Section 1-2 HW

(3) a) $f(-8) = 10$ $|-8|+2 = 8+2 = 10$ ✓

$f(-3) = 5$ $|-3|+2 = 3+2 = 5$ ✓

$f(0) = 2$ $|0|+2 = 0+2 = 2$ ✓

(6) $h(-1) = -4$ $\frac{-(-3)}{(-1)^2} = \frac{3}{1} = -4$ ✓

$h(1.5) = -0.5$ $\frac{(1.5-3)}{(1.5)^2} = \frac{-1.5}{2.25} = -\frac{2}{3}$ change

$h(2) = -0.25$ $\frac{(2-3)}{2^2} = \frac{-1}{4}$ ✓

(7) $1993 \approx 36{,}000$ tons

$1999 \approx 46{,}000$ tons (6 years)

$2006 \approx 51{,}000$ tons (13 years)

Put equation in $Y=$ and use table ✓

$f(0) = -0.0013(0)^4 + 0.0513(0)^3 - 0.66(0)^2 + 4.128(0) + 35.75$

$= 35.75 \cdot 1{,}000$

$= 35{,}750$ tons

$f(6) = 46.082$

$= 46.082 \cdot 1{,}000$

$= 46{,}082$ tons

$f(13) = 53.113$

$= 53.113 \cdot 1{,}000$

$= 53{,}113$ tons

(8) a) $1994 - 1977 = 17$ years

$\approx 3{,}100 \cdot 1{,}000{,}000$

$3{,}100{,}000{,}000$

3 billion, 1 hundred million

b) $f(17) = 9.35(17)^2 - 12.7(17) + 541.7$

$= 3{,}007.95 \cdot 1{,}000{,}000$

$= 3{,}007{,}950{,}000$

3.03 billion gallons

c) ≈ 25 years later, year 2002

$f(24) \approx 5{,}623$

$f(26) \approx 6{,}532$ ← occurs in between!

(9) D: $(-\infty, \infty)$, R: $[2, \infty)$

(15) D: $(-\infty, 7]$, R: $[-1] \cup (1, \infty)$

(15) a) Copper: D: $[-150, 150]$, R: $[1.75]$
Aluminum: D: $[-150, 150]$, R: $(0.6, 1.5]$
Zinc: D: D: $[-150, 150]$, R: $[0.5, 1.3]$
Steel: D: $[-150, 150]$, R: $[0.2, 1.75]$

b) Copper ≈ 1.75 J
Aluminum ≈ 1.2 J
Zinc ≈ 0.5 J
Steel ≈ 1.5 J

(18) y-int = 0, zero = 0

y-int: $f(0) = \sqrt[3]{0} = 0$
x-int: $0 = \sqrt[3]{x^3} \rightarrow 0 = x$

(21) y-int = -2, zeros = $-\frac{1}{2}, \frac{2}{3}$

y-int: $f(0) = 6(0)^2 - 0 - 2 = -2$ ✓
x-int:

$0 = 6x^2 - x - 2$
$0 = (6x^2 - 4x) + (3x - 2)$
$0 = 2x(3x - 2) + 1(3x - 2)$
$0 = (3x - 2)(2x + 1)$
$x = \frac{2}{3}$ $x = -\frac{1}{2}$

$-12x^2$
$-4x \quad 3x$
$-x$

(24) symmetric over x, y-axis and the origin.

Numerically: for every point (x,y) there is: $(x,-y)$, $(-x,y)$, $(-x,-y)$.

Algebraically:

x-axis: $x^2+4(-y)^2=16$ → $x^2+4y^2=16$ ✓

y-axis: $(-x)^2+4y^2=16$ → $x^2+4y^2=16$ ✓

origin: $(-x)^2+(-y)^2=16$ → $x^2+y^2=16$ ✓

(27) symmetric over x, y-axis and origin.

Numerically: For every point (x,y) there is: $(x,-y)$, $(-x,y)$, $(-x,-y)$.

Algebraically:

x-axis: $9x^2-25(-y)^2=1$ → $9x^2-25y^2=1$ ✓

y-axis: $9(-x)^2-25y^2=1$ → $9x^2-25y^2=1$ ✓

origin: $9(-x)^2-25(-y)^2=1$ → $9x^2-25y^2=1$ ✓

(30) The graph is not symmetric with respect to x, y-axis or the origin.

Numerically: There is not points $(-x,-y)$, $(-x,y)$, or $(x,-y)$ for (x,y).

Algebraically:

x-axis: $-y=x^3-2x^2+3x-4$ → $y=-x^3+2x^2-3x+4$ X

y-axis: $y=(-x)^3-2(-x)^2+3(-x)-4$ → $y=-x^3-2x^2-3x-4$ X

origin: $-y=(-x)^3-2(-x)^2+3(-x)-4$

$-y=-x^3-2x^2-3x-4$

$y=x^3+2x^2+3x+4$ X

(33) Symmetric over y-axis.

