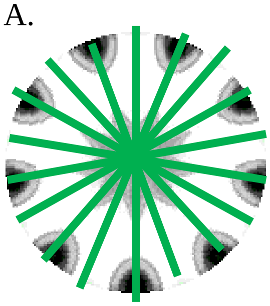
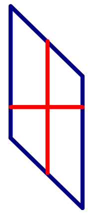
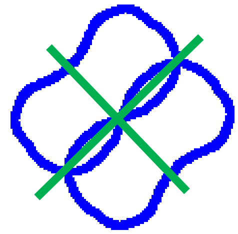
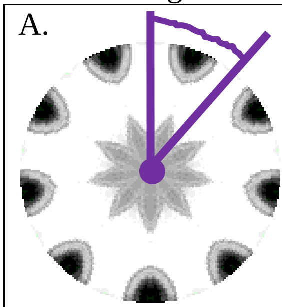
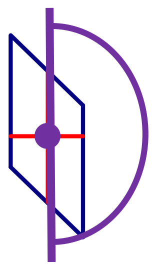
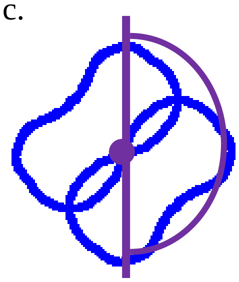
Math 246 Geometry practice problems:

1. Symmetry lines:

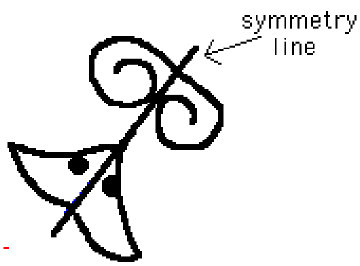
A.	B.	c.
	 No reflection lines	

Rotation angles:

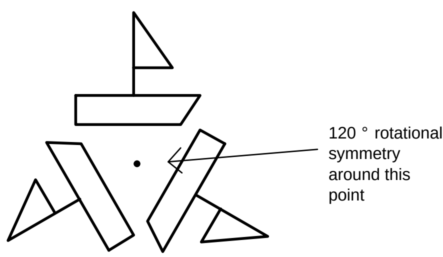
A.	B.	c.
 $360° \div 9 = 40°$ rotation Order 9 rotation	 180° Order 2 rotation	 180° Order 2 rotation

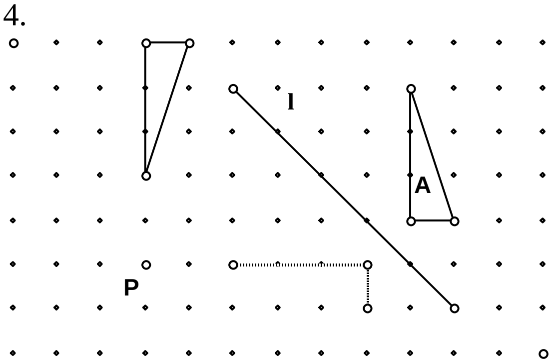
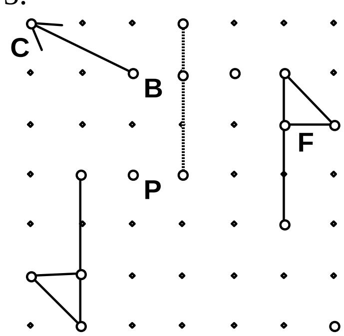
3. Complete the pattern so that it has reflection or rotational symmetry as specified:

A.

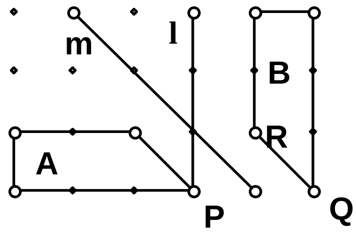
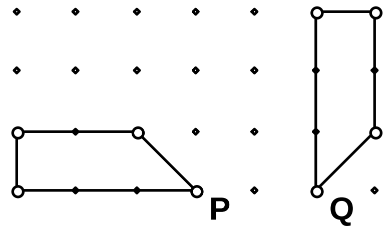


B.

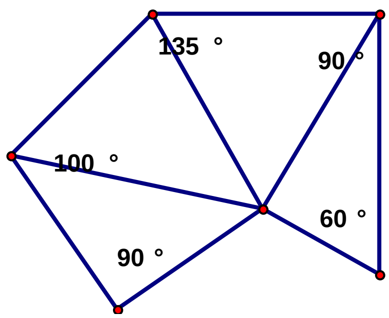


4.	5.
	

