Goal: $g(x) = -2\sqrt{10-5x} - 8$

tricky part

$10-5x = -5x+10 = -5(x-2)$

① $f(x) = \sqrt{x}$ $\longmapsto$ ② $-2\sqrt{x}$ $\longmapsto$ ③ $-2\sqrt{-5x}$

(x,y) $\quad (x,y) \longmapsto (x,-2y) \quad (x,y) \longmapsto (-\frac{1}{5}x, y)$

④ $\longmapsto -2\sqrt{-5(x-2)}$ $\longmapsto$ ⑤ $-2\sqrt{-5(x-2)} - 8$

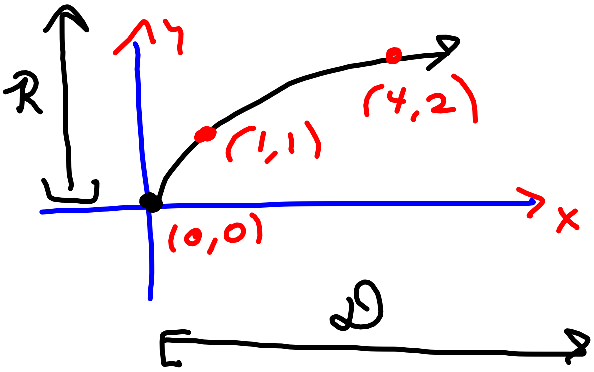
$(x,y) \longmapsto (x+2, y) \quad (x,y) \longmapsto (x, y-8)$

7) $f(x) = \frac{1}{x}$
$= x^{-1}$

8) $f(x) = \frac{1}{x^2}$
$= x^{-2}$

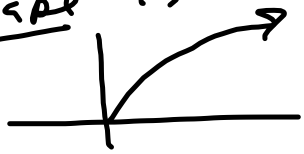
" $\frac{1}{0} = \infty$ "

$f(x) = \sqrt{x} = x^{\frac{1}{2}}$



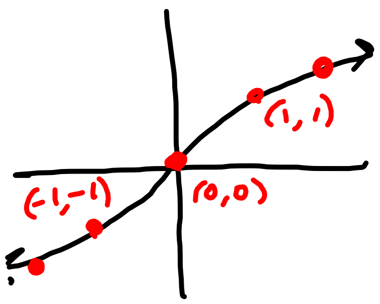
$\mathcal{D} = [0, \infty)$
$\mathcal{R} = [0, \infty)$
Inc: $(0, \infty)$
Leave out $x = 0$
Nothing to which to compare it.

$\sqrt[4]{x}$, $\sqrt[6]{x}$, ... almost, except once you're not at $0 = x$, or $x = 1$,
then $\sqrt[4]{x} \neq \sqrt{x}$
$\sqrt[4]{4} \neq 2$, like $\sqrt{4} = 2$,
but the shape is basically the same



$f(x) = \sqrt[3]{x}$
$= x^{\frac{1}{3}}$

$(\sqrt[5]{x}, \sqrt[7]{x}, \ldots)$
$(x^{1/5}, x^{1/7}, \ldots)$



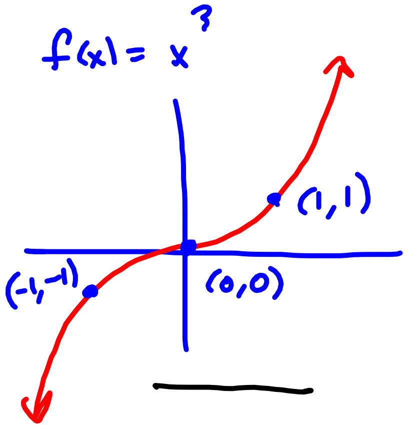
$\mathcal{D} = (-\infty, \infty) = \mathbb{R}$
$\mathcal{R} = (-\infty, \infty)$
Inc: $(-\infty, \infty)$
Symmetry: origin
ODD

$f(-x) = -f(x)$

(1,1)'s on graph; ~~therefore,~~

Its shadow. (-1,-1) is, too.

