Circle the letter of the correct answer for #1-3.

(7 pts)1. Consider the pentagram shown here. Imagine it as the base of a **pyramid**. How many faces, edges, and vertices would the resulting **pyramid** have?

A. faces: 7 edges: 15 vertices: 10

B. faces: 6 edges: 10 vertices: 6

C. faces: 11 edges: 30 vertices: 11

D. faces: 12 edges: 20 vertices: 12

E. faces: 11 edges: 20 vertices: 11

(7 pts)2. Consider these statements about parallelograms. Which statements are always true?

I. Opposite angles are the same size.
II. Diagonals are the same length.
III. Diagonals bisect each other.

A. I only

B. I and II only

C. II and III only

D. I and III only

E. I, II and III

(7 pts)3. Determine the volume and surface area of the figure shown. Assume that there are no unseen indentations or holes in the figure.

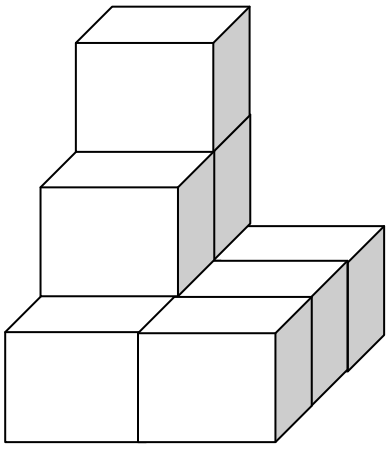
A. volume: 9 cu units surface area: 16 sq units

B. volume: 9 cu units surface area: 32 sq units

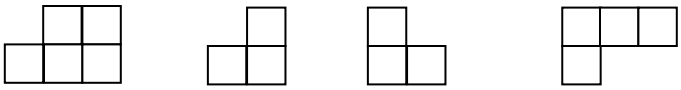
C. volume: 7 cu units surface area: 16 sq units

D. volume: 7 cu units surface area: 32 sq units

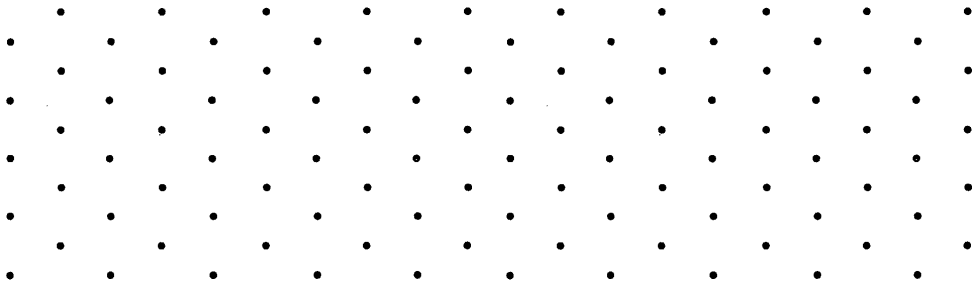
E. volume: 9 cu units surface area: 23 sq units



(6 pts)4. Draw the 3-D shape that has the given direct views.



Front view Right view Left view Top view from front



(7 pts)5. For an n-gon prism, determine the number of vertices, faces, and edges.

Vertices: _____ Faces: _____ Edges: _____

Demonstrate that your answers follow Euler's Formula.

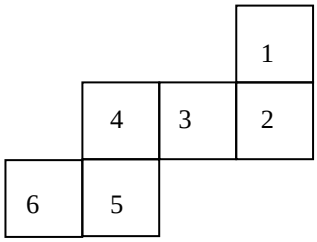
(8 pts)6. Fill in the blanks:

a) A pyramid with 16 edges has _____ faces and _____ vertices.

b) A polyhedron with 14 faces and 26 edges has _____ vertices.

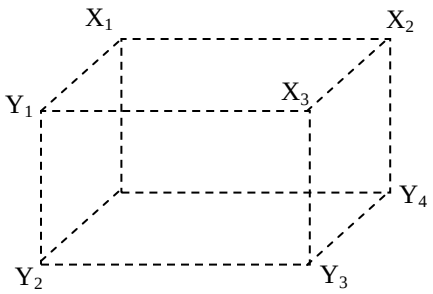
c) A prism with 18 vertices and 27 edges has _____ faces.

(6 pts)7. If the net were folded up to make a cube, which pairs of faces would be opposite each other?



_____ and _____ _____ and _____ _____ and _____

(8 pts)8. Sketch and label a chiral version of this "molecule."



(8 pts)9. Fill in the blank with a specific characteristic to form a true statement.

a) A square is a rectangle with _____

b) A parallelogram is a trapezoid with _____

c) A rectangle is a parallelogram with _____

d) A rhombus is a kite with _____

(6 pts)10. Name two characteristics that the five regular polyhedra (platonic solids) have in common.

1)

2)

(8 pts)11. Fill in the blank with the word "always," "sometimes," or "never." If a statement is sometimes true, sketch and label examples of when it is true and when it is not true.

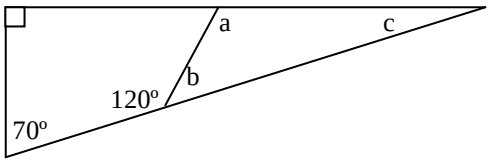
a) A right triangle is _____ an obtuse triangle.

b) A parallelogram is _____ a rhombus.

c) A square is _____ a trapezoid.

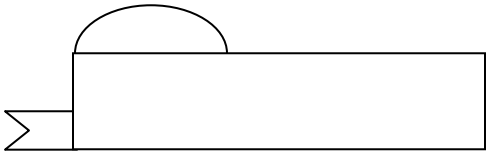
d) A scalene triangle is _____ a right triangle.

(6 pts)12. Find the number of degrees in each lettered angle. Do not use a protractor.

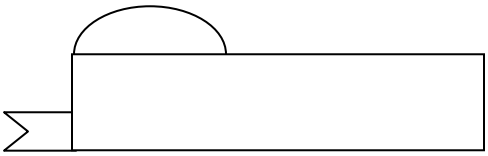


a: _____ b: _____ c: _____

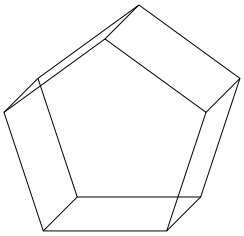
(8 pts)13. Add to the following design so that it has a reflection symmetry. Draw in the line of symmetry.



Now, add to the original design so that it has a rotational symmetry. Show the center of rotation.



(8 pts)14. Consider this right regular pentagonal prism. You may add to the drawing and/or include labels to help you with the required descriptions.



How many total reflection symmetries does the figure have? _____
Describe ONE plane of symmetry.

How many distinct rotational symmetries does the figure have? _____
Describe ONE axis of rotational symmetry and name the degrees of rotation for that axis.

Degrees of rotation: _____