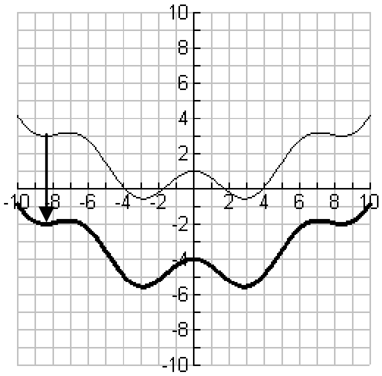
Chapter 2 Review Sheet- SOLUTIONS
Math 176, Precalculus, Vanden Eynden

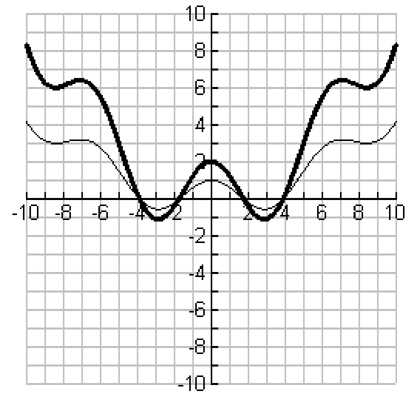
1. a. $(-\infty,\infty)$ b. $(-\infty,4]$ c. 30 d. 4 e. 0 f. minimum of -0.25

   g. 11 h. 1 i. $(-\infty,-1] \cup (-1,2]$ j. 5/2

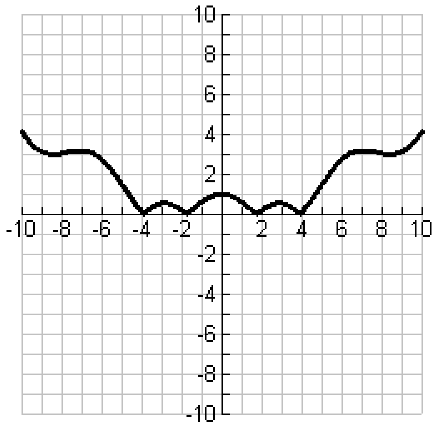
2. $f(x)-5$
   f(*x*) is shifted DOWN by 5.



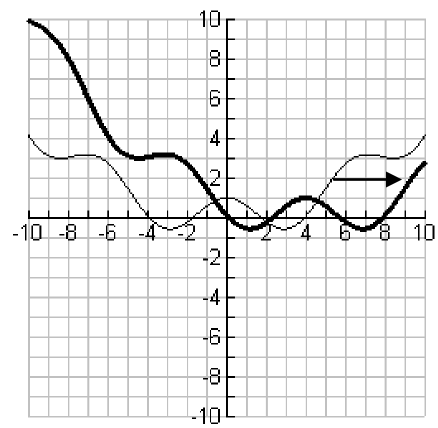
3. $2f(x)$
   f(*x*) is stretched vertically by factor of 2



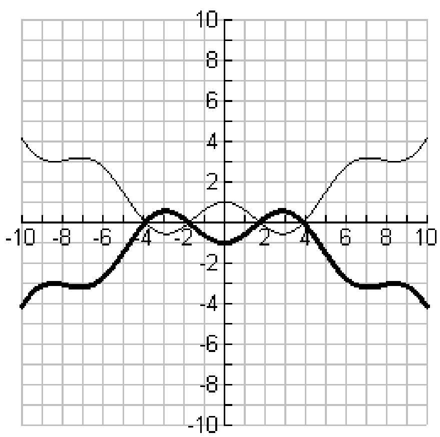
4. $|f(x)|$
   All points below the x-axis are reflected above the x-axis.



5. $f(x-4)$
   f(*x*) is shifted to the RIGHT by 4.



6. $-f(x)$
   f(*x*) is reflected about the x-axis.



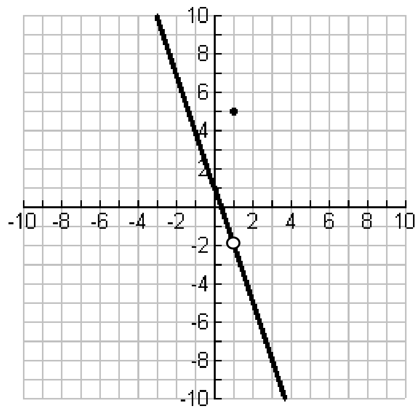
7. $D:[2,\infty),\ R:[0,\infty)$

8. $D:(-\infty,3) \cup (3,\infty),$
   $R:(-\infty,1) \cup (1,\infty)$

9.

