MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 4 - JANUARY 2017
ROUND 1 ANALYTIC GEOMETRY: ANYTHING

ANSWERS

A) _____

B) _____

C) (_____ , _____ , _____)

A) The vertical line $x = 4$ and the horizontal line $y = -5$ intersect the hyperbola $xy = 60$ in points *P* and *Q*, respectively. $\overleftrightarrow{PQ}$ intersects the *x*-axis at $(h, 0)$. Compute *h*.

B) Let *B* and *V* denote the *y*-intercept and the vertex of the parabola $y = (x-4)^2 + k$. Compute *BV*.

C) Circle C_1 whose center is at $(2, -6)$ is internally tangent to circle C_2 at point $P(-2, -9)$.
$\mathcal{T}$ is the common tangent line.
Points *P*, *Q*, *R*, and *S* lie on $\mathcal{L}$.
$\mathcal{L} \perp \mathcal{T}$.
S is the center of C_2 whose radius is 40
The equation of the circle C_3 with center on $\mathcal{L}$, passing through point *R* and *S* has equation $(x-h)^2 + (y-k)^2 = r^2$.
Compute the ordered triple (h, k, r^2).