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 m/s, and is given by:

\[
K = \frac{1}{2} M v^2.
\]

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