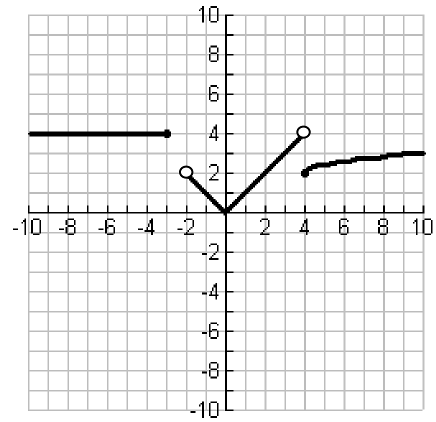
$D:$ °

$R:$ ° $, y \neq -2$



10. $D: \left(-\infty, -3\right] \cup \left(-2, \infty\right)$

$R: \left[0, \infty\right)$



11. a) $\dfrac{f(3) - f(-2)}{3 - (-2)} = \dfrac{-18 - 2}{5} = \dfrac{-20}{5} = -4$

b) $\dfrac{f(a+h) - f(a)}{a + h - a} = \dfrac{3(a+h) - (a+h)^3 - \left(3a - a^3\right)}{h} = \dfrac{h\left(-3a^2 - 3ah - h^2 + 3\right)}{h}$

$= -3a^2 - 3ah - h^2 + 3$

12. $f\left(g(-2)\right) = f\left(1\right) = 2.5$

13. $f\left(2\right) + g\left(2\right) = 2 + 1 = 3$

14. $g\left(f\left(6\right)\right) = g\left(0\right) = 3$

15. $\dfrac{g(2) - g(-4)}{2 - (-4)} = \dfrac{1 - (-5)}{6} = 1$

16. $f(x) = \begin{cases} 2x + 5 & x \neq 0 \\ -3 & x = 0 \end{cases}$

$D: \left(-\infty, \infty\right), R: \left(-\infty, 5\right) \cup \left(5, \infty\right)$

17. $g(x) = \begin{cases} -x & x \leq 0 \\ 5 & x > 0 \end{cases}$

$D: \left(-\infty, \infty\right), R: \left[0, \infty\right)$

18. $f(0) = 1$, $f(2) = -1$, $f(a) = a^2 - 3a + 1$, $f(-a) = a^2 + 3a + 1$,
$f(a+1) = a^2 - a - 1$, $f(2x) = 4x^2 - 6x + 1$, $f\left(f(0)\right) = f(1) = -1$

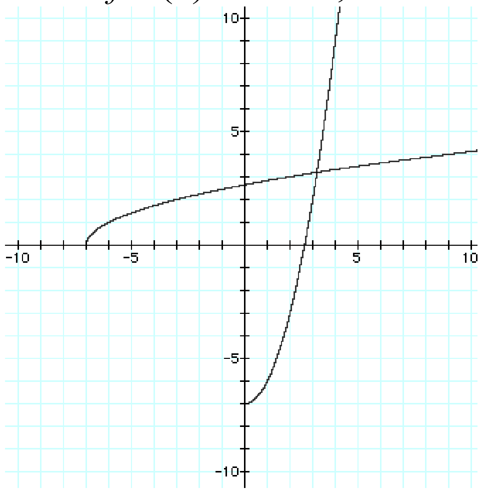
19. answers vary. even: $f(x) = x^4$; odd: $g(x) = x^5$; neither: $h(x) = x + 1$

20. one to one

21. one to one

22. NOT one to one

23. $f^{-1}(x) = x^2 - 7,\ x \geq 0$



24. Use Calculator, graph : $Y_1 = 3x^3 - 3x + 2$

a. local maximum value = 3.15 (found at x = – 0.58)

b. local minimum value = 0.85 (found at x = 0.58)

c. interval(s) of increase: $(-\infty, -0.58) \cup (0.58, \infty)$

d. interval(s) of decrease $(-0.58, 0.58)$