

$$f(x) = \frac{\ln x}{x} \quad [1, 3]$$

$$f'(x) = \frac{x \cdot \frac{1}{x} - \ln x}{x^2} = \frac{1 - \ln x}{x^2}$$

critical #s:

$$1 - \ln x = 0$$

$$\ln x = 1$$

$$x = e$$

$$x^2 = 0$$

$$x = 0$$



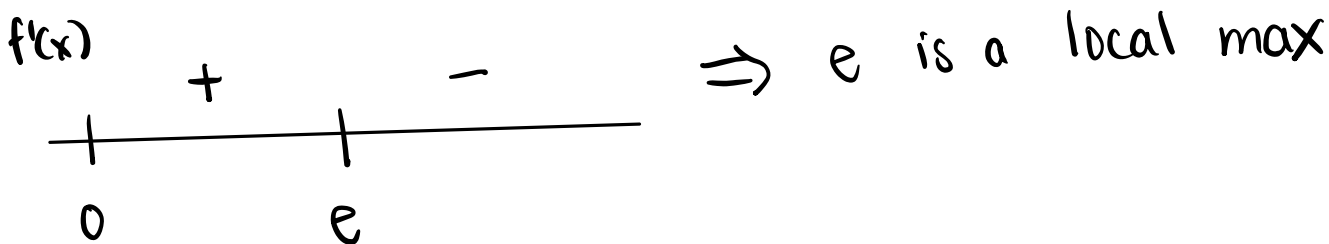
not in interval

$$f(1) = \frac{\ln 1}{1} = 0 \leftarrow \text{min}$$

$$f(e) = \frac{\ln e}{e} = \frac{1}{e} \leftarrow \text{max}$$

$$f(3) = \frac{\ln 3}{3}$$

Why is  $\frac{1}{e} > \frac{\ln 3}{3}$  ?



Since  $e$  is a local max,  $f(e)$  will be greater than the numbers around it (such as  $f(3)$ ).

$$\text{So, } \frac{1}{e} > \frac{\ln 3}{3}$$

