

6. (6 points) Consider the function $f(x) = 3xe^{ax} + x^2$, where a is a constant. If the error in the linear approximation to $f(x)$ near $x = 0$ is 0.02 when $x = 0.1$, what is a ? Show your work.

7. (6 points) The kinetic energy, K in Joules, of a particle in motion is a function of its fixed mass, M in kg, and its velocity, v , in $\frac{m}{s}$, and is given by:

$$K = \frac{1}{2}Mv^2.$$

For an object with a mass of 2 kg, how fast is its kinetic energy increasing when it is traveling $3\frac{m}{s}$ and accelerating at a rate of $10\frac{m}{s^2}$?