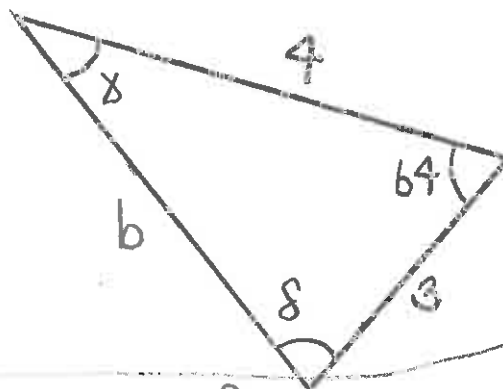
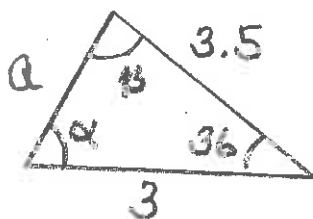
No. It is a symmetry of a regular pentagon,

(b)



Yes. It is a symmetrical change of a regular hexagon.

5. The following two polygons are proportional. Give the lengths of all the sides and the measure of all the angles. (6 points)



$$\alpha = 64$$

$$\gamma = 36$$

$$\beta = \delta = 80$$

$$\frac{4}{3} = \frac{3}{a} = \frac{b}{3.5}$$

$$\frac{4}{3} a = 3 \rightarrow a = \frac{9}{4}, \quad b = \frac{4 \cdot 3.5}{3} = \frac{14}{3}$$

5. Give the number of degree contained in the following. (6 points each)

(a) One twelfth of a circle.

$$\frac{1}{12} 360 = \frac{360}{12} = 30^\circ$$

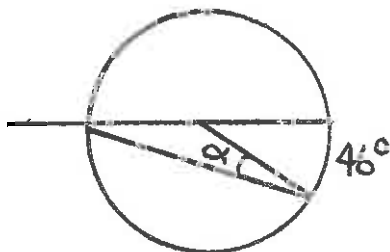
(b) 25 minutes on a circular clock.

$$60 \text{ minutes} = 360^\circ$$

$$\frac{25}{60} = \frac{x}{360}$$

$$x = \frac{25}{60} 360 = 6(25) = 150$$

(c) the angle α .



$$73 + 46 = 180^\circ \quad 73 = 134^\circ$$

$$2\alpha + 134^\circ = 180^\circ$$

$$2\alpha = 46^\circ$$

$$\alpha = 23^\circ$$