

## MATH 2A/5A Prep: Exponential and Logarithm Functions

### Facts to Know:

$e$  is the irrational number 2.718...

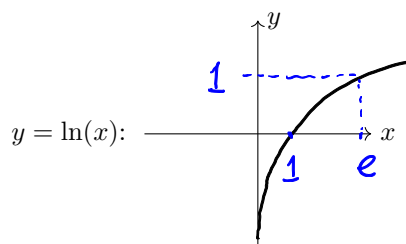
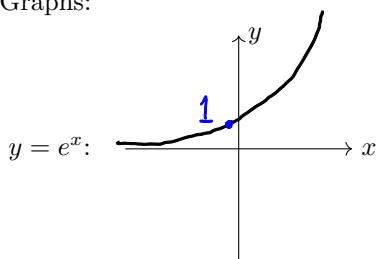
$$\bullet e^{a+b} = e^a \cdot e^b, e^{ab} = (e^a)^b$$

$$\bullet \ln(ab) = \ln(a) + \ln(b), \ln(a^n) = n \cdot \ln(a) \quad \bullet \ln(a+b) \neq \ln(a) + \ln(b)$$

$$\bullet e^0 = 1, \ln(1) = 0, \ln(e) = 1$$

$$\bullet \text{For } x > 0, e^{\ln(x)} = x, \ln(e^x) = x \cdot \ln(e) = x$$

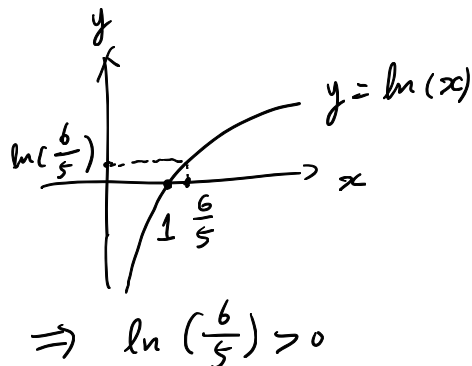
• Graphs:



### Examples:

1. Determine whether  $\ln(2) + \ln(3) - \ln(5)$  is positive or negative.

$$\begin{aligned} & \ln(2) + \ln(3) - \ln(5) \\ = & \ln(2 \cdot 3) - \ln(5) \\ = & \ln(6) + (-1) \cdot \ln(5) \\ = & \ln(6) + \ln(5^{-1}) = \ln(6) + \ln\left(\frac{1}{5}\right) = \ln\left(\frac{6}{5}\right) \end{aligned}$$



2. Order  $e^3 \cdot e^3$ ,  $e^{3 \cdot 3}$  and  $e^{3^3}$  from smallest to largest.

$$\begin{aligned} e^3 \cdot e^3 &= e^{3+3} = e^6 \\ e^{3 \cdot 3} &= e^9 \\ e^3 & \end{aligned}$$