2. [12 points] A scientist is growing a very large quantity of mold. Initially, the mass of mold grows exponentially, but after many hours, the mass stabilizes at 24 kilograms.
Suppose that t hours after the scientist begins, the mass of mold, in kilograms, can be modeled by the function M defined by the equation

$$M(t) = \begin{cases} 0.41e^{0.72t} & \text{if } 0 \le t \le 5 \\ \dfrac{2t^3}{at^b + c} & \text{if } t > 5. \end{cases}$$

a. [4 points] Find the value of k between 0 and 5 so that $M(k) = 1$. Then interpret the equation $M(k) = 1$ in the context of this problem. Use a complete sentence and include units.

Answer: $k =$ _____

Interpretation:

b. [8 points] Assuming that M is a continuous function of t, determine $\lim_{t\to\infty} M(t)$, and find the values of a, b, and c.

Answers: $\lim_{t\to\infty} M(t) =$ _____ $a =$ _____

$b =$ _____ $c =$ _____