9. [7 points] The air in a factory is being filtered so that the quantity of a pollutant, $P$ (in mg/liter), is decreasing exponentially. Suppose $t$ is the time in hours since the factory began filtering the air. Also assume 20% of the pollutant is removed in the first five hours.

a. [2 points] What percentage of the pollutant is left after 10 hours?

b. [5 points] How long is it before the pollution is reduced by 50%?

10. [5 points] Define a function

$$f(x) = \begin{cases} 
-x^3 + 5x^2 & x \neq 5, \\
\frac{5}{k} & x = 5.
\end{cases}$$

a. [3 points] Find a value of $k$ so that $f(x)$ is a continuous function for all real numbers $x$.

b. [2 points] For the value of $k$ you found, is $f(x)$ differentiable at $x = 5$? Briefly explain.