

MASSACHUSETTS MATHEMATICS LEAGUE
FEBRUARY 2004
ROUND 7: TEAM QUESTIONS

ANSWERS

A) _____ D) _____

B) _____ E) _____

C) _____ F) _____

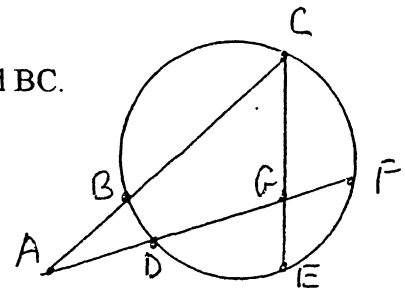
A) If $f(x) = 2x^2 - 17x + 24$ and $f(x + a) = 2x^2 - 5x - 9$, calculate the value of a .

B) Determine the 142^{nd} positive integer divisible by three or five.

C) Express $\cos^2 \frac{7\pi}{24} - \sin^2 \frac{7\pi}{24}$ in simplified radical form.

D) The hundred's digit of a three-digit number is one more than twice the units digit, and the tens digit is three less than the units digit. If the digits were reversed, the number obtained would be 396 less than the original number. Find the original number.

E) In the figure, $AC = 9$, $GC = 6$, $GE = 3$, and $AD = DG = GF$. Find BC .
(NOT TOO SCARY)



F) An infinite geometric series has a sum of 54 while the sum of the first three terms is 52. What is the first term?