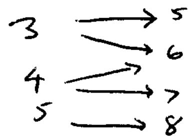
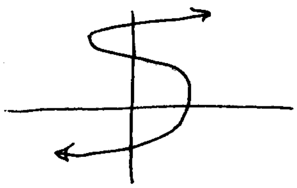
Math 107 - Prof. Richard B. Goldstein - Barnett - Chap 2 HW (2nd Ed)

Sect 2.1

#11 

$\boxed{\text{not}}$ a function $f(3)=5$, $f(3)=6$

#17 

$\boxed{\text{not}}$ a function $f(0) = -2.5$, $f(0) = 2.5$, and $f(0) = 7$

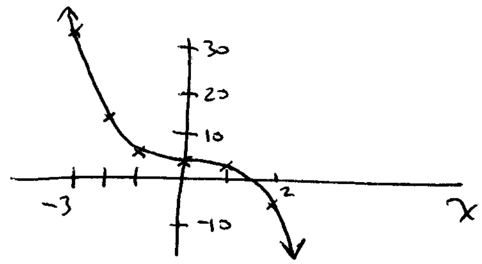
#25 $y = 8x - 1 + \frac{1}{x}$ $\boxed{\text{is}}$ a function

not linear, constant

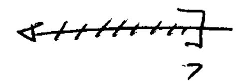
$\boxed{\frac{1}{x} \Rightarrow \text{neither}}$ (hyperpola)

#37 $f(x) = 4 - x^3$

x	$f(x)$
-3	31
-2	12
-1	5
0	4
1	3
2	-4



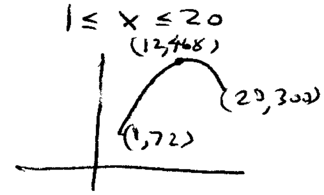
#67 $f(x) = \frac{x-2}{x+4}$ domain $x + 4 \neq 0 \Rightarrow x \neq -4$ $\boxed{(-\infty, -4) \cup (-4, \infty) \text{ or } \mathbb{R} \text{ except } -4}$

#69 $g(x) = \sqrt{7-x}$ domain $7 - x \geq 0$ $\boxed{7 \geq x}$ 

#119 $p(x) = 75 - 3x$ $1 \leq x \leq 20$

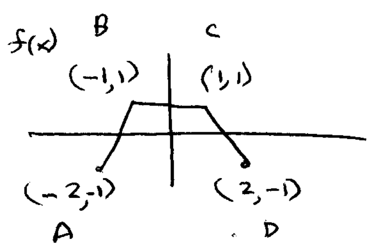
Revenue $R = x\,p(x) = x(75-3x) = \boxed{75x - 3x^2}$

domain $1 \leq x \leq 20$

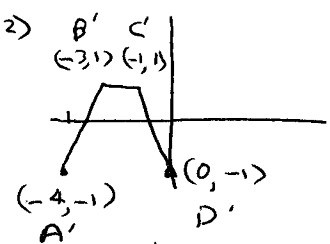


Sect 2.2

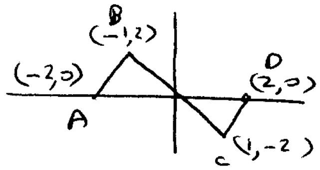
#11 $y = f(x+2)$



$\boxed{\text{shift left}}$

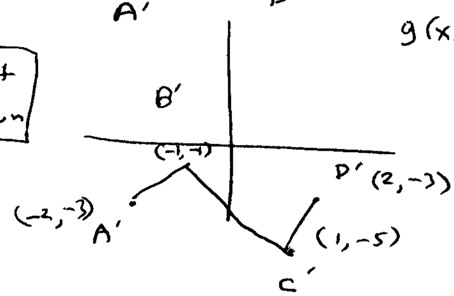


#15 $y = g(x) - 3$



$\boxed{\text{shift down}}$

$g(x) - 3$



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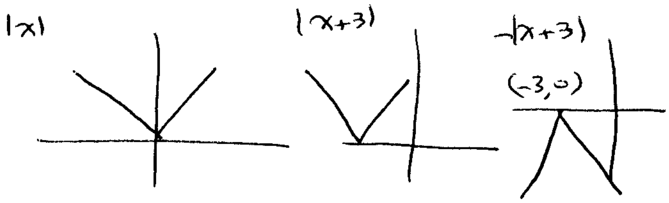
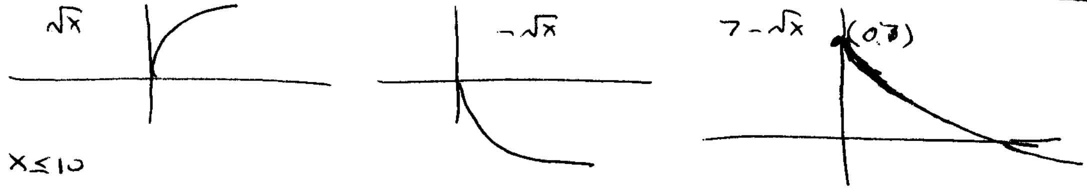
Sect 2.2

