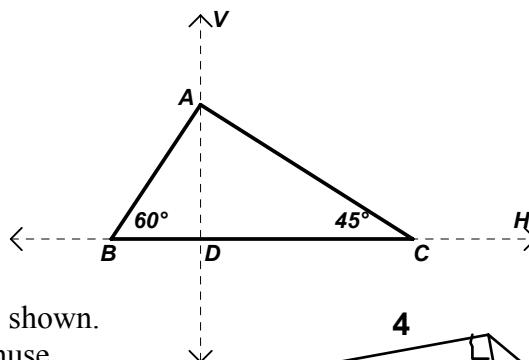


**MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 1 - OCTOBER 2006
ROUND 7 TEAM QUESTIONS**

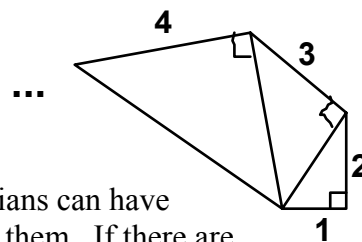
ANSWERS

- A) _____ D) _____
B) _____ E) _____
C) _____ F) _____

- A) Two solids are generated, one by rotating the triangle pictured below about the horizontal axis, the other by rotating about the vertical axis. If $BC = 10$, determine the positive difference between the volumes of the two solids. Give an exact answer.



- B) An infinite sequence of right triangles is formed as shown. Determine the length of the first (smallest) hypotenuse with integer length.



- C) Scientists have discovered life on Venus and have learned that Venutians can have 2, 3 or 4 legs. There are 26 Venutians in a crater with 68 legs among them. If there are at least three 4-legged Venutians for every 3-legged Venutian and at least one of each type, how many 2-legged Venutians are there?

- D) How many irreducible fractions $\frac{a}{b}$ lie between $\frac{4}{5}$ and $\frac{5}{6}$, where a and b are integers and $a + b = 2400$?

- E) Find the value of A for which the distance d between the two points of intersections of the graphs of $y = \frac{1}{2}(x + |x|)$ and $|x| + |y| = A$ is $2\sqrt{5}$ units.

- F) Consider the following recursive definition, defined for any integer values of n .

$$T_n = T_{n-1} + 2T_{n-2} \quad , \text{where } T_2 = 1.5 \text{ and } T_4 = 1.5T_0$$

Determine the exact value of T_{-1}