MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 1 – OCTOBER 2010
ROUND 1 VOLUME & SURFACES

ANSWERS

A) _____ units^3

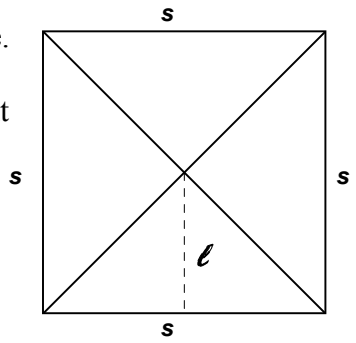
B) _____ : _____

C) _____

******* NO CALCULATORS ON THIS ROUND ******

A) The lengths of the edges of a rectangular solid are in a 1 : 2 : 3 ratio. If the total surface area of this solid is 198 units^2, compute its volume?

B) At the right is an aerial (top) view of a right pyramid with a square base. The ratio of its lateral surface area to its total surface area is 5 : 8. Compute the ratio of the length of an edge of the base to the slant height of the pyramid, namely s : l.



C) In the diagram at the right, a semicircle and a rectangle are rotated around line l which is perpendicular to the diameter of the semi-circle at the center point O, creating a hemisphere and a cylinder. A and B lie on the semicircle and C and D lie on the diameter. If the radius of the semicircle is 10, compute r, the radius of the cylinder, given that the height of the cylinder is an integer, such that the ratio of the volume of the cylinder to the volume of the hemisphere is 9 : 16.