6. Perpendicular Bisector: Answer Key

RECAP 1: New Vocabulary and Ideas (17 pts)

Check ALL correct answers. Explain your choice and provide details.

1. Constructing a *perpendicular bisector* to segment can be: **(6 pts)**
   - (I.) Understood by reading Euclid's Elements.
   - (II.) Performed by using a ruler and compasses.
   - (III.) Accomplished by drawing a rhombus whose diagonal is the given segment.
   - (IV.) Achieved by drawing two isosceles triangles based on the given segment.
   - (V.) Done by finding the midpoint of the segment and erecting a perpendicular to the segment.
   - (VI.) All of the above.
2. To *bisect* a segment means: **(5 pts)**
   - (I.) To chop up the segment in half.
   - II. To be perpendicular to the segment.
   - (III.) To cross the segment in its midpoint.
   - IV. To draw another segment equal in length to the given segment.
   - (V.) More than one of the above.
3. The sentence "Two planets are *equidistant* from the sun.": **(6 pts)**
   - (I.) Refers to the elliptical orbits of some planets about the sun.
   - II. Is true in our solar system.
   - III. Should be corrected (how?).
   - (IV.) Makes sense.
   - V. The two planets and the sun are all at equal distances from each other.
   - (VI.) 40% of the above.

RECAP 2: Applications (8 pts)

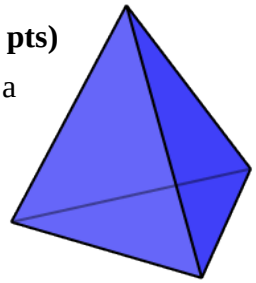
- In what situations in real life might *perpendicular bisectors* help us? List at least three such situations. **(4 pts)**
  - ➢ In building a fence between houses, a highway between fields, a railroad between two villages so that the distance from both houses/fields/villages to the fence/highway/railroad are the same, no matter to which point on them one goes them.
- Find objects around the house that are *equidistant* from other objects. **(4 pts)**
  - ➢ Your two hands, when stretched forward, are equidistant from your head. Your feet, when you are standing straight, are equidistant from your nose. For French doors (a double door made of two identical doors that open in the middle), the outside top corners of the doors are equidistant from the bottom of the line separating the doors.

RECAP 3: Geometric Visualization (9 pts)

- Could *three* objects be all equidistant from each other? What shape would they form? What space do you need to place the objects in? **(3 pts)**

- Yes, they would make an *equilateral triangle* in the plane (2-dimensional space).

- How about *four* objects? **(4 pts)**
  - Yes, they would make a *regular tetrahedron* (triangular pyramid) in space (3-dimensional space).



- How about *five* objects? **(2 pts)**
  - Yes, they would make a *regular polytope* in a 4-dimensional space.

RECAP 4: Origins of the Words Per-pendicular, Equi-distant, and Bi-sector

Connect each word or part of a word on the left with its meaning on the right, and color the two blocks the same way.

(16pts: 2 pts for each word)