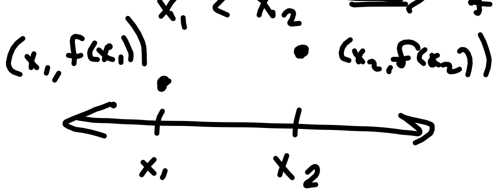
$f(x) = x^3$



$\mathcal{D} = \mathbb{R}$
$\mathcal{R} = \mathbb{R}$
Inc: $\mathbb{R}$
Symmetry: ORIGIN
ODD

Increasing:

$x_1 < x_2 \implies f(x_1) < f(x_2)$



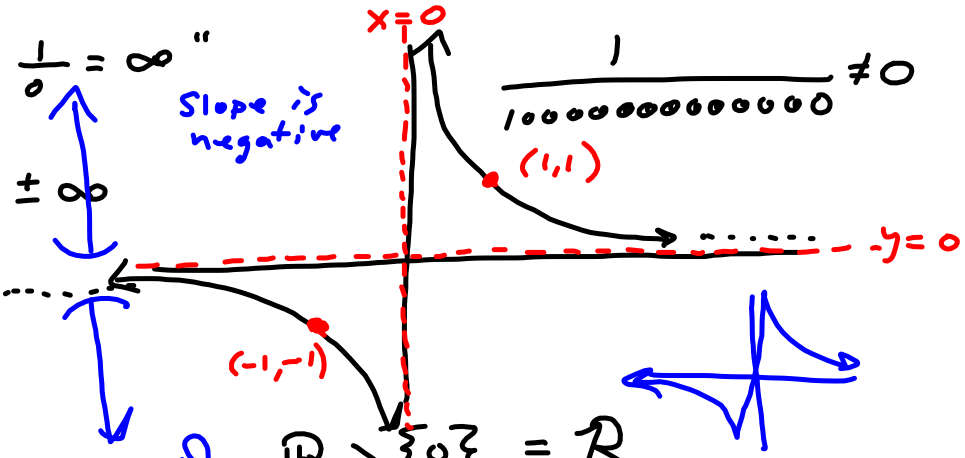
$f(x) = \frac{1}{x}$ " $\frac{1}{0} = \infty$ "

x	y
0	$\cancel{\exists}$
-1	-1
1	1
2	$\frac{1}{2}$
-2	$-\frac{1}{2}$
± 10	$\pm\frac{1}{10}$
$\pm\frac{1}{2}$	± 2
$\pm\frac{1}{10}$	± 10
$\pm\frac{1}{1000}$	± 1000
1000	$\pm\frac{1}{1000}$

Think: $\pm\infty$

Slope is negative

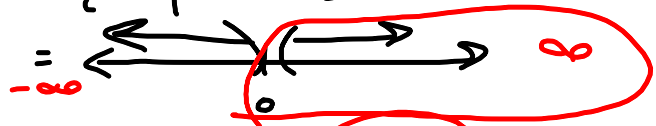
$\frac{1}{1000000000000000} \neq 0$



$\mathcal{D} = \mathbb{R} \setminus \{0\} = \mathbb{R}$

$= \{x \mid x \neq 0\}$

=



$= (-\infty, 0) \cup (0, \infty)$

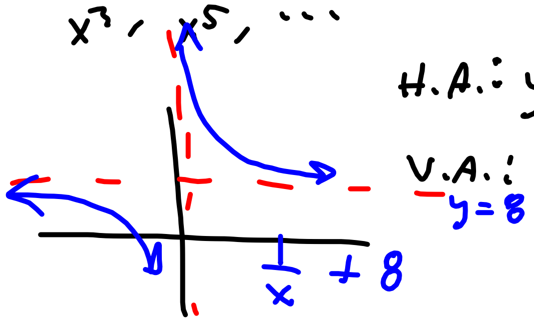
Dec: $(-\infty, 0) \cup (0, \infty) = \mathbb{R} \setminus \{0\}$

Sym: origin

H.A.: $y = 0$ HORIZONTAL ASYMPTOTE

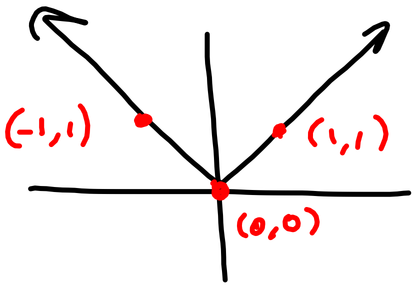
V.A.: $x = 0$ vertical asymptote.

