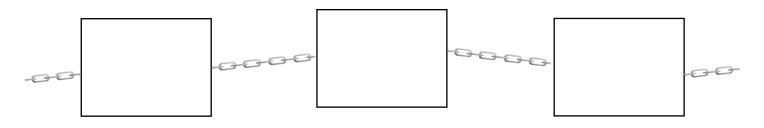
## **Chain Rule**

## Goal: Can describe chain rule as the measure of how much something two steps down changes. Can use chain rule along with the other derivative rules to find derivatives. Terminology: Chain Rule

Consider a chain that has three blocks connected like illustrated below:



If we move the block furthest to the left, it will cause the black on the far right to move a related amount. We are interested in measuring that rate of change. It helps to use units

**Example**: If  $A(x) = f(g(x)) + x^2$  and we know f(2) = 4, f'(6) = 5, g(2) = 6, g'(2) = -3. Determine A'(2). (Alternatively, you could write it as  $\frac{d}{dx}A(x)|_{x=2}$ )

**Example**: If 
$$y = \sqrt{u+3}$$
 and  $u = \frac{1}{w^2}$  and  $w = x^4 - 4x^3 + 8x$ . Find  $\frac{dy}{du}$ ,  $\frac{dy}{dw}$ , and  $\frac{dy}{dx}$ .

Practice Problems: 2.6: # 1-5 (do what you need), 6 (at least every other), 7-11

# 12, Problems Plus (page 102)