

2.3 Videos Guide

2.3a

- $\frac{d}{dx}(c) = 0$ (The derivative of a constant function)
- $\frac{d}{dx}(x^n) = nx^{n-1}, n \in \mathbb{R}$ (The Power Rule)

2.3b

- $\frac{d}{dx}[f(x) \pm g(x)] = f'(x) \pm g'(x)$ (The Sum and Difference Rules)
- $\frac{d}{dx}[cf(x)] = cf'(x)$ (The Constant Multiple Rule)
- $\frac{d}{dx}[f(x)g(x)] = f(x)g'(x) + f'(x)g(x)$ (The Product Rule)
OR $(uv)' = u'v + uv'$
- $\frac{d}{dx}\left[\frac{f(x)}{g(x)}\right] = \frac{f'(x)g(x) - f(x)g'(x)}{[g(x)]^2}$ (The Quotient Rule)
OR $\left(\frac{u}{v}\right)' = \frac{u'v - uv'}{v^2}$

2.3c

Exercises:

- Differentiate the function (aka find the derivative of the function).
 - $f(x) = 60x^4 - \frac{8}{3}x^3 + \frac{10}{3x^{1/3}} + 2$
 - $f(x) = \sqrt{x}$

2.3d

- $B(x) = (x^3 + 1)(2x^2 - 4x - 1)$
- $y = \frac{(u+2)^2}{1-u}$

2.3e

Proofs:

- The Product Rule
- The Quotient Rule