Math 252 Homework

Sections 4.2 & 4.3

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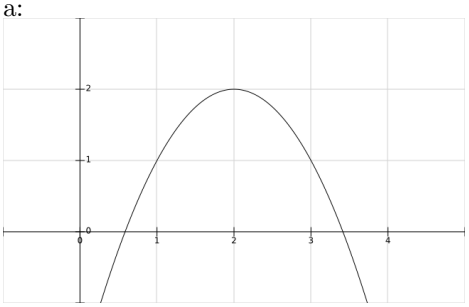
Chapter 4.2

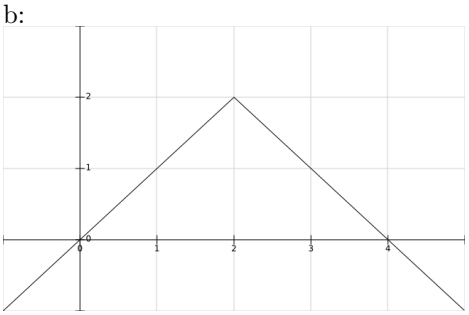
1:
An absolute minimum is a point at the lowest value that a graph reaches over an interval that, if the interval is open, does not include the limits of the interval. A relative minimum is any point that has a lesser value than the the points directly to the left or right of it.

5:
Local minima: (2, 2), (5, 3)
Local maxima: (4, 5)
Absolute minima: (0, 2), (2, 2)
Absolute maxima: (4, 5)

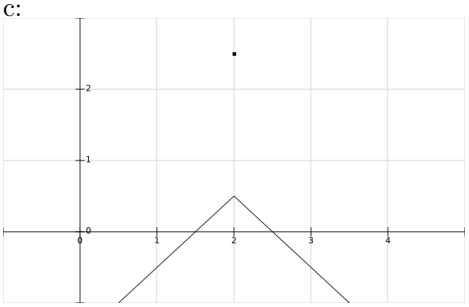
11:
a:



b:



c:



29:
Note: Used calculator (Ti-*n*spire CX CAS) to find x-intercepts of $f'(y)$
Critical numbers at $x = \{0, 2\}$

35:
Note: used calculator (Ti-*n*spire CX CAS) to find x-intercepts of $f'(\theta)$
Critical numbers at $\theta = \{2 \cdot n \cdot \pi, n \cdot \pi\}$

43:
Absolute maxima: $(-1, 8)$
Absolute minima: $(2, -18)$

51:
Absolute maxima: $(1, \ln(3))$
Absolute minima: $(1, \ln(1.75))$

59:
$f(x) = x \cdot \sqrt{x - x^2}$
a: No absolute min/max as function is consistantly concave down and on an open interval.
b: Likewise

61:
$V = 999.87 - 0.06426T - 0.0085043T^2 - 0.0000679T^3$
Max. density at $x = 208.614$

Chapter 4.3

2:
Concave upward: $(2, 4), (16/3, 8)$
Concave downward: $(0, 2), (4, 16/3)$

6:
a: $(2, 4), (6, 9)$ if $f'(x)$ is positive, x is increasing.
b: $x = 0, 2, 4, 6$ if $f'(x) = 0$, $f(x)$ is at a local max or min
c: $(1, 3), (5, 7), (8, 9)$ if $f''(x) > 0$, $f(x)$ is concave up, and vice versa
d: $x = 1, 3, 5, 7, 8, 9$ inflection points are where $f''(x)$ changes from < 0 to > 0 or vice versa.

7:
a: