section 8.7

352) $f(x) = \sqrt{6x-5}$

a) $f(5) = \sqrt{6(5)-5} = \sqrt{30-5} = \sqrt{25} = \underline{\underline{5}}$

b) $f(-1) = \sqrt{6(-1)-5} = \sqrt{-6-5} = \sqrt{-11}$ not real number

no value at $x=-1$

---

354) $g(x) = \sqrt{3x+1}$

a) $g(8) = \sqrt{3(8)+1} = \sqrt{24+1} = \sqrt{25} = \underline{\underline{5}}$

b) $g(5) = \sqrt{3(5)+1} = \sqrt{15+1} = \sqrt{16} = \underline{\underline{4}}$

---

356) $F(x) = \sqrt{8-4x}$

a) $F(1) = \sqrt{8-4(1)} = \sqrt{8-4} = \sqrt{4} = \underline{\underline{2}}$

b) $F(-2) = \sqrt{8-4(-2)} = \sqrt{8-(-8)} = \sqrt{8+8} = \sqrt{16} = \underline{\underline{4}}$

---

358) $G(x) = \sqrt{4x+1}$

a) $G(11) = \sqrt{4(11)+1} = \sqrt{44+1} = \sqrt{45} = \sqrt{9}\,\sqrt{5} = \underline{\underline{3\sqrt{5}}}$

b) $G(2) = \sqrt{4(2)+1} = \sqrt{8+1} = \sqrt{9} = \underline{\underline{3}}$

---

360) $g(x) = \sqrt[3]{7x-1}$

a) $g(4) = \sqrt[3]{7(4)-1} = \sqrt[3]{28-1} = \sqrt[3]{27} = \underline{\underline{3}}$

b) $g(-1) = \sqrt[3]{7(-1)-1} = \sqrt[3]{-7-1} = \sqrt[3]{-8} = \underline{\underline{-2}}$

362) $h(x) = \sqrt[3]{x^2+4}$

a) $h(-2) = \sqrt[3]{(-2)^2+4} = \sqrt[3]{4+4} = \sqrt[3]{8} = \underline{\underline{2}}$

b) $h(6) = \sqrt[3]{(6)^2+4} = \sqrt[3]{36+4} = \sqrt[3]{40} = \sqrt[3]{8}\,\sqrt[3]{5} = \underline{\underline{2\sqrt[3]{5}}}$

---

364) $f(x) = \sqrt[4]{3x^3}$

a) $f(0) = \sqrt[4]{3(0)^3} = \sqrt[4]{0} = \underline{\underline{0}}$

b) $f(3) = \sqrt[4]{3(3)^3} = \sqrt[4]{(3)^4} = \underline{\underline{3}}$

---

366) $g(x) = \sqrt[4]{8-4x}$

a) $g(-6) = \sqrt[4]{8-4(-6)} = \sqrt[4]{8+24} = \sqrt[4]{32} = \sqrt[4]{(2)^5} = \sqrt[4]{(2)^4}\,\sqrt[4]{2} = \underline{\underline{2\sqrt[4]{2}}}$

b) $g(2) = \sqrt[4]{8-4(2)} = \sqrt[4]{8-8} = \sqrt[4]{0} = \underline{\underline{0}}$

---

to find domain of even root functions ($\sqrt{\ }$, $\sqrt[4]{\ }$, etc.): solve the inside the radical as inequality greater or equal to 0. $\{\geq 0\}$

to find domain of odd root functions ($\sqrt[3]{\ }$, $\sqrt[5]{\ }$, etc.): domain is $(-\infty, \infty)$

---

368) $f(x) = \sqrt{4x-2}$

$(4x-2) \geq 0$

$4x - 2 \geq 0$

$\quad +2 \quad +2$

$4x \geq 2$

$\frac{4x}{4} \geq \frac{2}{4}$

$x \geq \frac{1}{2}$

$\frac{1}{2} \leq x \longrightarrow$ domain: $\underline{\underline{[\frac{1}{2}, \infty)}}$

