#61-63 1-4, 9, 11, 13, 15, 17, 19, 23, 24, 31-33, 35, 37, 49, 53, 55, 58, 71, 72, 75.

§1.5

1) D: $\{x \mid x \le -1 \text{ or } x \ge 1\}$
R: $\{x \mid x \ge 0\}$

2) D: $\{x \mid x \in \mathbb{R}\}$
$(-\infty, \infty)$
R: $[0, \infty)$

3) D: $[-4, 4]$
R: $[0, 4]$

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

9) Yes

11) Not a function

13) Function

15) $f(x) = 2x^2 - 7x - 30$
$0 = (2x + 5)(x - 6)$
$x = -\frac{5}{2}$; $x = 6$
$(-\frac{5}{2}, 0)(6, 0)$

17) $f(x) = \frac{x}{9x^2 - 4}$
$0 = \frac{x}{9x^2 - 4}$
$x = 0$

19) $f(x) = \frac{1}{2}x^3 - x$
$0 = x(\frac{1}{2}x^2 - 1)$ $\frac{1}{2}x^2 = 1$
$x^2 = 2$
$x = 0, \pm\sqrt{2}$

23) $f(x) = \sqrt{2x} - 1$
$0 = \sqrt{2x} - 1$
$1 = \sqrt{2x}$
$1 = 2x$
$\frac{1}{2} = x$

24) $f(x) = \sqrt{3x + 2}$
$0 = \sqrt{3x + 2}$
$0 = 3x + 2$
$-2 = 3x$
$-\frac{2}{3} = x$

31) increasing over $(-\infty, \infty)$

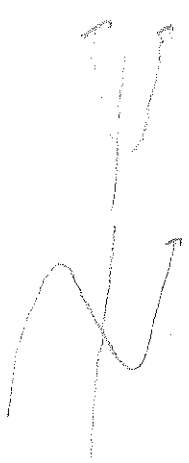
33) decreasing on $(-\infty, 0)$
increasing on $(0, \infty)$
~~constant at~~ 0

35) increasing on $(-\infty, 0)$
~~constant at~~ 0
decreasing on $(0, 2)$
~~constant at~~ 2
increasing on $(2, \infty)$

(35) increasing on $(-\infty, 0)$
const. on $(0, 2)$
increasing on $(2, \infty)$

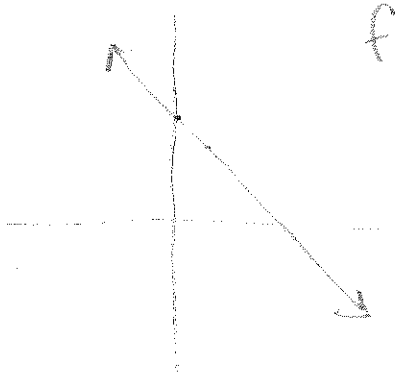
(37) Decreasing on $(-\infty, -1)$
const on $(-1, 1)$
increasing on $(1, \infty)$

(49) $f(x) = (x-4)(x+2)$
Min @ $(1, -9)$



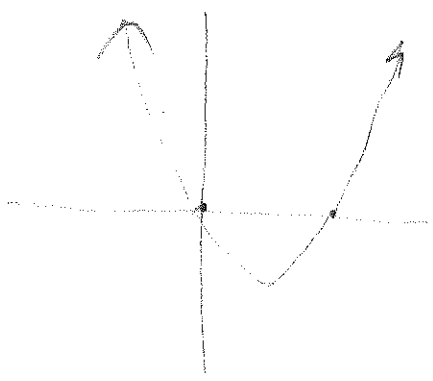
(53) $f(x) = x(x-2)(x+3)$
Max @ $(-1.79, 8.21)$
Min @ $(1.12, -4.06)$

(55) $f(x) = 4 - x$



$f(x) \geq 0$ on $(-\infty, 4]$

(58) $f(x) = x^2 - 4x = x(x-4)$



$(-\infty, 0] \cup [4, \infty)$

(71) $f(x) = x^6 - 2x^2 + 3$

$f(-x) = (-x)^6 - 2(-x)^2 + 3$

$= x^6 - 2x^2 + 3$

even y-axis sym

(72) $h(x) = x^3 - 5$

$h(-x) = (-x)^3 - 5$

$= -x^3 - 5$

neither even nor odd

no sym

(75) $f(t) = t^2 + 2t - 3$

$f(-t) = (-t)^2 + 2(-t) - 3$

$= t^2 - 2t - 3$

neither

no sym