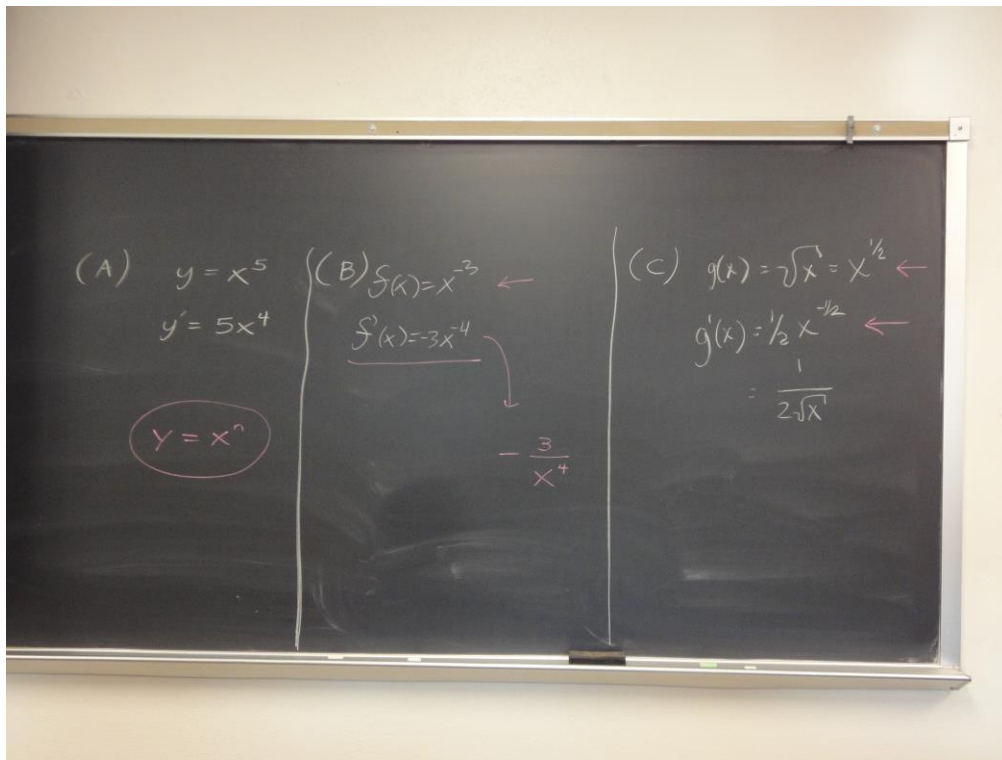
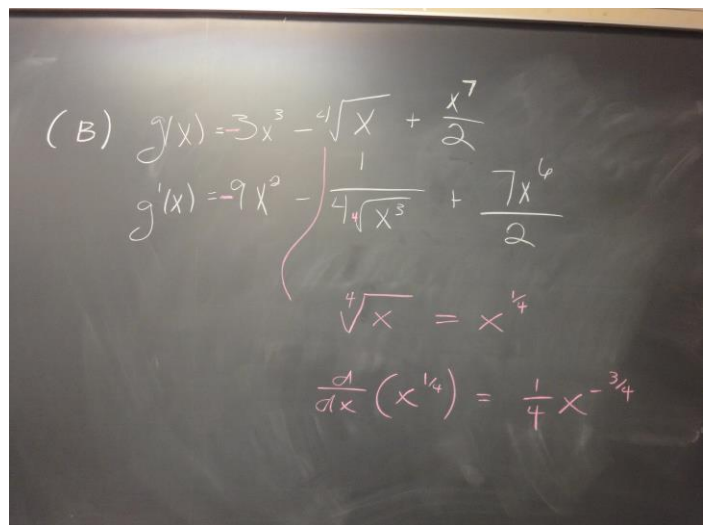
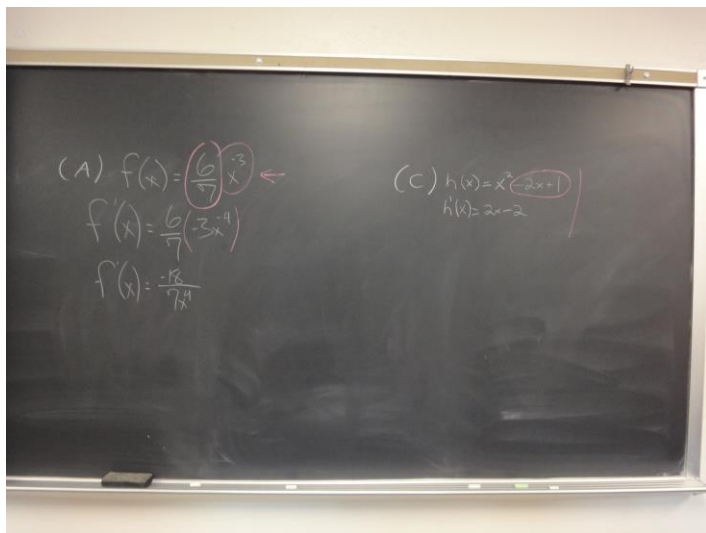


Warm Up (Power Rule); Level I Problems:



Level II Problems:



Physics Problem & some discussion on derivative notation:

a) $s = t^3 - 3t$
 $s' = v = 3t^2 - 3$
 $s'' = v' = a = 6t$

b) $a = 6t = 6(2) = 12 \text{ m/s}^2$

c) $v = 3t^2 - 3 = 0$
 $3t^2 = 3$
 $\frac{3t^2}{3} = \frac{3}{3}$
 $t^2 = 1$
 $t = 1 \text{ or } -1$
 no negative time

$a = 6(t)$
 $a = 6(1)$
 $a = 6 \text{ m/s}^2$

$s' = v = \frac{ds}{dt}$
 $s'' = a = \frac{d}{dt} \left(\frac{ds}{dt} \right) = \frac{d^2s}{dt^2}$

True/False Problem:

a) false e is a constant

b) false $\frac{d}{dx} x^{-3} = -3x^{-4} = -\frac{3}{x^4}$

c) true $\frac{d}{dx} \frac{1}{\pi} x = \frac{1}{\pi}$ (constant multiple rule)

d) false $f(x) = 2x + 7$ $f'(x) = 2$
 $g(x) = -2x - 10$ $g'(x) = -2$

a. False, e is a constant so...
 $\frac{d}{dx} (e^x) = e^x$

b. False
 $\frac{d}{dx} \left(\frac{1}{x^3} \right) = x^{-3}$
 $= -3x^{-4}$
 $= -\frac{3}{x^4}$

c. True
 $\frac{d}{dx} \left(\frac{x}{\pi} \right) = \frac{1}{\pi} \cdot x$
 $= \frac{1}{\pi} \cdot 1$
 $= \frac{1}{\pi}$

d. False, can have diff. constant
 $f(x) = x^2 + 2x + 1 \neq g(x) = x^2 + 2x + 2$
 $f'(x) = 2x + 2 = g'(x) = 2x + 2$