370) $g(x) = \sqrt{8-x}$

$(8-x) \geq 0$

$8-x \geq 0$

$+x \quad +x$

$8 \geq x$

$8 \geq x$

$x \leq 8 \rightarrow$ domain: $(-\infty, 8]$

---

372) $h(x) = \sqrt{\frac{6}{x+3}}$

$\left(\frac{6}{x+3}\right) \geq 0$

$\frac{6}{(x+3)} \geq 0$

critical points

bottom

$x+3=0$

$-3 \quad -3$

$x=-3$

	$(-\infty,-3)$	$(-3,\infty)$
$(x+3)$	neg	POS
$\frac{6}{(x+3)}$	neg	POS

domain: $(-3, \infty)$

---

374) $f(x) = \sqrt{\frac{x-1}{x+4}}$

$\left(\frac{x-1}{x+4}\right) \geq 0$

$\frac{(x-1)}{(x+4)} \geq 0$

critical points

top	bottom
$x-1=0$	$x+4=0$
$+1 \quad +1$	$-4 \quad -4$
$x=\boxed{1}$	$x=-4$

	$(-\infty,-4)$	$(-4,1)$	$(1,\infty)$
$(x-1)$	neg	neg	POS
$(x+4)$	neg	POS	POS
$\frac{(x-1)}{(x+4)}$	POS	neg	POS

domain: $(-\infty, -4) \cup [1, \infty)$

---

376) $g(x) = \sqrt[3]{6x+5}$ "odd root" domain: $(-\infty, \infty)$

---

378) $f(x) = \sqrt[3]{6x^2-25}$ "odd root" domain: $(-\infty, \infty)$

380) $F(x) = \sqrt[4]{10-7x}$

$(10-7x) \geq 0$

$10 - 7x \geq 0$
$\quad +7x \quad +7x$

$10 \geq 7x$

$\frac{10}{7} \geq \frac{7x}{7}$

$\frac{10}{7} \geq x$

$\frac{10}{7} \geq x$

$x \leq \frac{10}{7} \rightarrow$ domain: $\left(-\infty, \frac{10}{7}\right]$

---

382) $G(x) = \sqrt[5]{6x-3}$ "odd root" domain: $(-\infty, \infty)$

---

use the (shift technique) Translation of Graph to find the actual axis after drawing a basic graph

$y = f(x-h)+k$ in this section i.e. $y = \sqrt{x-(h)} + (k)$

where H-shift: h and V-shift: k

---

384) $f(x) = \sqrt{x-1} \rightarrow y = f(x) = \sqrt{x-(1)} + (0)$

H-shift: $+1$
V-shift: 0

a) $(x-1) \geq 0$

$x - 1 \geq 0$
$\quad +1 \quad +1$

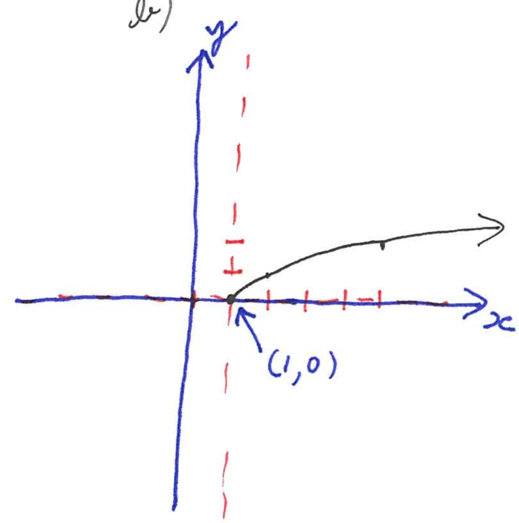
$x \geq 1$

$1 \leq x$

domain: $[1, \infty)$

like $y = \sqrt{x}$

b)



c) range: $[0, \infty)$

386) $g(x)=\sqrt{x-4} \rightarrow y=g(x)=\sqrt{x-(4)}+(0)$

a) $(x-4)\geq 0$

$x-4\geq 0$

$\underline{\quad +4 \quad +4}$

$x\geq 4$

$4\leq x$

domain: $[4,\infty)$

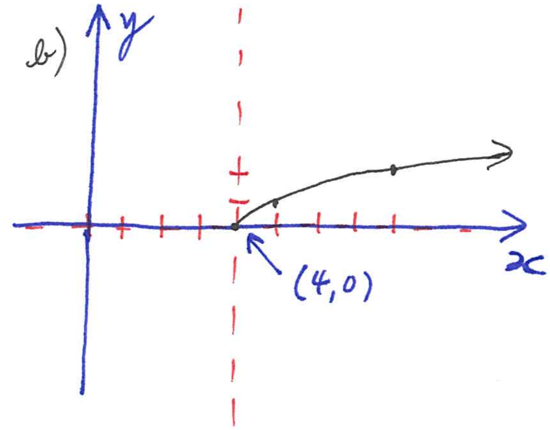
H-shift: +4

V-shift: 0

like

$y=\sqrt{x}$

b)



