$\boxed{1.1}$ p.74 1-10, 29-39 e

#1 (d)(q)
Constant change in x and y, common difference – linear
slope of 2 y-int of (0, 0)

#2 (f)(r)
as x changes by 1 y increases increasingly the differences in y is a linear pattern – quadratic
y-intercept of (0, 2) opens up

#3 (a)(p)
linear pattern like #1
Slope of 3 y-int (0, -2)

#4 (h)(o)
linear
slope of -2 y-int (0, 100)

#5 (e)(L)
quadratic pattern but opens down
y-int (0, 40)

#6 (b)(s)
linear
Slope of 2 y-int (0, 3)

#7 (g)(t)
linear
slope $= \frac{1}{2}$ y-int $\left(0, -\frac{3}{2}\right)$

#8 (j)(k)
quadratic opens up
y-int (0, 0)

#9 (i)(m)
quadratic opens up
y-int (0, -1)

#10 (c)(n)
x's increases faster than y
inverses pattern of quad – square root

#29
$$v^2 - 5 = 8 - 2v^2$$
$$+2v^2 + 5 \quad +5 + 2v^2$$
$$\frac{3v^2}{3} = \frac{13}{3}$$
$$\sqrt{v^2} = \sqrt{\frac{13}{3}}$$
$$\boxed{v = \pm\sqrt{\frac{13}{3}}} \text{ or } \pm\frac{\sqrt{39}}{3}$$

#31
$$2x^2 - 5x + 2 = (x-3)(x-2) + 3x$$
$$2x^2 - 5x + 2 = x^2 - 5x + 6 + 3x$$
$$-x^2 + 5x - 3x - 6 \quad -x^2 + 5x - 6 - 3x$$
$$x^2 - 3x - 4 = 0$$
$$(x-4)(x+1) = 0$$
$$\boxed{x = 4} \quad \boxed{x = -1}$$

#33 $x(2x-5)=12$

$2x^2-5x-12=0$

$(2x+3)(x-4)=0$

$2x+3=0 \qquad x-4=0$

$\quad -3 \quad -3$

$\frac{2x}{2}=\frac{-3}{2} \qquad \boxed{x=4}$

$\boxed{x=-\frac{3}{2}}$

#35 $x(x+7)=14$

$x^2+7x-14=0$

~~(x    )(x    )~~ doesn't factor

$x=\frac{-7\pm\sqrt{49-4(1)(-14)}}{2}$

$\boxed{x=\frac{-7\pm\sqrt{105}}{2}}$

#37 $x+1-2\sqrt{x+4}=0$

$+2\sqrt{x+4} \qquad 2\sqrt{x+4}$

$(x+1)^2=(2\sqrt{x+4})^2$

$x^2+2x+1=4(x+4)$

$x^2+2x+1=4x+16$

$\quad -4x-16 \quad -4x-16$

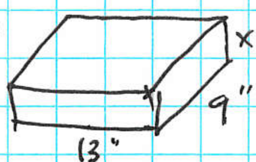
$x^2-2x-15=0$

$(x-5)(x+3)=0$

$\boxed{x=5} \qquad \boxed{x=-3}$

$\boxed{1.1}$ p.76 20-23, 39-46

#20




$V=lwh$

$V=(13)(9)(x)$

$V=117(x)$

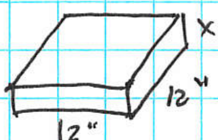
$\boxed{\text{Rectangular Cake}}$


$V=\pi r^2 h$

$V=\pi(4)^2\,2x$

$V=100.531(x)$

#21





height is same so just the area is compared

$A=(12)(12)$

$A=144\text{ in}^2$

$A=\pi(6.5)^2$

$A=132.732\text{ in}^2$

$\boxed{\text{Square stones}}$

#22 $d=16t^2$

$\frac{180}{16}=\frac{16t^2}{16}$

$\sqrt{11.25}=\sqrt{t^2}$

$\pm 3.354=t$

negative time doesn't make sense so

$\boxed{t=3.354\text{ seconds}}$

$d=16(12.5)^2$

$\boxed{d=2500\text{ feet}}$

#23 use calculator

Stat Edit to enter data

Stat calc for regression

$\boxed{y=1.2t^2}$

39–46 on calculator. I use the $y_1$ and $y_2$ method, not how the direction suggested.

#39 $\boxed{x = 3.906}$

#40 $\boxed{x = -1.086}$ $\boxed{x = 2.864}$

#41 $\boxed{x = 1.333}$ $\boxed{x = 4}$

#42 $\boxed{x = 2.665}$

#43 $\boxed{x = 1.769}$

#44 $\boxed{x = 2.355}$

#45 $\boxed{x = -1.466}$

#46 $\boxed{x = -1}$ $\boxed{x = 0}$ $\boxed{x = 1}$

$\boxed{1.2}$ part I p. 95 1–8, 9–19 odd

#1 function #2 Not a function #3 Not a function #4 Function

#5 function #6 Not a function #7 Not a function #8 Function

#9 $f(x) = x^2 + 4$

$\boxed{D: (-\infty, \infty)}$

It's a quadratic!

