

$$65. | f^{-1}(x) = \frac{1}{f'(f^{-1}(x))}$$

$$f^{-1}(3) = \frac{1}{f'(f^{-1}(3))} = \frac{1}{f'(9)} = \frac{1}{5}$$

62. $h'(2)$; $h(x) = (f(x))^3$ $f(x)$ is inside function

$$h'(x) = 3(f(x))^2 \cdot f'(x) \quad \text{Let } z = f(x) \Rightarrow g(z) = z^3$$

$$h(x) = g(f(x))$$

$$h'(x) = g'(z) \cdot f'(x) = 3z^2 \cdot f'(x) = 3(f(x))^2 \cdot f'(x)$$

$$h'(2) = 3(f(2))^2 \cdot f'(2)$$

$$= 3(5)^2 \cdot 3$$

$$m = \frac{5.3 - 5}{2.1 - 2} = \frac{.3}{.1} = 3$$

$$= 3(25) \cdot 3 = 9 \times 25 = 225$$

63. $k'(2)$; $k(x) = (f(x))^{-1} = \frac{1}{f(x)}$

Let $z = f(x) \Rightarrow g(z) = z^{-1}$

$$k(x) = g(f(x))$$

$$k'(x) = -1 \cdot z^{-2} \cdot f'(x) = -1 \cdot (f(x))^{-2} \cdot f'(x)$$

$$k'(2) = -1 \cdot (f(2))^{-2} \cdot f'(2) = -1(5)^{-2} \cdot 3 = -0.12$$

64. $g'(5)$; $g(x) = f^{-1}(x)$

$$g'(x) = \frac{1}{f'(f^{-1}(x))}$$

$$g'(5) = \frac{1}{f'(f^{-1}(5))} = \frac{1}{f'(2)} = \frac{1}{3} =$$

42. $f(x) = \ln(3x)$

Let $z = g(x) = 3x$ and define $h(z) = \ln(z)$

Thus, $f(x) = h(g(x)) = \ln(3x)$

$$f'(x) = \frac{1}{z} \cdot 3 = \frac{1}{3x} \cdot 3 = \frac{1}{x}$$

b) $f(x) = \ln(3) + \ln(x)$

c) $f'(x) = \frac{1}{x}$

More problems: #7, 8, #10

10. $f(x) = e^{\ln(e^{2x^2} + 3)} = e^{2x^2} + 3$

$$f'(x) = \frac{d}{dx} [e^{2x^2} + 3] = \frac{d}{dx} [e^{2x^2}] + \frac{d}{dx} [3]$$

$$f'(x) = \frac{d}{dx} [e^{2x^2}]$$

let $z = g(x) = 2x^2$
and $h(z) = e^z$

$$f'(x) = \frac{d}{dz} (h(z)) \cdot \frac{d}{dx} (g(x)) = e^z \cdot 4x = e^{2x^2} \cdot 4x$$