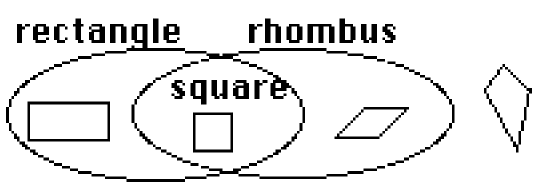
5. Tell how to get from trapezoid A to trapezoid B using 3 or fewer transformations:

A.	B.
	
Option 1: reflect in line m, and translate on the vector from R to Q. Option 2: reflect in line l, rotate 90° counter clockwise around P, translate on the vector from P to Q other correct answers are possible	Option 1: rotate -90° around P, and then translate on the vector from P to Q Option 2: translate on the vector from P to Q and then rotate 90° clockwise around Q.

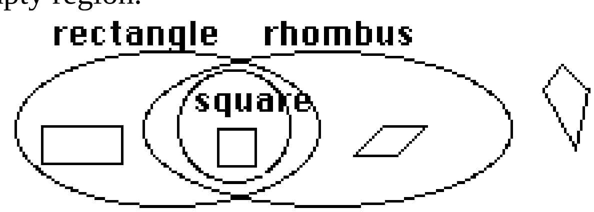
6. The polygon is a hexagon, which can be divided into 4 triangles, so the angle sum is 4x180=720, thus the missing angle is 720-90-100-135-90-60=245°



9. Draw a Venn diagram showing the relationship between a rectangles, rhombuses, and squares. Draw a picture of something that belongs in each non-empty region.

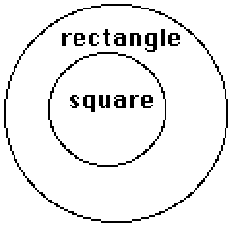


OR

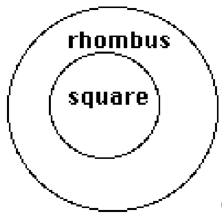


10. A. Circle the types of quadrilateral on the list whose diagonals bisect each other:
square; rectangle; parallelogram; rhombus; kite; trapezoid

11. Choose two of the types that you have chosen in the list above that have a set-subset relationship, and label them on the Venn Diagram below:

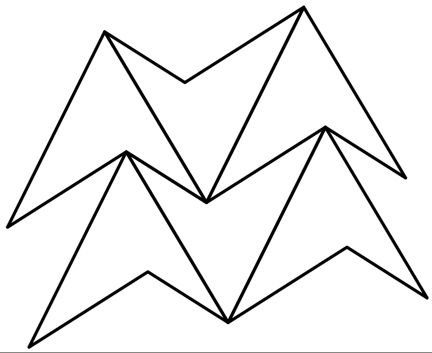
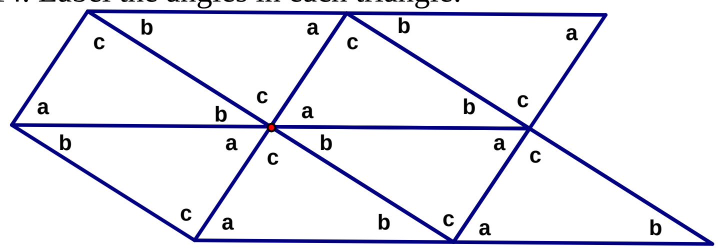


OR



OR a pair where parallelogram is the larger set, and any of the others is the subset.

12. A is chosen to show that trapezoids can’t have two parallel lines. B is chosen to show that trapezoids have to be closed (with no gaps).

13. Show at least this much of the tessellation: 	14. Label the angles in each triangle:  Then the interior angles in each triangle are a, b, c and we know a+b+c=180. Going around a point, we have a+c+b+a+c+b=180+180=360, so they fit perfectly.

15. Show how to find the measure of an interior angle of a regular octagon.
An octagon can be split into 6 triangles with the same angles as the octagon.
The angle sum in the whole octagon is $6 \times 180° = 1080°$
Each angle is the same size, and there are 8 angles, so each angle measures $1080° \div 8 = 135°$

16. Explain, using angle measurements, how you know that you can’t make a tessellation using only regular heptagons (7-sided)
The interior angle for a heptagon is 128.6. $128.6° \times 2 = 257.2° < 360°$ and $128.6° \times 3 = 385.8° > 360°$, so there can never be a whole number of heptagons that would fit together perfectly around a point.