

**MASSACHUSETTS MATHEMATICS LEAGUE  
CONTEST 1 - OCTOBER 2016  
ROUND 1 VOLUME & SURFACES**

**ANSWERS**

A) \_\_\_\_\_

B) \_\_\_\_\_

C) ( \_\_\_\_\_ , \_\_\_\_\_ )

- A) The sum of the lengths of the edges of a cube is 60 inches.  
Compute the surface area of this cube (in inches<sup>2</sup>).
- B) The dimensions of a rectangular solid are  $x$ ,  $y$ , and  $xy$ .  
If the interior diagonal of this solid has length  $xy + 1$ , find *all* possible expressions for  $y$  in terms of  $x$ .
- C) Three faces of a rectangular solid have areas of 864, 1440 and 2160 units<sup>2</sup>, respectively.  
This solid is packed with  $k$  congruent cubes with edge  $E$ , where  $k$  is as small as possible.  
Each of the  $k$  cubes is inscribed in a sphere. The total volume of the  $E$  spheres, in simplified form, is  $A\pi\sqrt{B}$ . Compute the ordered pair  $(A, B)$ .