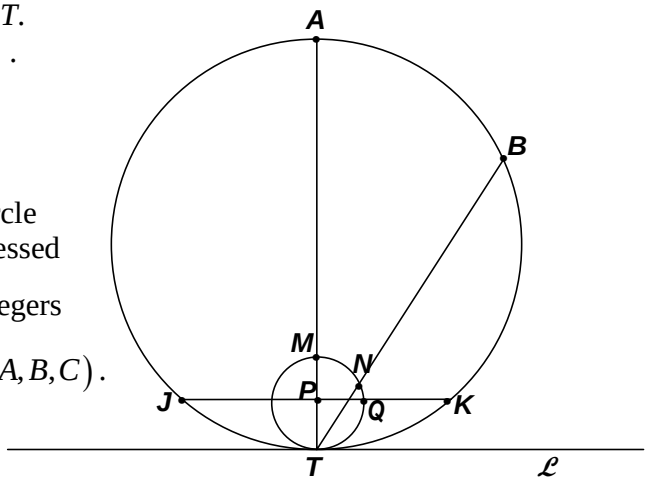
MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 5 - FEBRUARY 2015
ROUND 7 TEAM QUESTIONS

E) Two circles are tangent to line $\mathcal{L}$ at point *T*.
$m\angle ATB = 36°$, $JK = 2$ and $PT = 3 \cdot PM$.
The length of minor arc $\overset{\frown}{AB}$ is $\frac{4\pi}{5}$.
$\overline{AT} \perp \mathcal{L}$, $\overline{JK} \perp \overline{AT}$.
The area of the region inside the larger circle and outside the smaller circle can be expressed in simplest form as $\frac{A}{B}\left(1 + C\sqrt{3}\right)\pi$, for integers *A*, *B* and *C*. Compute the ordered triple (A, B, C).



F) *x* and *y* are the first and second terms, respectively, of an arithmetic sequence (AS).
x and *y* are also the first and second terms, respectively, of a geometric sequence (GS).
If the third term of the GS is –27 and the third term of the AS is 21, compute <u>all</u> possible values of the 5th term of the AS divided by the 4th term of the GS.