2.3 → 53, 57, 49, 63

49.) use max or min functions on calc After you graph in order to find local max + local min
[2^{ND} → Trace]

53.) Find Avg rate of change for $f(x) = -2x^2 + 4$

a.) 0 to 2

b.) 1 to 3

c.) 1 to 4

$$\frac{f(b) - f(a)}{b-a}$$

a.) $\frac{f(2) - f(0)}{2-0} = \frac{[-2(2)^2+4] - [-2(0)^2+4]}{2} = \frac{-4-4}{2} = -4$

b.) $\frac{f(3) - f(1)}{3-1} = \frac{[-2(3)^2+4] - [-2(1)^2+4]}{2} = \frac{-14-2}{2} = -8$

c.) $\frac{f(4) - f(1)}{4-1} = \frac{[-2(4)^2+4] - [-2(1)^2+4]}{4-1} = \frac{-28-2}{3} = -10$

57.) $f(x) = 5x - 2$

a.) Find Avg rate of change From 1 to x

$$\frac{f(b) - f(a)}{b-a} = \frac{f(x) - f(1)}{x-1} = \frac{[5x-2] - [5(1)-2]}{x-1}$$

$$= \frac{5x-2-3}{x-1} = \frac{5x-5}{x-1} = \frac{5\cancel{(x-1)}}{\cancel{x-1}} = 5$$

57b.) Also 5. It doesn't matter what my x-value is, I will always get an Avg rate of change of 5 b/c the Avg rate of change is the slope of the function.

57c.) Secant line → line connecting $(1, f(1))$ and $(3, f(3))$. $y = 5x - 2$

$f(1) = 5(1) - 2 = \underline{3}$; $f(3) = 5(3) - 2 = \underline{13}$

Find $\boxed{\text{equ. of line}}$ that goes through $(1,3) + (3,13)$

① $m = \frac{13-3}{3-1} = \frac{10}{2} = 5$

② $y = mx + b$

$3 = 5(1) + b$

$3 - 5 = b \rightarrow -2 = b$

③ $y = 5x - 2$

63.) a.) $V(x) = x(24-2x)(24-2x)$; length $= 24-2x$, width $= 24-2x$; height $= x$

b.) $V(3) = 3(24-2(3))(24-2(3)) = \underline{972 \text{ in}^3}$

c.) $V(10) = 10(24-2(10))(24-2(10)) = \underline{160 \text{ in}^3}$

d.) graph $V(x)$ on calc + use 2nd → Trace → max to find the coordinates of the max, + the solution will be the max's x-coordinate. $\boxed{x = 4 \text{ in}}$