Assignment #1.1b Homework Solutions

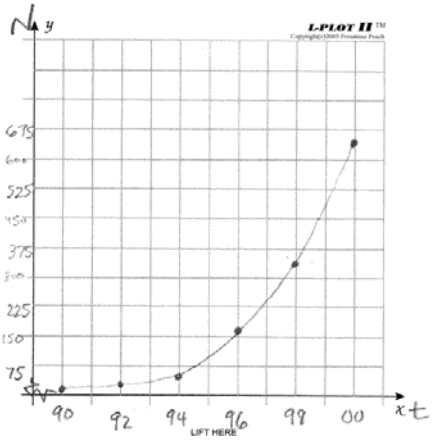
Pages 20-23 #1-3, 19, 20, 28, 30-32, 35, 37, 45, 47, 61, 62

1. (a) $f(-1) = -2$
   (b) $f(2) \approx 2.8$
   (c) When $y=2$ we have $x=-3$ and $x=1$
   (d) When $y=0$ we have $x \approx -2.5$ and $x \approx 0.3$
   (e) Domain: $[-3,3]$
   Range: $[-2,3]$
   (f) f is increasing on $[-1,3]$

2. (a) $f(-4) = -2$ and $g(3) = 4$
   (b) $x=-2$ and $x=2$
   (c) When $y=-1$ we have $x=-3$ and $x=4$
   (d) $[0,4]$
   (e) Domain: $[-4,4]$
   Range: $[-2,3]$
   (f) Domain: $[-4,3]$
   Range: $[0.5,4]$

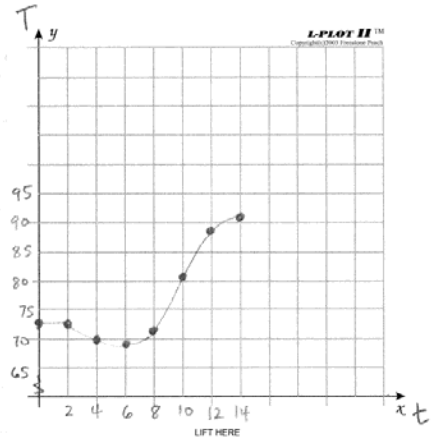
3. $[-85,115]$ (page 11)

19. (a)



(b) in 1995 approx 90 million (book = 92)
in 1999 approx 490 million (book = 485)

20. (a)



(b) at 11:00 am we have $t = 11$ so approx 85° F
(book = 84.5° F)

28. $f(x) = \dfrac{5x+4}{x^2+3x+2} = \dfrac{5x+4}{(x+2)(x+1)}$

Domain = all real #s except -2 and -1

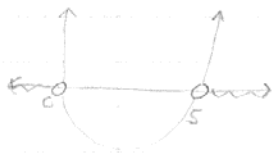
30. $g(u) = \sqrt{u} + \sqrt{4-u}$

$u \geq 0$ and $4-u \geq 0$
$u \leq 4$

Domain : $[0, 4]$

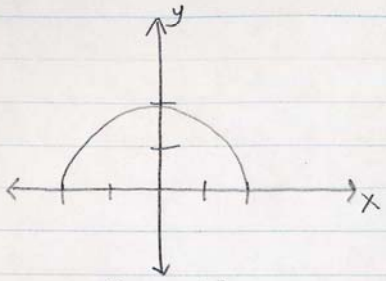
31. $h(x) = \dfrac{1}{\sqrt[4]{x^2-5x}}$

$x^2-5x > 0$
$x(x-5) > 0$
$x < 0$ or $x > 5$



Domain : $(-\infty, 0) \cup (5, \infty)$

32. $h(x) = \sqrt{4-x^2}$ $\longrightarrow$ $y = \sqrt{4-x^2}$



D: $[-2, 2]$
R: $[0, 2]$

$y^2 = 4 - x^2$

$x^2 + y^2 = 4$ ← circle $C(0,0)$ $r = 2$

but original equation is $h(x) = \sqrt{4-x^2}$ so only top half

35. $f(t) = t^2 - 6t$

$y = t^2 - 6t$

$0 = t(t-6)$

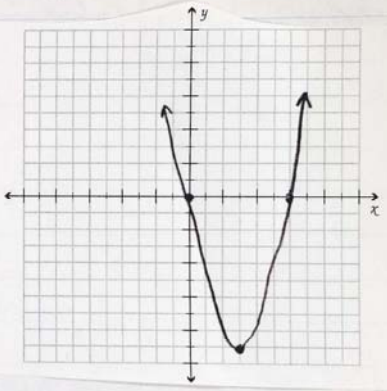
$t = 0 \quad t = 6$

t-int: 0, 6

vertex: $f(3) = 3^2 - 6(3) = -9$

$(3, -9)$

Domain: $\mathbb{R}$



37. $g(x) = \sqrt{x-5}$ $\longrightarrow$ $y = \sqrt{x-5}$

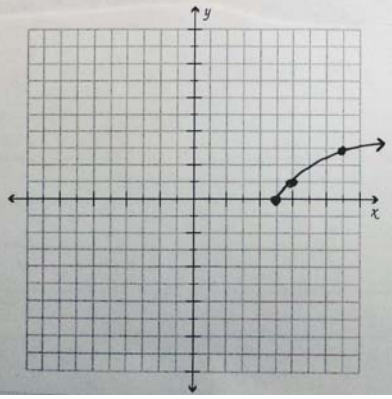
$x - 5 \geq 0$

$x \geq 5$

Domain: $[5, \infty)$

$y^2 = x - 5$

$x = y^2 + 5$ ← parabola but only top half since original equation $g(x) = \sqrt{x-5}$



45. line segment joining $(1, -3)$ and $(5, 7)$

$m = \frac{7+3}{5-1} = \frac{10}{4} = \frac{5}{2}$

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

$y + 3 = \frac{5}{2}x - \frac{5}{2}$

$y = \frac{5}{2}x - \frac{11}{2}$ for $1 \leq x \leq 5$

47. bottom half of parabola $x+(y-1)^2=0$

$x+(y-1)^2=0$
$(y-1)^2=-x$ OK SINCE $\curvearrowright$ $x<0$
$y-1=\pm\sqrt{-x}$
$y=1\pm\sqrt{-x}$

top half: $y=1+\sqrt{-x}$ $x\leq 0$
bottom half: $y=1-\sqrt{-x}$ $x\leq 0$

61. g is even since symmetric with respect to the y-axis
f is odd since symmetric about the origin

62. f is neither
g is even since symmetric with respect to the y-axis