1.) Given the function $y = f(x) = x^{10} - 10x$, on the interval $0 \leq x \leq 2$,

a.) (5 pts.) use calculus to find the value(s) of $x$ for which $f(x)$ has a local maximum or minimum. Indicate which are maxima and which are minima.

$$f'(x) = 10x^9 - 10 = 10(x^9 - 1)$$

Set equal to 0.

$$10(x^9 - 1) = 0$$

$$x^9 - 1 = 0$$

$$x = 1$$

$$f''(x) = 90x^8$$

$$f''(1) = 90 > 0$$

$f'' > 0 \Rightarrow$ local min at $x = 1$

b.) (5 pts.) find the value(s) of $x$ for which $f(x)$ has a global maximum or global minimum.

Check critical points and endpoints:

$f(0) = 0$

$f(1) = -9 \rightarrow$ global min at $x = 1$

$f(2) = 1004 \rightarrow$ global max at $x = 2$