\# 21 $g(x) = -|x+3|$



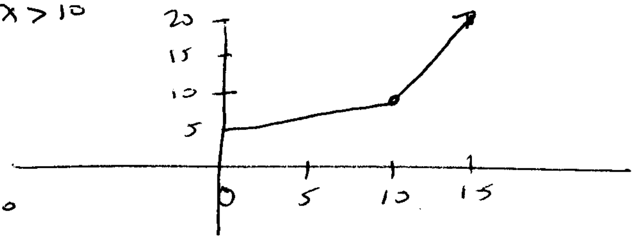
\# 25 $f(x) = 7 - \sqrt{x}$



\#45 $h(x) = \begin{cases} 5 + 0.5x & 0 \le x \le 10 \\ -10 + 2x & \text{if } x > 10 \end{cases}$

x	$h(x)$
0	5
5	7.5
10	10
10.1	10.2
15	20

} meet at 10

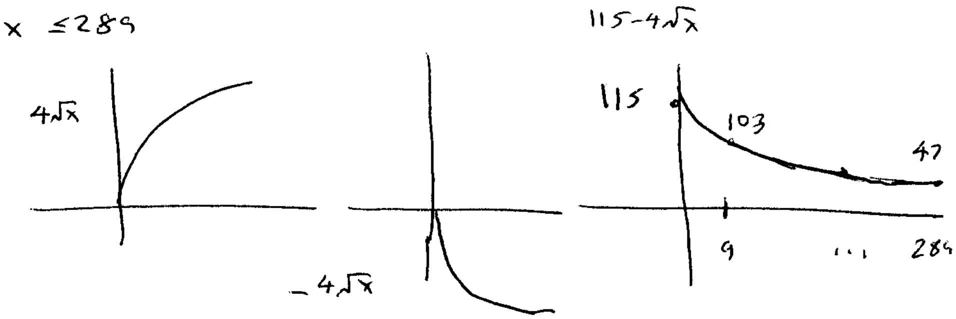


(note – line segments are connected)

\# 61 $p(x) = 115 - 4\sqrt{x}$ $\quad 9 \le x \le 289$

$p(9) = 115 - 4\sqrt{9} = 103$

$p(289) = 115 - 4\sqrt{289} = 47$



Sect 2.3

\# 3 $m(x) = -x^2 + 6x - 4$

$= -(x^2 - 6x) - 4$ added + subtracted 9

$= -(x-3)^2 + 9 - 4 = \boxed{-(x-3)^2 + 5}$

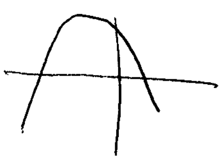
\# 9 (A) $y = -(x+2)^2 + 1$ $\quad y(-2) = 1$ ∩ m

(B) $y = (x-2)^2 - 1$ $\quad y(2) = -1$ ∪ g

(C) $y = (x+2)^2 - 1$ $\quad y(-2) = -1$ ∪ f

(D) $y = -(x-2)^2 + 1$ $\quad y(2) = 1$ ∩ n

\# 19



vertex $(-2, 5)$

a -1

$\boxed{y = -(x+2)^2 + 5}$

\# 25 $r(x) = -4x^2 + 16x - 15$

(A) $= -(2x-5)(2x-3)$

$\boxed{\begin{array}{l} r(0) = -15 \\ r(1.5) = r(2.5) = 0 \end{array}}$

quadratic eq. $\dfrac{-16 \pm \sqrt{16^2 - 4(-4)(-15)}}{2(-4)} = \dfrac{-16 \pm 4}{-8}$

roots $+2.5$, $+1.5$

(B) $r(x) = -4(x^2 - 4x) - 15 = -4(x-2)^2 + 1$ $\quad \boxed{\text{Vertex } (2,1)}$