#11 $f(x) = \dfrac{3x-1}{(x+3)(x-1)}$ Variables in denominator

$(x+3)(x-1) = 0$

$x+3=0 \quad x-1=0$

$x \neq -3 \quad x \neq 1$

Both are vertical asymptotes by the way

$\boxed{D: (-\infty,-3) \cup (-3,1) \cup (1,\infty)}$

#13 $g(x) = \dfrac{x}{x^2-5x}$

$x^2 - 5x = 0$

$x(x-5) = 0$

$x \neq 0 \quad x - 5 \neq 0$

$x \neq 5$

$\boxed{D: (-\infty,0) \cup (0,5) \cup (5,\infty)}$

$g(x) = \dfrac{x}{x(x-5)}$

$x = 0$ is a point discontinuity

$x = 5$ is a vertical asymptote

#15 $h(x) = \dfrac{\sqrt{4-x}}{(x+1)(x^2+1)}$ ← radical! ← Variables in denominator!

$\sqrt{4-x} \geq 0$

$4 - x \geq 0$

$\quad +x \quad +x$

$4 \geq x$

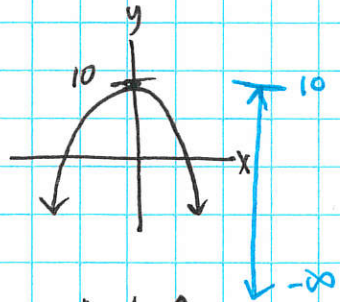
or $x \leq 4$

$x + 1 \neq 0 \quad x^2 + 1 \neq 0$

$x \neq -1 \quad \sqrt{x^2} \neq \sqrt{-1}$ imaginary

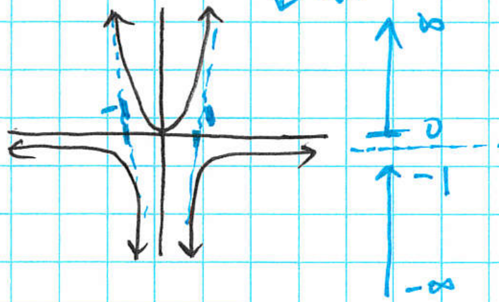
$\boxed{D: (-\infty,-1) \cup (-1,4]}$

#17 $f(x) = 10 - x^2$




$\boxed{R: (-\infty, 10]}$

#19 $f(x) = \dfrac{x^2}{1-x^2}$




zoom out on x's only
maybe zoom in on y's

x-min = -100000
x-max = 100000
x-scl = 1000
y-min = -5
y-max = 5
y-scl = 1

$\boxed{1.2}$ p.95 22-34 even, 41-46
part 2

#22 $h(x) = \dfrac{x^3+x}{x} = \dfrac{(x)(x^2+1)}{(x)}$

* Point discontinuity @ $x=0$

#24 $g(x) = \dfrac{x}{x-2}$

Vertical asymptote at $x=2$

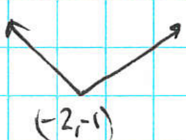
#26 (1,2) local minimum
(3,3) Neither
(5,7) local maximum

$f(x)$ decreases on $(-\infty,1) \cup (5,\infty)$
$f(x)$ increases on $(1,5)$

#28 (-1,1) local minimum
(1,6) local maximum
(3,1) local minimum
(5,4) local maximum

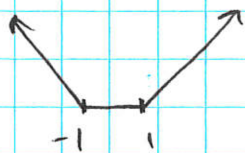
$f(x)$ decreases on $(-\infty,-1) \cup (1,3) \cup (5,\infty)$
$f(x)$ increases on $(-1,1) \cup (3,5)$

oops
#29 ~~Vertex~~ $f(x) = |x+2| - 1$
$v = (-2,-1)$



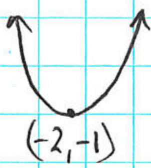

$f(x)$ is decreasing on $(-\infty,-2)$
$f(x)$ is increasing on $(-2,\infty)$

#30 $y = |x+1| + |x-1| - 3$



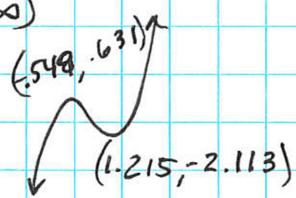

$f(x)$ is decreasing on $(-\infty, -1)$
$f(x)$ is constant on $[-1, 1]$
$f(x)$ is increasing on $(1, \infty)$

