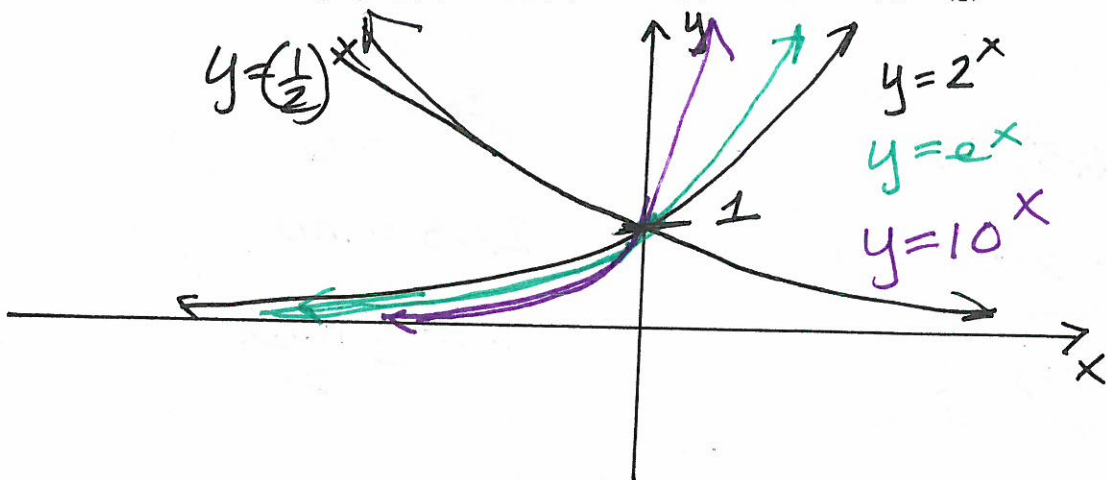


## LECTURE NOTES: §1.4 & 1.5

1. On the same set of axes, graph  $f(x) = 2^x$ ,  $g(x) = e^x$ ,  $h(x) = 10^x$ , and  $k(x) = (\frac{1}{2})^x$ .



2. Assume  $a > 0$ . What is the domain and range of  $f(x) = a^x$ ? Asymptotes?

domain :  $(-\infty, \infty)$

asymptote  $y = 0$

range :  $(0, \infty)$

3. Without the use of a calculator, compute the following:

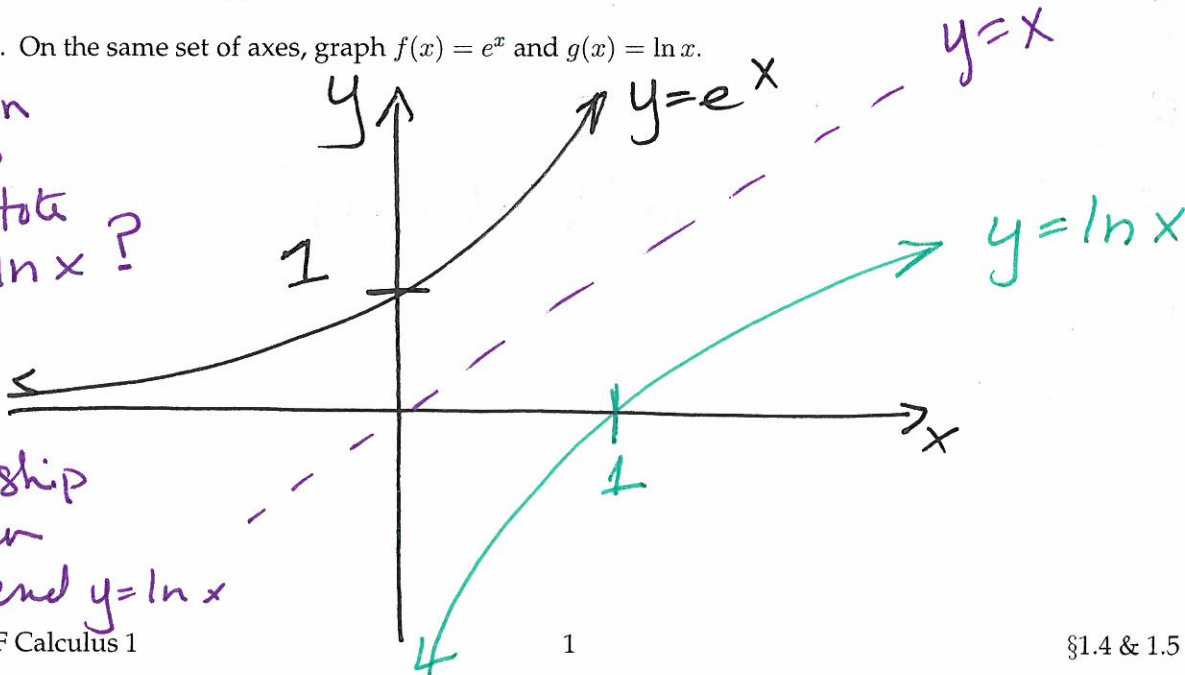
(a)  $\log_2 \frac{1}{16} = \log_2 2^{-4} = -4$

(b)  $\ln e^{0.24} = 0.24$

(c)  $e^{5 \ln x} = e^{\ln(x^5)} = x^5$

4. On the same set of axes, graph  $f(x) = e^x$  and  $g(x) = \ln x$ .

- domain
- range
- asymptote for  $\ln x$ ?



• relationship between  $y = e^x$  and  $y = \ln x$

5. Solve the following equations for  $x$ .

(a)  $\ln(x+5) - 1 = 7$

$$\ln(x+5) = 8$$

$$e^8 = x+5$$

$$\boxed{e^8 - 5 = x}$$

(b)  $e^{2x-5} + 4 = 10$

$$e^{2x-5} = 6$$

$$2x-5 = \ln 6$$

$$x = \frac{5 + \ln 6}{2}$$

6. Are the following statements true or false? If either case, explain why. If possible, change the false statements so that they are a true statement.

F (a)  $(a+b)^2 = a^2 + b^2$

F (b)  $\sqrt{x^2+4} = x+2$

F (c)  $\frac{a+b}{c+d} = \frac{a}{c} + \frac{b}{d} \quad | = \frac{2+2}{1+3} = 2 + \frac{2}{3}$

T (d)  $\frac{a+b}{c} = \frac{a}{c} + \frac{b}{c}$

F (e)  $\ln(x+y) = \ln x + \ln y$

F (f)  $\frac{\ln x}{\ln y} = \ln\left(\frac{x}{y}\right)$

$$\ln\left(\frac{x}{y}\right) = \ln x - \ln y$$

F (g)  $\ln(x-y) = \ln\left(\frac{x}{y}\right)$

F (h)  $f^{-1}(x) = \frac{1}{f(x)}$

T (i)  $f^2(x) = (f(x))^2$