Example 1. (Based on Hughes-Hallett, 4e, 3.3 Example 1) The amount of gas, G, in gallons, consumed by a car depends on the distance traveled, s, in miles. But, suppose we want to know how much gas is consumed each *hour*, not each mile? Well, the distance traveled, s depends on the time traveled, t, in hours. Let 0.05 gallons of gas be consumed for each mile traveled, and suppose that the car is traveling at $30\,{}^{\text{mi}}/_{\text{hr}}$. How fast is gas being consumed? Give units.

Example 2. Write each of the following functions as a function of z, where z is the "inside" function.

(a) $y = \sqrt{x^2 + 2x}$
(b) $y = 5(2x + 7)^8$
(c) $y = \dfrac{11}{x^2 + 1}$
(d) $y = -7.2e^{x^2}$
(e) $y = \frac{1}{2} \ln(3x^2 + 5)$

Example 3. Find the derivatives of the following functions. Use z for the inside function, and use the Leibniz notation for the chain rule.
(a) $y = 5(-3x^2 + 2x + 7)^{11}$.
(b) $y = \frac{7}{3}\ln(x^3 + x)$.

Example 4. Find the following derivatives

(a) $\dfrac{d}{dx}(3x-7)^{11}$

(b) $\dfrac{d}{dx}\sqrt{1.9x-4.3}$

(c) $\dfrac{d}{dx}\dfrac{1}{10x-4}$

(d) $\dfrac{d}{dx}e^{1.03x-1}$

(e) $\dfrac{d}{dx}\ln(2x+e^2)$