

Name _____

The Chain Rule

Chain Rule #1

Find $f'(x)$

1) $(4x^2 + 1)^7$

2) $\cos\sqrt{3x^2 + 5x - 2}$

3) $\frac{1}{x^2 + x^4}$

4) $\frac{\sin x}{(1-x)^3}$

5) $\frac{x}{(\sqrt{x} - 1)^3}$

Use the Chain Rule to find the derivatives for #6 and 7

6) $\sec x$

7) $\csc x$

Chain Rule #2

8) If you are driving 65 miles per hour in a car that is burning a gallon of gas every 20 miles, use the Chain Rule to determine how many gallons is your car burning every hour.

First of all, find labels for everything! M = miles, t = time, G = gallons then read the sentence again...

If you are driving 65 miles per hour $\left(\frac{dM}{dt} = 65 \text{ miles/hr}\right)$ in a car that is burning a gallon of gas every 20

miles $\left(\frac{dG}{dM} = \frac{1}{20} \text{ gallons/mile}\right)$, how many gallons is your car burning every hour? $\left(\text{find } \frac{dG}{dt}\right)$

9) Suppose the length, L cm, of a steel bar depends on the air temperature, H° Celcius, which itself depends on time t, measured in hours. If the length increases by 2 cm for every degree increase in temperature and the temperature is increasing at 3° per hour, how fast is the length of the bar increasing?