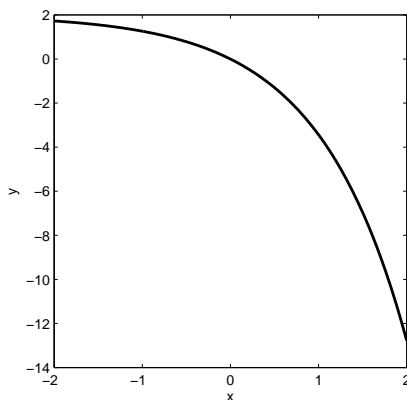


Solution to Assignment #2 (“Paper Homework”)

Sec 1.5 - Prob. 6 [2 pts]

- (a) You can define it like the textbook: e is chosen such that the slope of tangent line to the graph of e^x at point $(0, 1)$ is 1.
- (b) $e \approx 2.7172$.
- (c) The natural exponential function is $f(x) = e^x$.

Sec 1.5 - Prob. 16 [2 pts]



Sec 1.5 - Prob. 23 [2 pts] $f(x) = 5^x$. We have:

$$\begin{aligned}\frac{f(x+h) - f(x)}{h} &= \frac{5^{x+h} - 5^x}{h} \\ &= \frac{5^x \cdot 5^h - 5^x}{h} \\ &= 5^x \cdot \left(\frac{5^h - 1}{h} \right).\end{aligned}$$

Sec 1.6 - Prob. 40 [2 pts]

$$\begin{aligned}\ln(a+b) + \ln(a-b) - 2\ln c &= \ln[(a+b)(a-b)] - \ln c^2 \\ &= \ln \frac{(a+b)(a-b)}{c^2}.\end{aligned}$$

Sec 1.6 - Prob. 52 [2 pts]

(a)

$$\begin{aligned}\ln(\ln(x)) &= 1 \\ e^{\ln(\ln(x))} &= e^1 \\ \ln(x) &= e \\ e^{\ln(x)} &= e^e \\ x &= e^e.\end{aligned}$$

(b)

$$\begin{aligned}e^{ax} &= Ce^{bx} \\ \frac{e^{ax}}{e^{bx}} &= C \\ e^{(a-b)x} &= C \\ \ln(e^{(a-b)x}) &= \ln(C) \\ (a-b)x &= \ln(C) \\ x &= \frac{\ln(C)}{a-b}.\end{aligned}$$