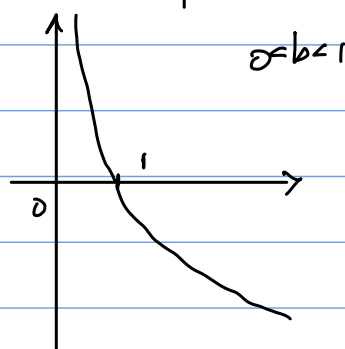
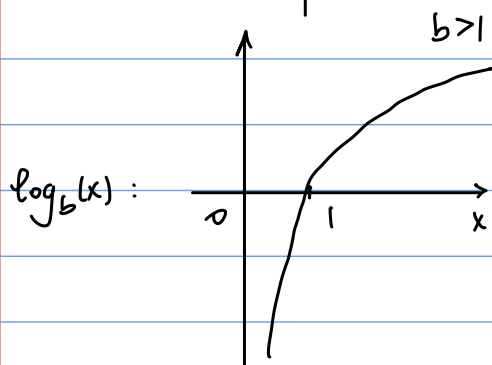
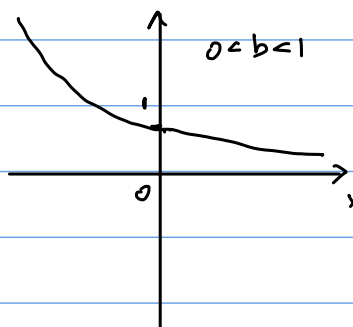
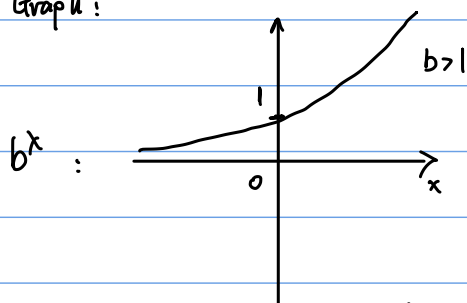


• Executive summary of exps and logs: $b > 0, b \neq 1$. (MT2 $\rightarrow$ Final)

• Graph:



⊕ Exp rules:

- $b^x b^y = b^{x+y}$
- $\frac{b^x}{b^y} = b^{x-y}$
- $(b^x)^y = b^{xy}$
- $b^{-x} = \frac{1}{b^x} = \left(\frac{1}{b}\right)^x$
- $b^0 = 1, b^1 = b$
- $b^{\log_b x} = x \quad (e^{\ln x} = x)$
- $b^x = (k^{\log_k b})^x = k^{(\log_k(b) x)}$
($b^x = e^{\ln(b) x}$)

⊕ log rules:

- $\log_b(x) + \log_b(y) = \log_b(xy)$
- $\log_b(x) - \log_b(y) = \log_b\left(\frac{x}{y}\right)$
- $\log(x^k) = k \log_b(x)$
- $-\log_b(x) = \log_b\left(\frac{1}{x}\right) = \log_{\frac{1}{b}}(x)$
- $\log_b(1) = 0, \log_b(b) = 1$
- $\log_b(b^x) = x \quad (\ln(e^x) = x)$
- $\log_b(x) = \frac{\log_k(x)}{\log_k(b)}$ (Change of base)
($\log_b(x) = \frac{\ln(x)}{\ln(b)}$)

⊕ Derivatives for b^x :

- $\frac{d}{dx}(e^x) = e^x$
- $\frac{d}{dx}(b^x) = (\ln b) b^x$

⊕ Derivatives for $\log_b(x)$:

- $\frac{d}{dx}(\ln(x)) = \frac{1}{x}$
- $\frac{d}{dx}(\log_b(x)) = \frac{1}{\ln(b)} \frac{1}{x}$

⊕ Don't forget inverse functions!