Homework 6

§3.3#1, 5, 11, 15, 17, 53, **46**, **48**

§3.4#1, 5, 9, 23, 29, 35, 49, 51, **30**, **64**, **68**

§3.3 #1. If $f(x) = x^2(x^3 + 5)$, find $f'(x)$ two ways: by using the product rule and by multiplying out before taking the derivative. Do you get the same result? Should you?

§3.3 #5. Find the derivative of $y = \sqrt{x} \cdot 2^x$.

§3.3 #11. Find the derivative of $y = \frac{t+1}{2^t}$.

§3.3 #15. Find the derivative of $z = \frac{3t+1}{5t+2}$.

§3.3 #17. Find the derivative of $f(t) = 2te^t - \frac{1}{\sqrt{t}}$.

§3.3 #53. If $H(3) = 1,\ H'(3) = 3,\ F(3) = 5$, and $F'(3) = 4$, find:

a) $G'(3)$ if $G(z) = F(z)H(z)$

b) $G'(3)$ if $G(w) = F(w)/H(w)$

§3.3 #**46**. Find the equation of the tangent line at $x = 1$ to $y = f(x)$ where $f(x) = \frac{3x^2}{5x^2+7x}$.

§3.3 #**48**. Find the derivative of the function $x^2 f(x)$ using symbols such as $f(x)$ and $f'(x)$ in your answer as necessary. Assume that $f(x)$ is differentiable.

§3.4 #1. Find the derivative of $f(x) = (x + 1)^{99}$

§3.4 #5. Find the derivative of $y = \sqrt{e^x + 1}$

§3.4 #9. Find the derivative of $w(r) = \sqrt{r^4 + 1}$

§3.4 #23. Find the derivative of $w = e^{\sqrt{s}}$

§3.4 #29. Find the derivative of $x = 2^{5t-3}$

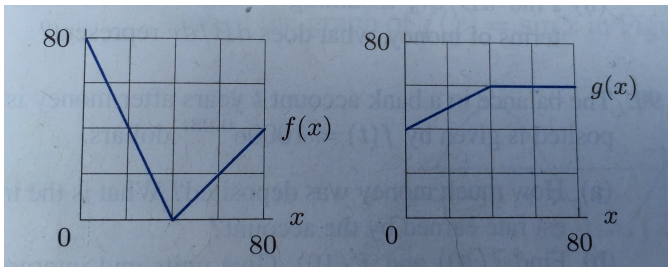
§3.4 #35. Find the derivative of $h(x) = \sqrt{\frac{x^2+9}{x+3}}$

§3.4 #49. Find the derivative of $f(y) = e^{e^{(y^2)}}$

§3.4 #51. Find the derivative of $f(x) = (ax^2 + b)^3$ where a and b are constants.

§3.4 #**30**. Find the derivative of the function $w = \sqrt{(x^2 5^x)^3}$.

§3.4 #**64**. Using the two graphs below, evaluate the derivative $\frac{d}{dx} g(f(x))|_{x=70}$.



§3.4 #**68**. For what values of x is the graph of $y = e^{-x^2}$ concave down?