(C) max $(2,1)$ $\quad$ (D) Range $(-\infty, 1)$

(E) increases for $x \le 2$ $\quad$ (F) decreases for $x \ge 2$

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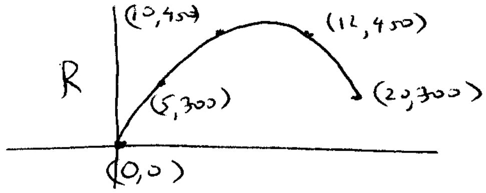
Sect 2.3

#57 $R(x) = x(75-3x)$



(A)

x	0	5	10	15	20
R	0	300	450	450	300

(B) maximum $R(x) = -3x^2 + 75x = -3(x^2 - 25x) = -3(x-12.5)^2 + 468.75$

$\boxed{R(12.5) = \$468.75}$

(C) $p = 75 - 3(12.5) = 37.5$ $\boxed{\$37.50}$

Sect 2.4

#1 (A) $y = 2^x$ (k) $y(1) = 2$

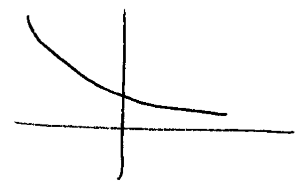
(B) $y = (0.2)^x$ (g) $y(-1) = \frac{1}{0.2} = 5$

(C) $y = 4^x$ (h) $y(1) = 4$

(D) $y = \left(\frac{1}{3}\right)^x$ (f) $y(-1) = 3$

#5 $y = \left(\frac{1}{5}\right)^x = 5^{-x}$

x	-2	-1	0	1	2
5^{-x}	25	5	1	0.2	0.04



#19 $(2e^{1.2t})^3 = 2^3 e^{1.2t(3)} = \boxed{8e^{3.6t}}$

#63 $A = P\left(1 + \frac{r}{m}\right)^{mt}$ $15000 = P\left(1 + \frac{0.0675}{52}\right)^{\overset{260}{52(5)}} = 1.40113292\,P$

$P = 15000/1.401\ldots = \boxed{\$10,705.62} \sim \$10,706$

#65 (A) $10000\left(1 + \frac{0.0540}{12}\right)^{12} = \$10,553.57$ ⟸ best Stonebridge Bank

(B) $10000\left(1 + \frac{0.0495}{365}\right)^{365} = \$10,507.42$

(C) $10000\left(1 + \frac{0.0515}{4}\right)^{4} = \$10,525.03$

Sect 2.5

#5 $\log_4 8 = \frac{3}{2} \Rightarrow \boxed{4^{3/2} = 8}$

#9 $8 = 4^{3/2} \Rightarrow \boxed{\log_4 8 = \frac{3}{2}}$

#21 $\log_2 2^{-3} = \boxed{-3}$

Sect 2.5

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#39 $\log_{1/3} 9 = y$ $\quad \left(\frac{1}{3}\right)^y = 9 = 3^2 = \left(\frac{1}{3}\right)^{-2}$ $\boxed{y=-2}$

#55 $\log_b x = \frac{3}{2}\log_b 4 - \frac{2}{3}\log_b 8 + 2\log_b 2$

$= \log_b 4^{3/2}\, 8^{-\frac{2}{3}}\, 2^2 = \log_b (8)(4)(4) = \log_b 128$ $\boxed{x = 128}$

#75 $1.03^x = 2.475$ $\quad x \ln 1.03 = \ln 2.475$

$\ln 1.03^x = \ln 2.475$ $\quad x = \frac{\ln 2.475}{\ln 1.03} = \frac{0.9062\ldots}{0.0295\ldots} = \boxed{30.659}$

#95

qtr.

$1800 = 1000\left(1 + \frac{0.06}{4}\right)^{4y}$ $\quad 4y \ln 1.015 = \ln 1.8$

$1800 = 1000\,(1.015)^{4y}$ $\quad y = \frac{\left(\frac{\ln 1.8}{\ln 1.015}\right)}{4} = \frac{\ln 1.8}{4 \ln 1.015} = \boxed{9.87}$

$1.015^{4y} = 1.8$

daily

$1800 = 1000\left(1 + \frac{.06}{365}\right)^{365y}$ $\quad 365y \ln\left(1 + \frac{.06}{365}\right) = \ln 1.8$

$\left(1 + \frac{.06}{365}\right)^{365y} = 1.8$

$y = \frac{\ln 1.8}{365 \ln\left(1 + \frac{.06}{365}\right)} = \frac{0.58778\ldots}{.059995\ldots} = \boxed{9.80}$