

You must show your work to get full credit.

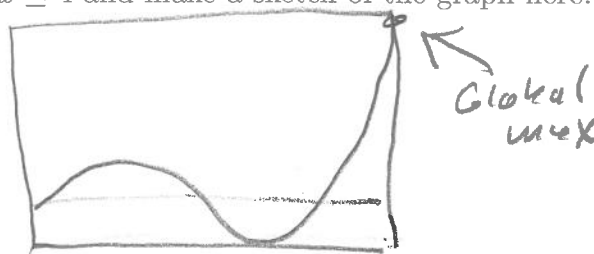
1. Compute the derivative of $f(x) = \frac{e^{2x} - 1}{e^{2x} + 1}$. $f'(x) = \frac{4e^{2x}}{(e^{2x} + 1)^2}$

$$\begin{aligned} f'(x) &= \frac{(e^{2x} - 1)'(e^{2x} + 1) - (e^{2x} - 1)(e^{2x} + 1)'}{(e^{2x} + 1)^2} \\ &= \frac{2e^{2x}(e^{2x} + 1) - (e^{2x} - 1)(2e^{2x})}{(e^{2x} + 1)^2} \\ &= \frac{2e^{4x} + 2e^{2x} - 2e^{4x} + 2e^{2x}}{(e^{2x} + 1)^2} \end{aligned}$$

2. Let $f(x) = x(x - 2)(x - 3)(.9)^x$.

(a) Use your calculator to plot $y = f(x)$ for $0 \leq x \leq 4$ and make a sketch of the graph here.

$Y_1 = X(X-2)(X-3)(.9)^X$
 $X_{min} = 0$
 $X_{max} = 4$
 ZoomFit



(b) Find the global extrema of $f(x)$ on $0 \leq x \leq 4$ to three decimal places

The maximizer is
 $x = 4$. Use
 2nd Calc
 1: value
 $x = 4$ to get
 2nd Calc
 3: minimum

Global maximizer	<u>4</u>
Global maximum	<u>5.249</u>
Global minimizer	<u>2.536</u>
Global minimum	<u>-0.483</u>