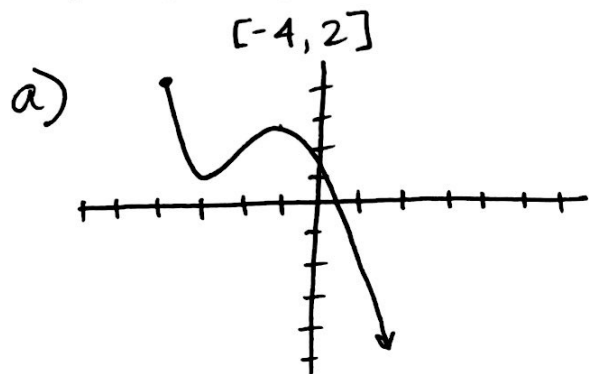


HW 3-1

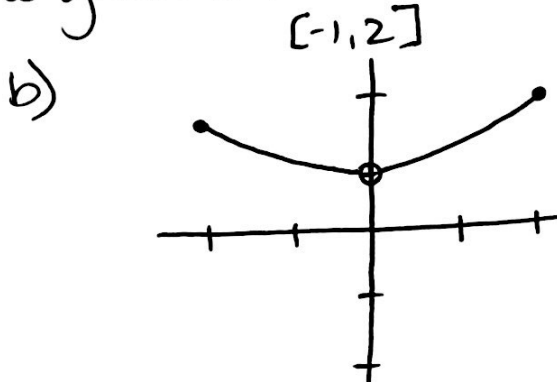
Extrema on an Interval

1) Using your own words (and your notes), explain the difference between the Extreme Value Theorem and the Intermediate Value Theorem you previously learned.

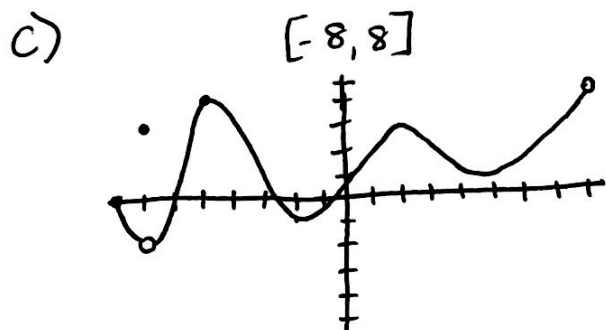
2) Use the graphs to find the absolute and relative minima and maxima on the given interval.



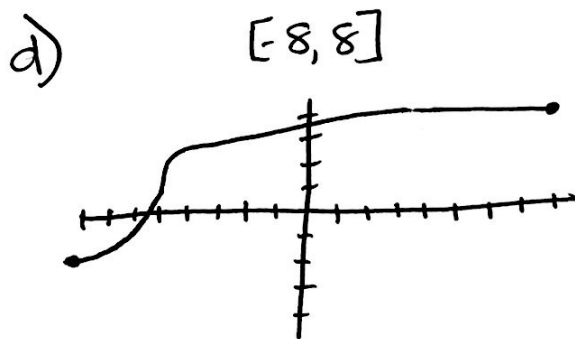
Relative min. _____ at $x =$ _____
 Relative max. _____ at $x =$ _____
 Absolute min. _____ at $x =$ _____
 Absolute max. _____ at $x =$ _____



Relative min. ~~_____~~ at $x =$ _____
 Relative max. _____ at $x =$ _____
 Absolute min. _____ at $x =$ _____
 Absolute max. _____ at $x =$ _____



Relative min. _____ at $x =$ _____
 Relative max. _____ at $x =$ _____
 Absolute min. _____ at $x =$ _____
 Absolute max. _____ at $x =$ _____



Relative min. _____ at $x =$ _____
 Relative max. _____ at $x =$ _____
 Absolute min. _____ at $x =$ _____
 Absolute max. _____ at $x =$ _____

3) For each of the following statements, give an example that proves it is not always true.

a) If $f'(5) = 0$, there is a maximum or minimum at $x = 5$.

b) If $x = 2$ is a critical point, then $f'(2) = 0$.

c) An extrema (minimum or maximum) occurs at every critical point.

d) If m is a local minimum and M is a local maximum of a function, then $m < M$. (Hint: draw a picture!)

4) Find the critical points, the absolute extrema, and the relative extrema of each function on the given interval.

a) $f(x) = x^3 + 6x^2 + 9x + 3$ on $[-4, 0]$

b) $f(x) = x^4 - 3x^2 + 4$ on $[-1, 1]$.

c) $f(x) = \frac{x^2}{3x-6}$ on $[3, \infty]$

d) $f(x) = (x+2)^{2/3}$ on $[-4, -2]$