#32 $h(x) = 0.5(x+2)^2 - 1$




$h(x)$ decreases on $(-\infty, -2)$
$h(x)$ increases on $(-2, \infty)$

#34 $f(x) = x^3 - x^2 - 2x$




$f(x)$ increases on $(-\infty, -.549) \cup (1.215, \infty)$
$f(x)$ decreases on $(-.549, 1.215)$

#41

Minimum $(.5, 3.75)$

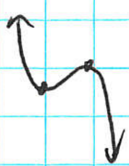
on calculator

#42

Minimum $(1.155, -2.079)$
Maximum $(-1.155, 4.079)$

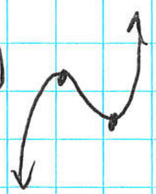
on calculator

#43

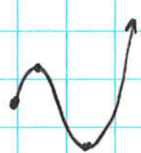


Minimum $(-.816, -4.089)$
Maximum $(.816, -1.911)$

#44

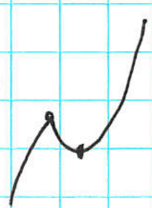


#45



Minimum $(0,0)$ $(-4, 6\text{ish})$
Maximum $(-3.2, 9.159)$

#46



Minimum $(-1.25, -3.125)$
Maximum $(-2.5, 0)$

$\boxed{1.2}$ p.95 35-40, 47-53 odd
day 3

#35 $y = 32$
Bounded

#36 $y = 2 - x^2$
Bounded above

#37 $y = 2^x$
Bounded below

#38 $y = 2^{-x}$
Bound Below

#39 $y = \sqrt{1 - x^2}$
Bounded

#40 $y = x - x^3$
Not bounded

#47 $f(x) = 2x^4$
$f(-x) = 2(-x)^4 = 2x^4$
$\boxed{\text{even}}$

#49 $f(x) = \sqrt{x^2 + 2}$
$f(-x) = \sqrt{(-x)^2 + 2}$
$= \sqrt{x^2 + 2}$
$\boxed{\text{Even}}$

#51 $f(x) = -x^2 + 0.03x + 5$
$f(-x) = -(-x)^2 + 0.03(-x) + 5$
$= -x^2 - 0.03x + 5$
$\boxed{\text{Neither}}$

#53 $g(x) = 2x^3 - 3x$
$g(-x) = 2(-x)^3 - 3(-x)$
$= -2x^3 + x$
$\boxed{\text{odd}}$

$\boxed{1.2}$ p.95 55-61 odd
day 4

#55 $f(x) = \dfrac{x^{0}}{x^{0} - 1}$
$x - 1 \neq 0$
$+1 \quad +1$
$x \neq 1$
Vertical asymptote @ $x = 1$
$y = \frac{1}{1}$
Horizontal asymptote @ $y = 1$

#57 $g(x) = \dfrac{x^{0} + 2}{3 - x^{0}}$
$3 - x = 0$
$3 = x$
Vertical asymptote @ $x = 3$
$y = \frac{1}{-1}$
Horizontal asymptote @ $y = -1$

#59 $f(x) = \dfrac{x^{2} + 2}{x^{2} - 1}$
$x^2 - 1 = 0$
$\sqrt{x^2} = \sqrt{1}$
$x = \pm 1$
Vertical asymptotes @ $x = 1, x = -1$
$y = \frac{1}{1}$
Horizontal asymptotes @ $y = 1$

#61 $g(x) = \dfrac{4x^{0} - 4}{x^{3} - 8}$ difference of Cubes!
$x^3 - 8 = 0$
$(x - 2)(x^2 + 2x + 4) = 0$
$\boxed{\{x = 2\}}$
$y = 0$
Vertical asymptote @ $x = 2$
Horizontal asymptote @ $y = 0$

$\boxed{1.3}$ day 1 p. 106 1–18, 29, 30, 31, 34, 60–63

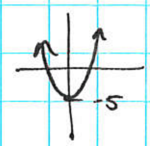
#1 (e) #2 (g) #3 (j) #4 (a) #5 (i) #6 (f)

#7 (k) #8 (h) #9 (d) #10 (c) #11 (l) #12 (b)

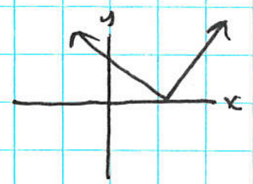
#13 8 #14 3 #15 7, 8 #16 7 #17 2, 4, 6, 10, 11, 12

#18 3, 4, 11, 12

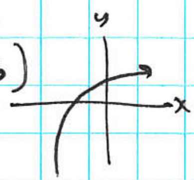
#29 $f(x) = x^2 - 5$
D: $(-\infty, \infty)$
R: $[-5, \infty)$