c) range: $[0,\infty)$

---

388) $f(x)=\sqrt{x}-2 \rightarrow y=f(x)=\sqrt{x-(0)}+(-2)$

a) $(x)\geq 0$

$x\geq 0$

$0\leq x$

domain: $[0,\infty)$

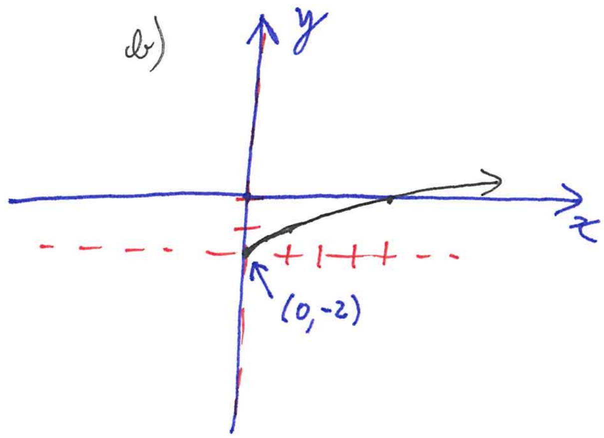
H-shift: 0

V-shift: -2

like

$y=\sqrt{x}$

b)



c) range: $[-2,\infty)$

---

390) $g(x)=3\sqrt{x} \rightarrow y=g(x)=3\sqrt{x-(0)}+(0)$

a) $(x)\geq 0$

$x\geq 0$

$0\leq x$

domain: $[0,\infty)$

H-shift: 0

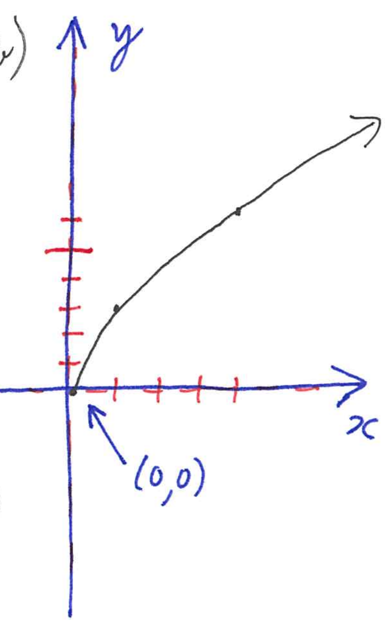
V-shift: 0

like

$y=3\sqrt{x}$

x	y
0	0
1	3
4	6

b)



c) range: $[0,\infty)$

392) $f(x) = \sqrt{4-x} \rightarrow y = f(x) = \sqrt{-(x-(4))} + (0)$

a) $(4-x) \geq 0$

$4 - x \geq 0$
$+x \quad +x$

$4 \geq x$

$x \leq 4$

domain: $(-\infty, 4]$

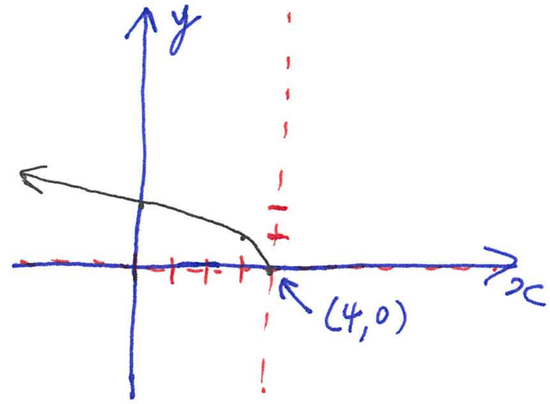
H-shift: +4

V-shift: 0

like $y = \sqrt{-x}$

x	y
0	0
-1	1
-4	2

b)



c) range: $[0, \infty)$

394) $g(x) = -\sqrt{x} + 1 \rightarrow y = g(x) = -\sqrt{x-(0)} + (1)$

a) $(x) \geq 0$

$x \geq 0$

$0 \leq x$

domain: $[0, \infty)$

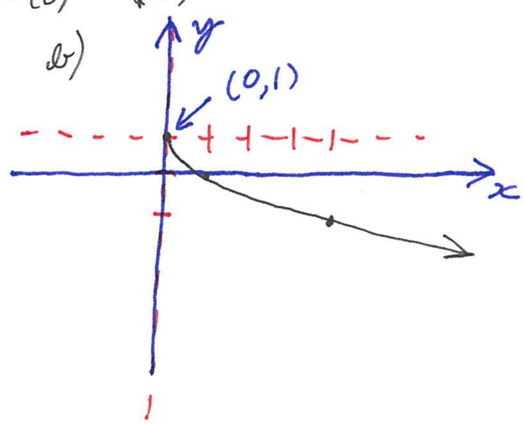
H-shift: 0

V-shift: +1

like $y = -\sqrt{x}$

x	y
0	0
1	-1
4	-2

b)



