

MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 3 – DECEMBER 2011
ROUND 1 TRIG: RIGHT ANGLE PROBLEMS, LAWS OF SINES AND COSINES

ANSWERS

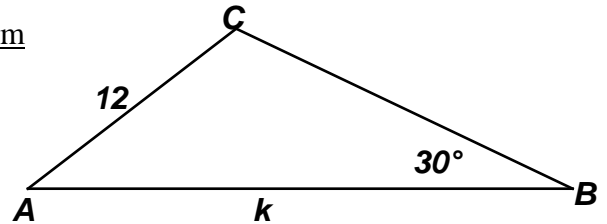
A) _____

B) _____

C) _____

- A) Let $\triangle ABC$ be a right triangle with legs of length 5 and 12.
If A is the right angle, compute $\cos B + \cos C$.

- B) In $\triangle ABC$, $\sin C$ is a rational number with a terminating decimal representation. Compute the sum of all possible positive integer values of k .



- C) In parallelogram $ABCD$, $BD = k$, where k is a positive integer.
Compute the positive difference between the value of $\cos A$, when k is as large as possible,
and the value of $\cos A$, when k is as small as possible.

