

Answers for class prep quiz on section 3.4, Stewart's Calculus (8th ed.)

1. **Answer:** (d). The “outside” function is  $y = \sin u$  and the “inside” function is  $u = f(x)$ , so

$$g'(x) = \frac{dy}{du} \frac{du}{dx} = (\cos u)(f'(x)) = \cos(f(x))f'(x).$$

2. **Answer:** (a). The chain rule says that  $h'(x) = g'(f(x))f'(x)$ , so

$$h'(2) = g'(f(2))f'(2) = g'(5)f'(2) = 11(-5) = -55.$$

3. **Answer:** (a). We can decompose  $y = f(x) = \sqrt{e^{2x} + 1}$  as the (3-step!) chain  $y = u^{1/2}$ ,  $u = e^w + 1$ ,  $w = 2x$ , which means that

$$f'(x) = \frac{dy}{du} \frac{du}{dw} \frac{dw}{dx} = \left( \frac{u^{-1/2}}{2} \right) (e^w)(2) = \frac{2e^{2x}}{2\sqrt{e^{2x} + 1}}.$$

4. **Answer:** (d). With the chain rule, we can find the derivative of any function formed by using algebraic operations and composition to combine the functions for which we have basic derivative formulas (power, exponential, trig).