c) range: $(-\infty, 1]$

396) $f(x) = \sqrt[3]{x+1} \rightarrow y = f(x) = \sqrt[3]{x-(-1)} + (0)$

a) "odd root"

domain: $(-\infty, \infty)$

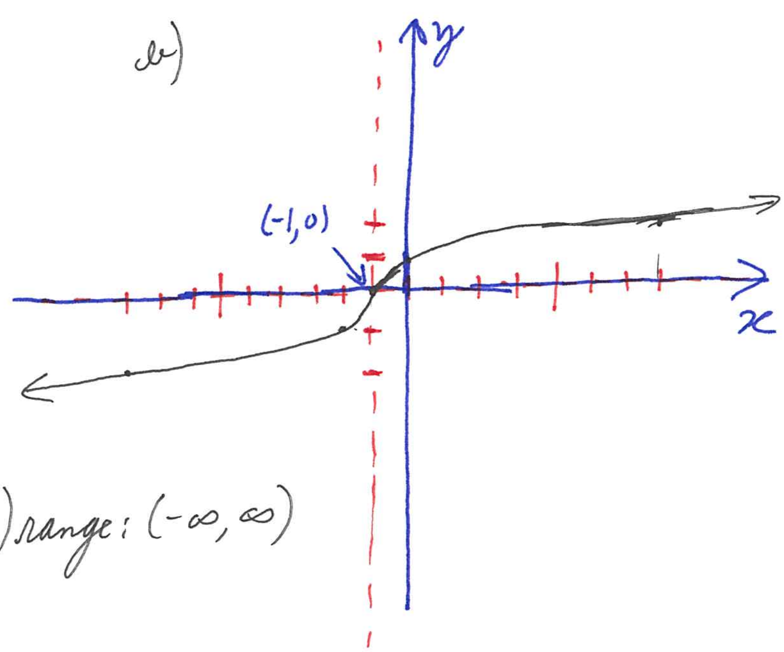
H-shift: -1

V-shift: 0

like $y = \sqrt[3]{x}$

x	y
8	2
1	1
0	0
-1	-1
-8	-2

b)



c) range: $(-\infty, \infty)$

398) $g(x) = \sqrt[3]{x-2} \rightarrow y = g(2) = \sqrt[3]{x-(2)} + (0)$

a) "odd root"

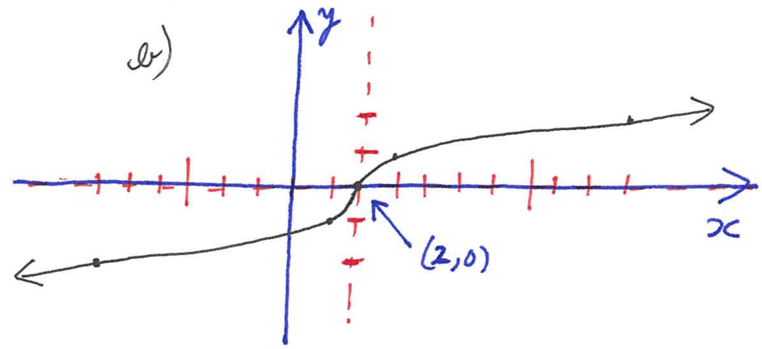
domain: $(-\infty, \infty)$

H-shift: +2

V-shift: 0

like $y = \sqrt[3]{x}$

b)



c) range: $(-\infty, \infty)$

400) $f(x) = \sqrt[3]{x} - 3 \rightarrow y = f(x) = \sqrt[3]{x-(0)} + (-3)$

a) "odd root"

