MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 3 - DECEMBER 2007 SOLUTION KEY

Team Round - continued

E) $\dfrac{85+W}{132+W+L} \geq 0.700$ (rounded to 3 dec. pl.)

$850 + 10W \geq 924 + 7W + 7L \rightarrow L \leq \dfrac{3W-74}{7}$

The minimum value of W is determined by letting $L = 0$.

$\dfrac{85+W}{132+W} \geq 0.700 \rightarrow 3W > 74 \rightarrow W \geq 25$

There are a maximum of 30 games remaining in the schedule.

The ordered pair (25, 0) works (0.701), as well as (W, 0) for $26 \leq W \leq 30$ $\rightarrow$ 6 pairs
(26,1) fails (0.698)
(27,1) passes (0.700), as do (28, 1) and (29, 1)
(27, 2) fails (0.696)
(28, 2) fails (0.6975)
Thus, there are **<u>9</u>** pairs.

F) $DC = 60$, $EC = 36$

ΔDEC is a right triangle $\rightarrow$ (36, ? , 60) = 12(3, x, 5)
$\rightarrow x = 4 \rightarrow DE = 48$

Area(ΔDEC) = $\dfrac{1}{2}\cdot 36\cdot 48 = \dfrac{1}{2}\cdot 60\cdot NE \rightarrow NE = \dfrac{144}{5}$

In right ΔNEC, (EN, NC, EC) = $\left(\dfrac{144}{5},?,36\right)$

$= \dfrac{1}{5}(144,?,180) = \dfrac{36}{5}(4,x,5)$

$x = 3 \rightarrow NC = \dfrac{108}{5}$

Since $MENC$ is a <u>kite</u>, its perimeter is $2\left(\dfrac{144+108}{5}\right) = \underline{\mathbf{\dfrac{504}{5}}}$ or **<u>100.8</u>**