6. (20 points) The quantity $\displaystyle\int_1^\infty \frac{dx}{\sqrt{(a^2+x)(b^2+x)(c^2+x)}}$ roughly models the resistance that football-shaped plankton encounter when falling through water. Note that $a=1$, $b=2$, and $c=3$ are constants that describe the dimensions of the plankton.

Find a value of M for which $\displaystyle\int_1^M \frac{dx}{\sqrt{(a^2+x)(b^2+x)(c^2+x)}}$ differs from the original model of

resistance by at most 0.001. *Hint*: make use of the integral $\displaystyle\int_M^\infty \frac{dx}{\sqrt{(a^2+x)(b^2+x)(c^2+x)}}$ and the comparison test.