Math 310 ☆ Summer 2008 ☆ Test #1 ☆ 100 pts ☆ NAME▸ _____

(22*) 1. True-False: Write in the blank T for each true statement, F for false.

a. ___ A rectangle is a square.

b. ___ A rectangle is a parallelogram.

c. ___ A pyramid may have four faces.

d. ___ The least possible number of faces on a prism is five.

e. ___ A convex polyhedron may have eight faces, ten vertices and sixteen edges.

f. ___ The number of faces, vertices and edges of a polyhedron may all be odd numbers.

g. ___ A quadrilateral may have exactly two right angles.

h. ___ A prism may have exactly one face that is a regular hexagon.

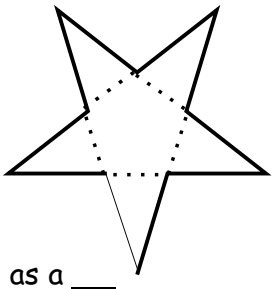
i. ___ A cone is a type of polyhedron.

j. ___ A prism may have sixteen edges.

k. ___ There is only one quadrilateral with sides of lengths 10cm, 7cm, 6cm, & 8cm (in that order.)

(12) 2. Multiple choice. For each statement, choose the BEST completion of the statement from this list:

A tetrahedron	B dodecahedron	C prism	D pyramid	E cube
F octahedron	G icosahedron	H square	J polygon	K cone
L quadrilateral	M parallelogram	N rectangle	O rhombus	P polygon



a. A quadrilateral with all sides congruent is a __

b. A quadrilateral with all angles congruent is a __

c. The figure above right can be folded up into the polyhedron known as a ___

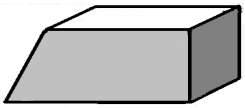
d. A simple closed curve consisting of line segments in a plane is a ___

e. An ordinary shoebox most closely resembles the shape known as a ___

f. The regular polyhedron in which four triangles meet at each vertex is a ___

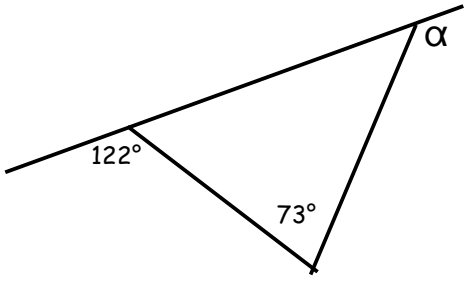
(6) 3. Give the best name you can for each of the following:

a. 

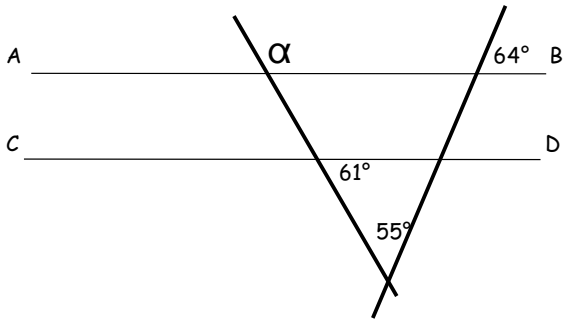
b. 

c. 

(6) 4. Find the measure of the angle marked α.
All apparent segments ARE segments.



Segments $\overline{AB}$ and $\overline{CD}$ are parallel.



(10) 5. a. Sketch a **prism** with a pentagonal base.

b. Find the number of faces: _____

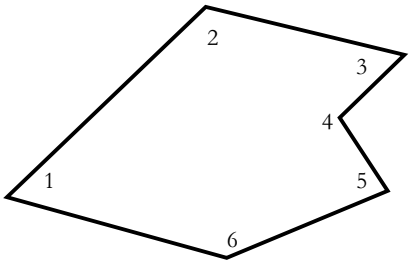
the number of edges: _____

and vertices: _____

c. Show Euler's formula holds.

(10) 6. a. Without using a protractor, showing your work, find the sum of the interior angles in the polygon at right:

$m(\angle 1) + m(\angle 2) + m(\angle 3) + m(\angle 4) + m(\angle 5) + m(\angle 6)$



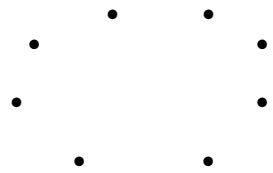
(3) b. Use the above result to find the measure of one interior angle of a regular heptagon:

(3) c. Explain why there can be no regular convex polyhedra with faces which are hexagons. Be specific, but concise.

(6) 7. Name the remaining three regular convex polyhedra (Platonic solids) and describe them in the manner shown for the cube and icosahedron (that is, state the number & type of faces, what forms each vertex).

Icosahedron	20 equilaterial triangular faces, with five meeting at each vertex.
Cube	Six square faces, with three meeting at each vertex.

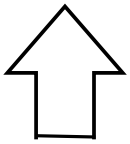
(6) 8. Showing your work, find the number of segments connecting eight distinct points, no 3 of which are collinear.

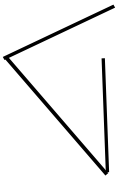


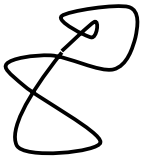
What is the number of diagonals in a convex octagon?

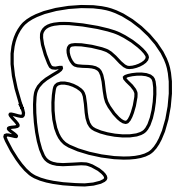
(10*) 9. Of the following, which are not simple, closed plane curves ? (Write NO under the figure.) If a figure is not, indicate in what way it fails.

a. 

b. 

c. 

d. 

e. 

(6*) 10.If m(∠α) = 108° 38' 5", what is the measure of α's supplement?

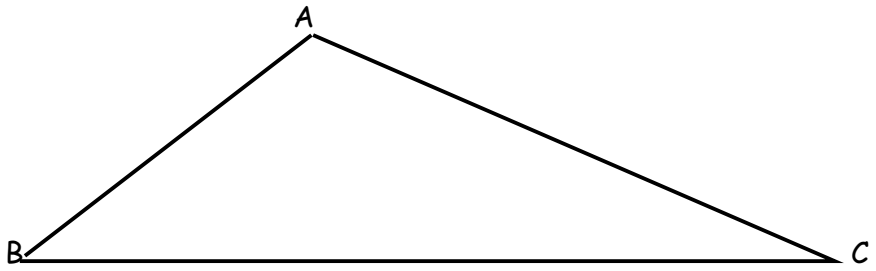
(5) 11. Showing your work, carefully <u>construct*</u> the median, of the triangle ABC below, which passes through A.

A ·

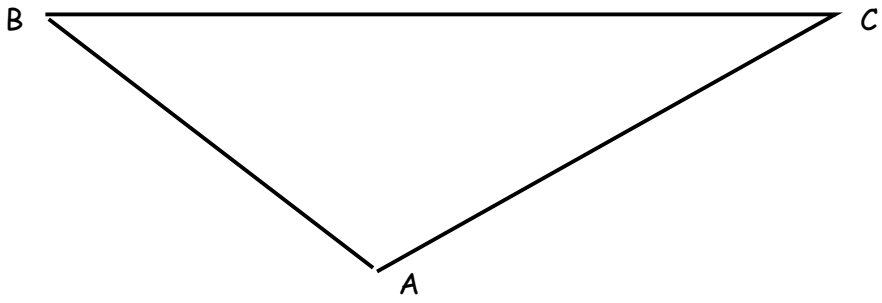
B ·

· C

(5) 12. a. Showing your work, construct* a **line** parallel to BC through A.



(5) 13. Showing your work, construct* the **altitude** of triangle ABC from B.



(5) 14. Construct* an angle bisector of angle ACB.

A

B

C