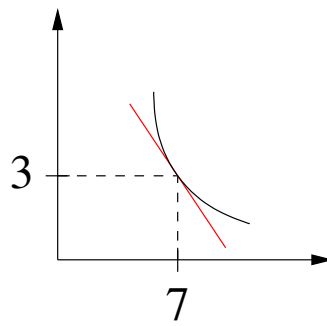


Answers for class prep quiz on section 3.10, Stewart's Calculus (8th ed.)

1. **Answer:** (c). Remember, the equation of the tangent line to  $y = f(x)$  at  $x = a$  is  $y - f(a) = (f'(a))(x - a)$ , and (c) is what you get when you solve for  $y = L(x)$  in the equation of the tangent line.
2. **Answer:** (c). Remember, the standard notation is that  $\Delta y$  is the exact change in  $f(x)$  over a change  $\Delta x = dx$  in  $x$ , and  $dy$  is the change in the tangent line approximation over a change  $dx = \Delta x$  in  $x$ ; the problem with (c) is that it equates the change in the tangent line approximation with the exact change in  $f(x)$ . (a) is true because that's the definition of  $\Delta y$ , (b) is indeed another way to write  $L(x) - f(a) = (f'(a))(x - a)$ , and (d) is true because here, we are only saying that  $dy$  is *approximately* the change in  $f(x)$ , not exactly.
3. **Answer:** (c). Since we are approximating  $f(x)$  at  $a = 7$ , the value  $x = 6.95$  gives a value of  $x - a = -0.05$ , which means that the linear approximation to  $f(6.95)$  is

$$f(6.95) \approx L(6.95) = 3 + (-4)(-0.05) = 3.2.$$

Note that since  $f'(7) < 0$  and  $6.95 < 7$ , the tangent line approximation to  $f(x)$  should give a number larger than  $f(7) = 3$ , so even without calculation, the only answer that could possibly work is (c) (the only option larger than 3).



4. **Answer:** (d). Since  $f''(x) > 0$  for all  $x$ , the graph of  $f(x)$  is a “smiley face”, and therefore, bends up from the tangent line at  $a = 7$ , as shown in the picture above (tangent line is red).