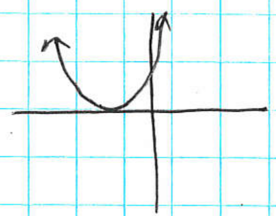

#30 $g(x) = |x - 4|$
D: $(-\infty, \infty)$
R: $[0, \infty)$




#31 $h(x) = \ln(x + 6)$
D: $(6, \infty)$
R: $(-\infty, \infty)$




#34 $p(x) = (x+3)^2$
D: $(-\infty, \infty)$
R: $[0, \infty)$



#60 (A) #61 (D) #62 (C)

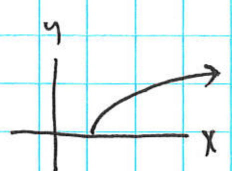
b has H.A.
c has 2 H.A.
d is a step function
e is bounded

All others either go up, down or both forever

#63 (E)

$\boxed{1.3}$ day 2 p. 106 35–42 odd, 45–51 odd

#35 $r(x) = \sqrt{x - 10}$




a) $r(x)$ increases on $[10, \infty)$
b) Neither $r(-x) = \sqrt{-x - 10}$ Not the same or opposite
c) minimum @ $\cancel{x} = 10$ (global)
d) square root function shifted 10 to the right

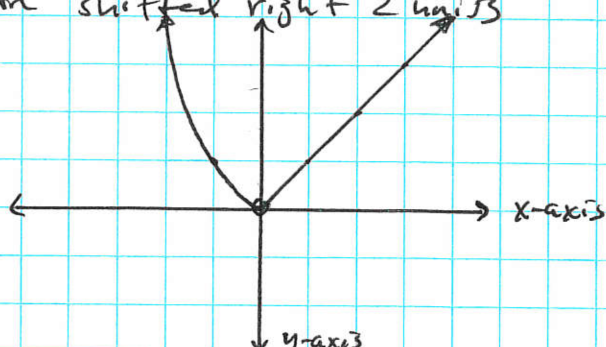
#37 $f(x) = \dfrac{3}{1+e^{-x}}$

a) $f(x)$ increases on $(-\infty, \infty)$
b) Neither $f(-x) = ?$
c) No extrema
d) logistic function, vertical stretch by a factor of 3

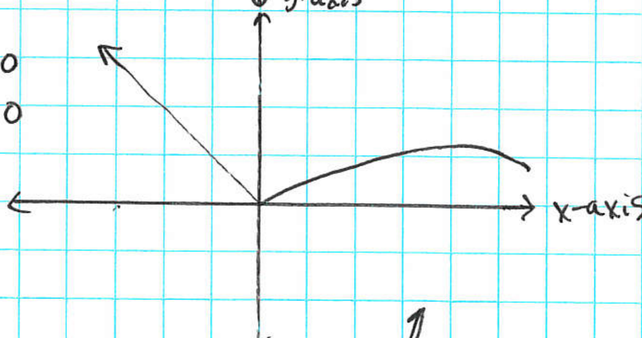
#39 $h(x) = |x| - 10$
a) $h(x)$ decreases on $(-\infty, 0)$ and increases on $(0, \infty)$
b) Even $h(-x) = |-x| - 10 = |x| - 10$
c) Minimum @ $x = 0$
d) Absolute Value function shifted down 10

#41 $s(x) = |x-2|$
a) $s(x)$ decreases on $(-\infty, 2)$ and increases on $(2, \infty)$
b) Neither
c) Absolute minimum @ $x = 2$
d) Absolute Value function shifted right 2 units

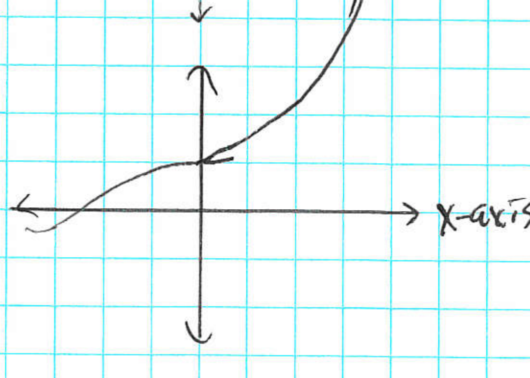
#45 $f(x) = \begin{cases} x & \text{if } x \leq 0 \\ x^2 & \text{if } x > 0 \end{cases}$




#47 $h(x) = \begin{cases} |x| & \text{if } x < 0 \\ \sin x & \text{if } x \geq 0 \end{cases}$




#49 $f(x) = \begin{cases} \cos x & \text{if } x \leq 0 \\ e^x & \text{if } x \geq 0 \end{cases}$



#51 $f(x) = \begin{cases} x^2 & \text{if } x < -1 \\ |x| & \text{if } -1 \le x < 1 \\ \text{int}(x) & \text{if } x \ge 1 \end{cases}$