

$$f(x) = 2(\sqrt{x})^x \text{ on } (0.05, 1]$$

critical points:

$f'(x) = 0$ or DNE in its domain

$$f'(x) = ?$$

$$y = 2(\sqrt{x})^x \Rightarrow \frac{y}{2} = (\sqrt{x})^x$$

$$\ln\left(\frac{y}{2}\right) = x \cdot \ln(\sqrt{x})$$

$$\frac{\left(\frac{y}{2}\right)'}{\left(\frac{y}{2}\right)} = 1 \cdot \ln(\sqrt{x}) + x \cdot \frac{5}{5x} \rightarrow 1$$

$$\frac{y'}{2} = \ln(\sqrt{x}) + 1$$

$$\frac{y'}{y} = \ln(\sqrt{x}) + 1 \Rightarrow y' = 2(\sqrt{x})^x (\ln \sqrt{x} + 1)$$

$$f'(x) = 2(\sqrt{x})^x (\ln(\sqrt{x}) + 1) = 0$$

$$(\sqrt{x})^x = 0 \text{ or } \ln(\sqrt{x}) + 1 = 0$$

DNE

$$\ln(\sqrt{x}) = -1$$

$$5x = e^{-1} = \frac{1}{e}$$

$$\boxed{x = \frac{1}{5e}}$$

To determine
Abs. min/max

Compare

$$f\left(\frac{1}{5e}\right) \text{ critical p.}$$

$$f(0.05)$$

$$f(1)$$