HW #12   (2.3) 6, 20, 32, 34, [36] 46, 48   (2.4) 8, 10, 12

6)
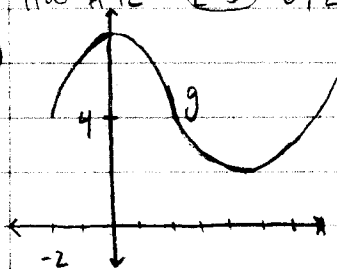
a) $g(-2) = 4$ b) Domain $[-2, 8]$
   $g(0) = 7$ Range $[2, 7]$
   $g(7) = 4$

c) $g(-2) = 4$
   $g(2) = 4$ $g(x) = 4$ when $x = -2, 7$
   $g(7) = 4$

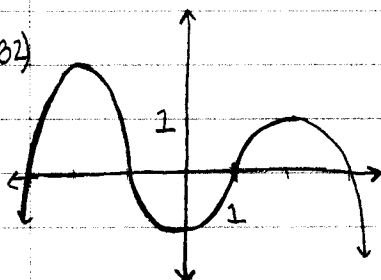d) $g(x) > 4$ when $-2 < x < 2$ and $7 < x \leq 8$

20)
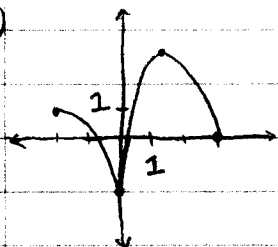
a) increasing on $[0, 1]$
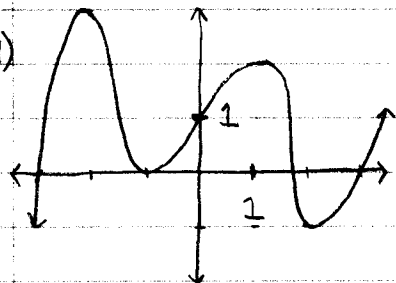b) decreasing on $[-2, 0]$ and $[1, 3]$

32)

a) Local max: 2 at $x = -2$, and 1 at $x = 2$
   Local min: -1 at $x = 0$
b) Increases on $(-\infty, -2]$ and $[0, 2]$
   decreases on $[-2, 0]$ and $[2, \infty)$

34)

a) Local max: 3 at $x = -2$, and 2 at $x = 1$
   Local min: 0 at $x = -1$, and -1 at $x = 2$
b) Increases on $(-\infty, -2]$, $[-1, 1]$, $[2, \infty)$
   decreases on $[-2, -1]$, $[1, 2]$

Extra Credit 36) $f(x) = 3 + x + x^2 - x^3$

a) Local max 4.00 when $x \approx 1.00$ b) Increases on $[-0.33, 1.00]$
   Local min 2.81 when $x \approx -0.33$ decreases on $(-\infty, -0.33]$, $[1.00, \infty)$

46.48 (2.4) 8, 10, 12   ([3,5])

46b) increasing on $[8,9]$, $[10,12]$ and $[15,17]$
Constant on $[9,10]$, $[12,13]$ and $[17,18]$
decreasing on $[13,15]$, $[18,19]$ ($[1,3]$, $[6,7]$)

b) The salesman travels away from home and stops to make a sales call between 9 and 10AM, then travels further from home for a sales call between 12 noon and 1 pm. Next he travels along a route that takes him closer to home before taking him further away from home. He then makes a final sales call between 5 and 6pm, then goes home.

48a) Increases on $[0,25]$, decreases on $[25,50]$

b) A maximum population was 50,000, and it was attained at $x = 25$ years which is 1975

(2.4)

8)
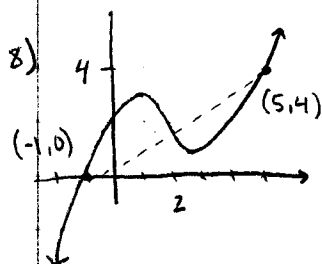
average rate of change is $\dfrac{4-0}{5-(-1)} = \dfrac{4}{6}$ $\boxed{= \dfrac{2}{3}}$

10) $g(x) = 5 + \frac{1}{2}x$ $x = 1, 5$

average rate of change $= \dfrac{g(5) - g(1)}{5 - 1} = \dfrac{[5 + \frac{1}{2}(5)] - [5 + \frac{1}{2}(1)]}{4}$

$= \dfrac{\frac{15}{2} - \frac{11}{2}}{4} = \dfrac{2}{4}$

$\boxed{= \dfrac{1}{2}}$

12) $f(z) = 1 - 3z^2$ $z = -2$, $z = 0$

average rate of change $= \dfrac{f(0) - f(-2)}{0 - (-2)} = \dfrac{[1 - 3(0)^2] - [1 - 3(-2)^2]}{2}$

$= \dfrac{1 - (-11)}{2} = \dfrac{12}{2}$ $\boxed{= 6}$