

Name _____

Date _____

18.01 ESG Independent Study Path

Unit 2 Practice Test

1. Use the definition of the limit to find

$$\frac{d}{dx}x^2$$

2. Find a tangent line to the curve $y = 3x^2 + 6x + 1$ which passes through the point $(0, 1)$.
3. Find $y^{(7)}$ ($= \frac{d^7 y}{dx^7}$):

$$y = x^7 + 3x^6 + 4x^5 - x^3 + 78x^2 - 5x + 4.$$

(*Hint*: think before starting; you don't have to differentiate 7 times.)

4. Find $\frac{dq}{dp}$:

$$q = \frac{(p^5 - p)(p^3 + p^2)}{p^4 + (p^3 + 1)(p^3 - 1)}.$$

5. What is $D_x[f(x)g(x)h(x)]$ equal to in terms of f' , g' , and h' ? What is $D_x[f(x)^3]$?
6. If $f(2) = 3$, $f'(2) = -1$, $g(2) = -5$, and $g'(2) = 2$, then what are $(4f/g)'(2)$ and $(f + fg - 1/g)'(2)$?