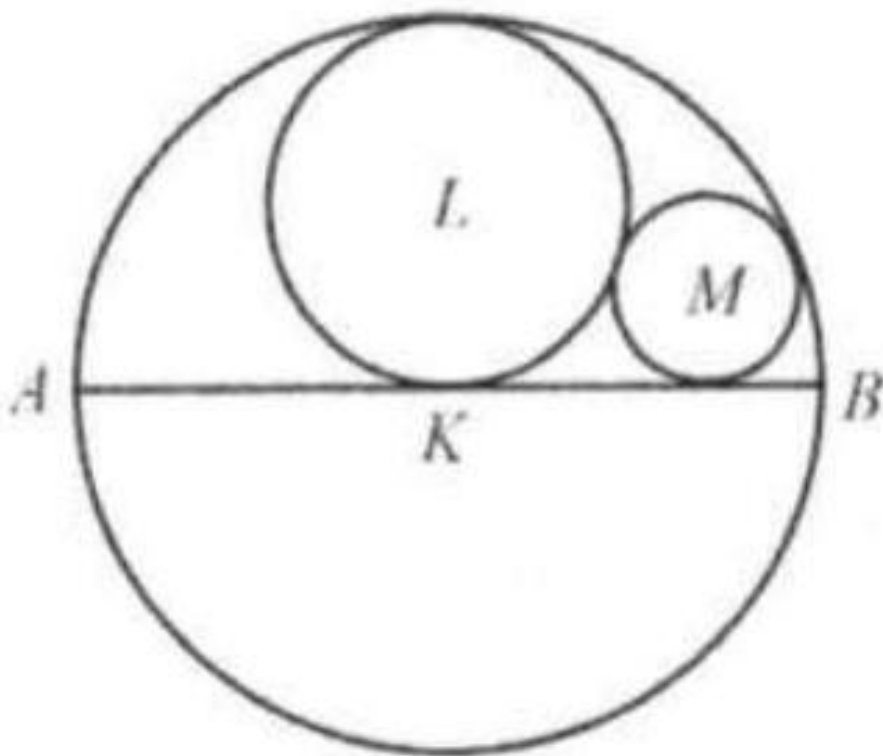# Problem

As shown in the figure, circle K has diameter AB; circle L is tangent to circle K and to AB at the center of circle K; and circle M is tangent to circle K, to circle L and to AB. Find the ratio of the areas of circles K, L, M.

Solution

16:4:1. MF is parallel to AB and intersects KL at F. Let $r, s(=r/2)$ and t be the radii of the circles with centers K, L and M, respectively. Using the Pythagorean theorem to $\triangle FLM$ and $\triangle FKM : (MF)^2 = \left(\frac{r}{2} + t\right)^2 - \left(\frac{r}{2} - t\right)^2$,
$$(MF)^2 = (r-t)^2 - (t)^2.$$
Solving w get $r : t = 4 : 1$. So $r : s : t = 4 : 2 : 1$.
The ratio of the areas is then is $16 : 4 : 1$.

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