Warm-up Problems

1. Compute derivative
\[
\left( \frac{e^x}{x^2 + 2x} \right)' =
\]

2. Speed and velocity are not the same thing. Explain how they are different.

Lecture Problems

3. Let \( f(x) = x^4 - 3x^2 + 13x - 12 \).
   (a) \( f'(x) = 4x^3 - 6x + 13 \)
   (b) \( f''(x) = 12x^2 - 6 \)
   (c) \( f'''(x) = 24x \)
   (d) \( f^{(4)}(x) = 24 \)
   (e) \( f^{(5)}(x) = 0 \)

4. A particle moves in one dimension with position function \( x(t) = 5t^3 - 8t^2 + 20 \)
   (a) Velocity: \( v(t) = 15t^2 - 16t \)
   (b) Acceleration: \( a(t) = 30t - 16 \)
   (c) Find the time(s) when the particle comes to a momentary stop?
      Solution: \( v = 0 \) which gives \( t = 0 \) and \( t = 16/15 \).
   (d) Find the time(s) when the particle’s acceleration is zero?
      Solution: \( t = 16/30 \)