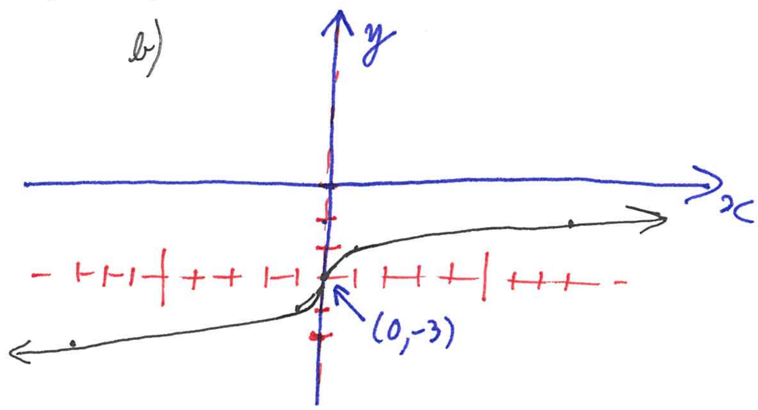
domain: $(-\infty, \infty)$

H-shift: 0

V-shift: -3

like $y = \sqrt[3]{x}$

b)



c) range: $(-\infty, \infty)$

402) $g(x) = -\sqrt[3]{x} \rightarrow y = g(x) = -\sqrt[3]{x-(0)} + (0)$

a) "odd root"

domain: $(-\infty, \infty)$

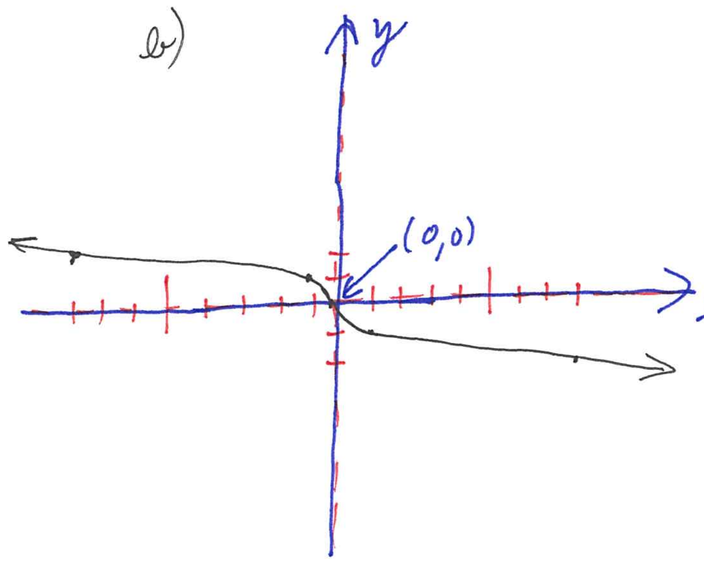
H-shift: 0

V-shift: 0

like $y = -\sqrt[3]{x}$

x	y
8	-2
1	-1
0	0
-1	1
-8	2

b)



c) range: $(-\infty, \infty)$

404) $f(x) = -2\sqrt[3]{x} \rightarrow y = f(x) = -2\sqrt[3]{x-(0)} + (0)$

a) "odd root"

domain: $(-\infty, \infty)$

H-shift: 0

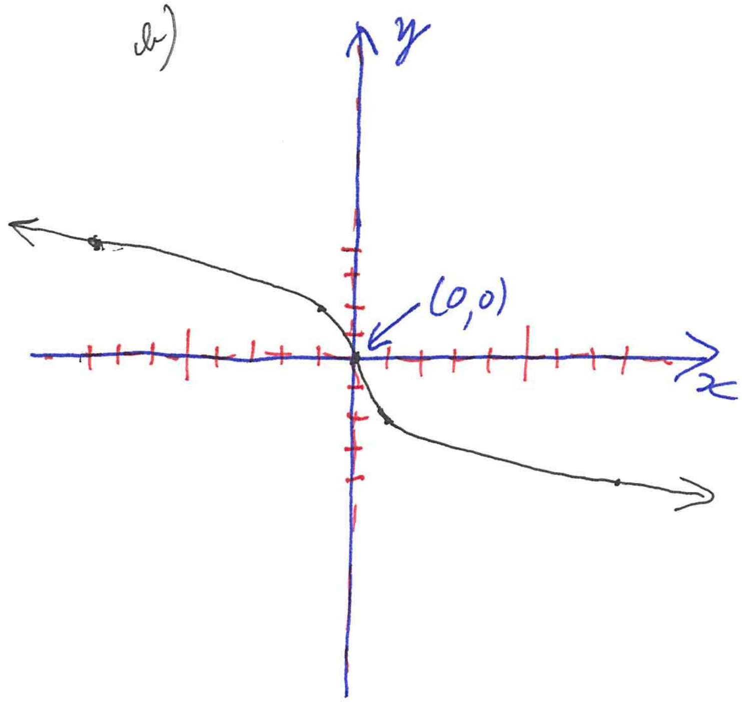
V-shift: 0

like

$y = -2\sqrt[3]{x}$

x	y
8	-4
1	-2
0	0
-1	2
-8	4

b)



c) range: $(-\infty, \infty)$