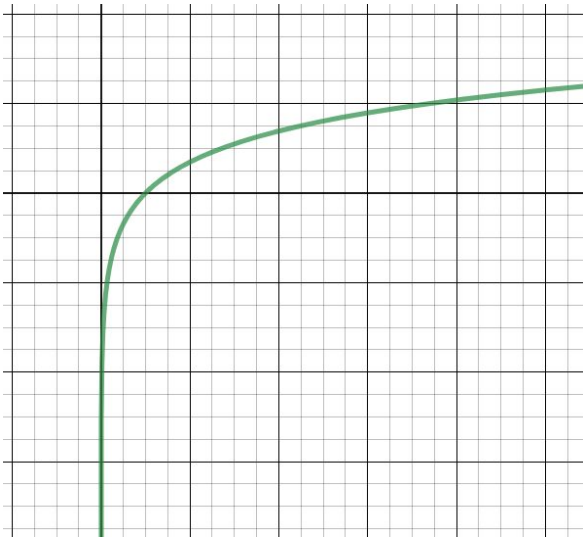
1. **(C5.7 - N) (CI)** Here is a graph of the function $g(x) = \ln(x)$. Sketch a graph of the ***first*** derivative of this function. Record any observations/conclusions you might make about the function and their derivatives. Finally, what appears to be the equation of the derivative of $g(x) = \ln(x)$?
(Cirrito 19.2, p.60)



2. **(C5.4 - N) (CI)** Determine the equations of the derivatives of the following functions.
(Cirrito 20.1, p.646)

   a. $g(x) = \ln(x^2 - 3)$.
   b. $h(x) = \ln\left(\frac{2}{x}\right)$.
   c. $f(x) = \ln(1 - x^3)$.
   d. $h(x) = (\ln x)^2$

3. **(C5.4 - N) (CI)** Find the slope of the following curves at the specified x-values.
(Cirrito 20.1, p.646)

   a. $g(x) = \cos^2(x)$ at the point where $x = \frac{\pi}{4}$.
   b. $h(x) = \sin(x^2)$ at the point where $x = \frac{\pi}{2}$.
   c. $f(x) = e^{\sin(x)}$ at the point where $x = -\pi$.
   d. $h(x) = \sqrt[3]{(11 - 3x)^2}$ at the point where $x = 1$.

4. Repeat Question 2, but now as a CALC ACTIVE question.

5. **(C5.4 - N) (CI)** Determine the equations of the lines that are *tangent* to the following functions at the specified points.
(Cirrito 20.1, p.646)

   a. $g(x) = \sin(\pi x)$ at the point where $x = \frac{1}{4}$.
   b. $h(x) = \sqrt{1 + 4x}$ at the point where x = 2.
   c. $f(x) = e^{1-x^3}$ at the point where $x = 1$.
   d. k(x) = ln(2 + sin x) at the point where $x = \pi$.

6. **(C5.4 - N) (CA)** Determine the equations of the lines that are *normal* to the following functions at the specified points.
(Cirrito 20.1, p.646)

   a. $g(x) = \sin(\pi x)$ at the point where $x = \frac{1}{3}$.
   b. $h(x) = \sqrt{1 + 4x}$ at the point where x = 1.
   c. $f(x) = e^{1-x^3}$ at the point where $x = 2$.
   d. k(x) = ln(2 + sin x) at the point where $x = \frac{\pi}{3}$.

7. Use Symbolab or Wolframalpha to determine the derivatives of the following functions.

   a. $y = x^2 \sin(x)$
   b. $y = \left(\frac{1}{x}\right) \sin(x)$
   c. $y = (x^4 - x^3)\cos(x)$
   d. $y = e^x \cos(x)$
   e. $y = x^3 e^x$
   f. $y = (x^4 - x^3)e^x$

8. Now that you have determined the derivatives of the given functions, explain any patterns in the derivatives that you notice. Hence, propose a conjecture as to how to take derivatives of the product of two functions: $y = f(x) \times g(x)$

FOR PRACTICE & HW

http://mrsantowski.tripod.com/2019AnalysisApproachesSL/Homework/PS49_PR_Practice.pdf

https://www.nagwa.com/en/worksheets/280137153968/