MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 3 - DECEMBER 2013
ROUND 6 PLANE GEOMETRY: POLYGONS (no areas)

ANSWERS

A) _____

B) _____ ≤ _____ ≤ _____

C) _____

A) A regular polygon has 88 more diagonals than sides.
Compute the degree-measure of an <u>exterior</u> angle of this polygon.

B) Regular pentagon MINDY and regular decagon BLACKSMITH lie on opposite sides of line $\overleftrightarrow{MI}$. List the <u>three</u> degree-measures of the angles in ΔTIN from smallest to largest.

C) Square *ABCD* has a side of length *x*.
Equilateral triangle *CEF* has side of length *x*.
Points *B*, *C* and *F* are collinear, as are each of these sets of three points:
P, *B* and *A* *A*, *D* and *R* *R*, *F* and *Q* *Q*, *E* and *P*

The diagonal in rectangle *PQRA* has length *d*.
Compute the numerical value of the ratio $\frac{d^2}{x^2}$ as a single fraction with a rationalized denominator.