Numerically: For every (x, y) we have $(-x, y)$.

Algebraically:

x-axis: $(-y-6)^2+8x^2=64$ ✗

y-axis: $(y-6)^2+8(-x)^2=64$

$(y-6)^2+8x^2=64$ ✓

origin: $(-y-6)^2+8(-x)^2=64$

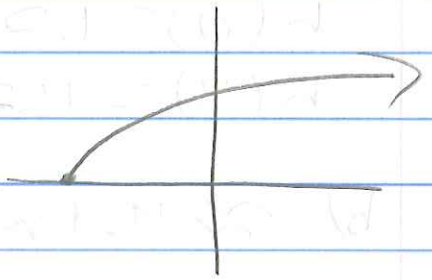
$(-y-6)^2+8x^2=64$ ✗

(36) Neither even nor odd

$g(x)=\sqrt{x+6}$

$g(-x)=\sqrt{-x+6}$

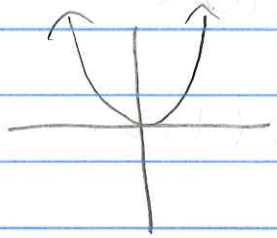
$-g(x)=-\sqrt{x+6}$



$g(x) \neq g(-x)$ ∴ Not even

$g(-x) \neq -g(x)$ ∴ Not odd

(39)



Symmetric with respect to the y-axis. ∴ Even

$f(x)=|x^3|$

$f(-x)=|-x^3|=|x^3|$ ✓

$-f(x)=-|x^3|$

$f(x)=f(-x)$ ∴ even

$f(-x) \neq -f(x)$ ∴ Not odd

(43) $f(-2)=-2$

$f(-6)=$ undefined

$f(0)=$ undefined

(45) a) $D: [0, 4]$

$R: [1.2, 11.2]$

$h(0) = 1.2$

$h(4) = 11.2$

b) ≈ 4.1 million

$h(2) = 4.2$ million

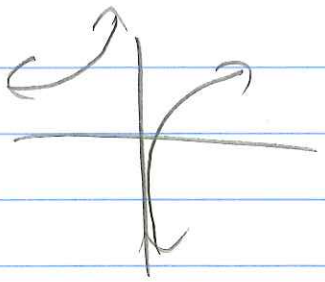
c) ≈ 1.1 million

$h(0) = 1.2$ million

Y-int represents # of households with wireless only in 2001.

d) NO zeros. more than zero households have wireless service for all years in the domain.

(48)



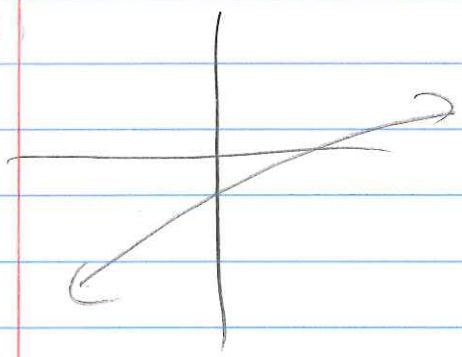
(0.25, 0)

$$0 = \frac{4x-1}{x}$$

$$0 = 4x - 1$$

$$\frac{1}{4} = x$$

(51)



(4, 0)

$$0 = 2\sqrt{x+12} - 8$$

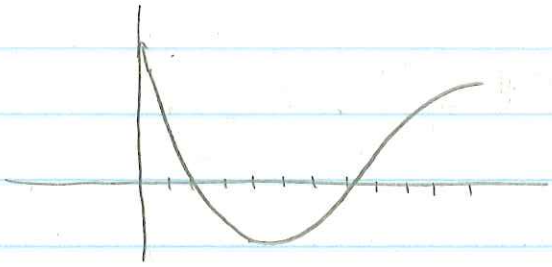
$$8 = 2\sqrt{x+12}$$

$$4 = \sqrt{x+12}$$

$$16 = x + 12$$

$$4 = x$$

(60) a)



b) D: [0, 11]
R: [-0.3, 1.04]

c) (0, 1.04)
The y-int represents the initial stock fluctation %.

d) 1.5, 5.2
The zeros represent the months when the stock price returned to the initial value.

(89) a) $g(2) = (2)^2 - 10(2) + 3 = -13$

b) $g(-4x) = (-4x)^2 - 10(-4x) + 3$

$= 16x^2 + 40x + 3$

c) $g(1+3n) = (1+3n)^2 - 10(1+3n) + 3$

$= 1 + 6n + 9n^2 - 10 - 30n + 3$

$= 9n^2 - 24n - 6$

(101) $25^{3/2}$

$= \sqrt{25}^{3}$

$= 5^{3}$

$= 125$

(107) $1^2 + x^2 = n^2$

$1 + x^2 = n$

$x^2 = n - 1$

$x = \sqrt{n-1}$