MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 3 – DECEMBER 2014
ROUND 1 TRIG: RIGHT ANGLE PROBLEMS, LAWS OF SINES AND COSINES

ANSWERS

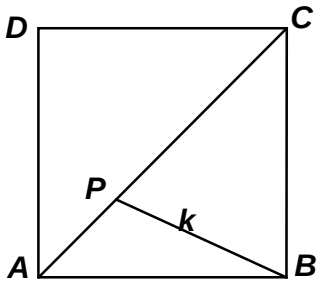
A) _____

B) (_____ , _____)

C) _____

A) The hypotenuse of right triangle *ABC* has a length of 195 units.
If all sides of ΔABC have integer lengths, compute the perimeters of <u>all</u> possible triangles *ABC*.

B) Point *P* is located on the diagonal $\overline{AC}$ (not at an endpoint) in square *ABCD* whose side has length 6. $BP = k$. For the <u>minimum</u> integer value of *k*, $\sin \angle APB = q$.
Compute the ordered pair (k, q).



C) In ΔABC, $AC = 7$, $AB = 13$ and $\measuredangle A$ is <u>obtuse</u>.
If $\overline{BC}$ has integer length, what is the <u>maximum</u> value of $\cos A$?