MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 1 – OCTOBER 2009
ROUND 1 VOLUME & SURFACES

******* NO CALCULATORS IN THIS ROUND *******

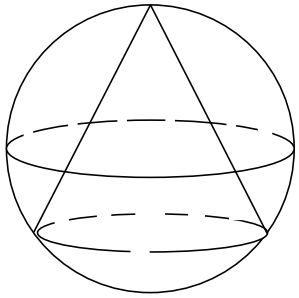
ANSWERS

A) _____ : _____

B) _____ units

C) _____inches^3

A) A cone is inscribed in a sphere. The radius of the base of the cone is 3 and the radius of the sphere is 5. Find the ratio of the volume of the sphere to the volume of the cone.



B) A rectangular sheet of cardboard has dimensions of $\frac{9x}{2}$ by $\frac{11x}{2}$ units. Squares x units on a side are cut from each corner of the sheet. The sheet is then folded upward to form an open box. The volume of this box is 560 units^3. What was the perimeter of the original rectangular sheet of cardboard?

C) A square pyramid has a volume of 108 cubic inches and the ratio of length of its altitude to the perimeter of its base is 3 : 8. A plane parallel to its base divides the pyramid into two solids one of which is a smaller pyramid whose slant height is $\sqrt{10}$.
Compute the volume of the smaller pyramid.