The lines \( \overline{BH} \) and \( \overline{CL} \) are parallel. Refer to the diagram above when answering the questions on this page.

1. [3] TRUE/FALSE: If true, circle T and explain briefly why the statement is true. Otherwise, circle F.

   \( \text{T} \) F \( \measuredangle AEB \) has the same measure as \( \measuredangle LJK \)

   \( \text{Alternate interior angles are congruent since} \)

   \( \overline{BH} \parallel \overline{CL} \)

   \( \text{T} \) \( \text{F} \) \( \measuredangle AEB \) has the same measure as \( \measuredangle DEH \)

2. [1] Find a pair of angles that are alternate interior angles.

   \( \measuredangle BEF \) and \( \measuredangle CFS \)

   \( \measuredangle BCS \) and \( \measuredangle EFS \)

   \( \measuredangle BFE \) and \( \measuredangle EFC \)

   \( \measuredangle BCS \) and \( \measuredangle EFS \)

3. [1] Fill in the blank: If a line \( l \) was perpendicular to line \( \overline{BH} \), then \( l \) would be \( \text{perpendicular} \) to \( \overline{CL} \).
4. Angles $\angle ADB$, $\angle BDC$ and $\angle ABC$ are right angles in the diagram below. Use this diagram to answer the questions below.

(a) [1] Identify two triangles that are similar

$$\triangle ABC \sim \triangle ADB \sim \triangle BDC$$

(b) [1] Find the length of $BD$

$$BD^2 + (BD)^2 = 5^2$$

$$2(BD)^2 = 25 - 9$$

$$BD = \sqrt{16} = 4$$

(c) [2] Find the length of $DC$.

Since $\triangle ABD \sim \triangle DCB$ and $\angle ABD$ and $\angle DCB$ add up to 90°,

$$\frac{DB}{AD} = \frac{DC}{BD}$$

$$\Rightarrow \frac{4}{3} = \frac{DC}{4} \Rightarrow DC = \frac{16}{3}$$

5. [2] Write down a conditional statement that is true but has a false converse.

T: If an object is a square, then it is also a rectangle.

F: If an object is a rectangle, then it is a square. May not be true.

6. [2] Logic, as written by Aristotle in 384 BC (and discussed in class on 1/5), had three rules. Write down one of the rules.

1) identity “a square is a square”
2) excluded middle: statements have to be true or false.
3) Statements cannot be both true and false. (contradiction)

7. [2] What trait about the cult of Pythagorus do you find the most interesting?

I think it is interesting that they thought the planets each had their own musical note and thus originated the ‘music of the spheres’ idea. Although the idea to kill a man to hide the existence of irational numbers is also interesting.