Class prep quiz on section 3.10, Stewart's Calculus (8th ed.)

1. Suppose $f(x)$ is differentiable at $x = a$. The formula for the linear approximation of f at a is:
   (a) $L(x) = f(a) + (f'(x))(x - a)$ (b) $L(x) = (f'(a))(x - a)$
   (c) $L(x) = f(a) + (f'(a))(x - a)$ (d) $L(x) = (f'(x))(x - a)$

2. Which of the following is **NOT** a true statement about either dy or Δy for $y = f(x)$, considered at $x = a$?
   (a) $\Delta y = f(a + \Delta x) - f(a)$ is the change in f as x changes from $x = a$ to $x = a + \Delta x$.
   (b) The equation $dy = f'(a)dx$ is another way to write the linear approximation of f at a.
   (c) $dy = f(a + dx) - f(a)$ is the change in f as x changes from $x = a$ to $x = a + dx$.
   (d) For small values of dx, $f(a + dx) \approx f(a) + dy$.

3. Suppose $f(7) = 3$ and $f'(7) = -4$. If you use the linear approximation to f at $x = 7$ to approximate $f(6.95)$, what value do you get?
   (a) 2.8 (b) 0.2 (c) 3.2 (d) -0.2

4. Suppose $f(7) = 3$, $f'(7) = -4$, and $f''(x) > 0$ for all x. Which of the following statements about the linear approximation $L(x)$ to f at $x = 7$ is correct?
   (a) We have $L(x) \geq f(x)$ for $x < 7$ and $L(x) \geq f(x)$ for $x > 7$.
   (b) We have $L(x) \leq f(x)$ for $x < 7$ and $L(x) \geq f(x)$ for $x > 7$.
   (c) We always have $L(x) \geq f(x)$.
   (d) We always have $L(x) \leq f(x)$.