$\frac{1}{x^3}, \frac{1}{x^5}, \ldots$



$\frac{1}{x} + 8$

$f(x) = |x|$



$\mathcal{D} = \mathbb{R}$

$\mathcal{R} = [0, \infty)$

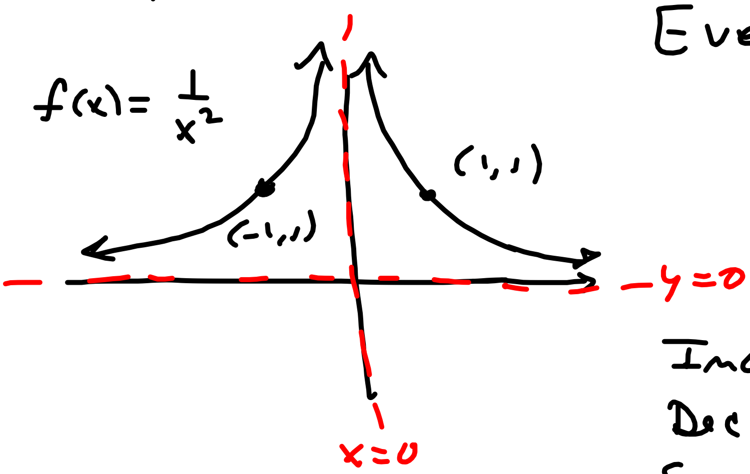
Inc: $(0, \infty)$

Dec: $(-\infty, 0)$

Sym: y-axis

Even

$f(x) = \frac{1}{x^2}$



$\frac{1}{(-1)^2} = 1$

$\mathcal{D} = \mathbb{R} \setminus \{0\}$

$\mathcal{R} = (0, \infty)$

Inc: $(-\infty, 0)$

Dec: $(0, \infty$

Sym: y-axis

EVEN

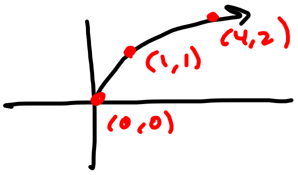
$f(-x) = f(x)$

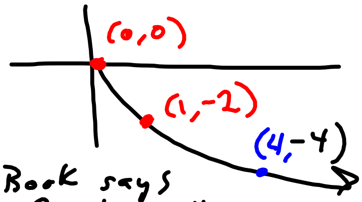
5x7 : $f(x)$ $\quad$ $c\,f(x)$ $\qquad$ $-2\sqrt{10-5x}-8$

$c\,f(x)$ $\qquad (x,y) \longmapsto (x, cy)$

$5\sqrt{x}$ $\qquad (1,1) \longmapsto (x, 5y)$

① $\sqrt{x} = f(x)$ $\qquad$ ② $-2\sqrt{x} = -2f(x)$

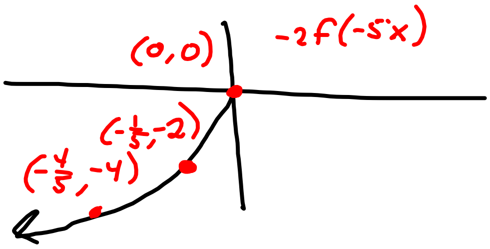




Book says reflection "in the x-axis," which sucks. Flip ~~across x-axis~~ vertically.

③ $-2\sqrt{-5x} = -2f(-5x)$

$(x,y) \longmapsto (-\frac{1}{5}x, y)$

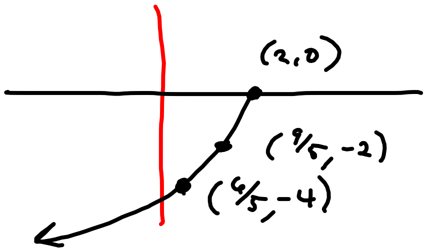


$-\frac{1}{5}+2$
$= \frac{-1}{5} + \frac{2}{1}\cdot\frac{5}{5}$
$= \frac{-1+10}{5} = \frac{9}{5}$

④ $-2\sqrt{-5(x-2)} = -2f(-5(x-2))$

Delay

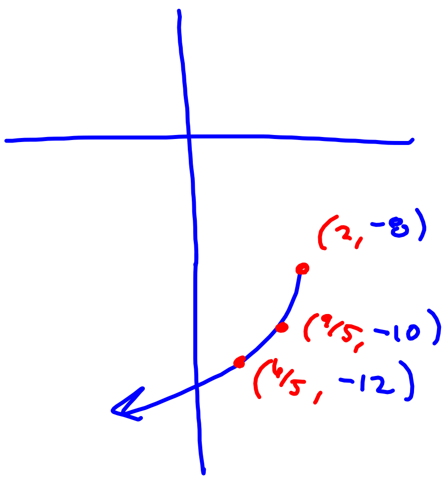
$(x,y) \longmapsto (x+2, y)$



$\frac{-4+10}{5} = \frac{6}{5}$

$-\frac{4}{5}+2 = \frac{-4+10}{5}$

⑤ $-2\sqrt{-5(x-2)} - 8$



1. vertical stretch/Flip
2. Horiz. stretch/Flip
3. Horiz. Shift
4. Vert. Shift

§2.2, 2.3 Posted
video on Old Test 2 is in the Practice Tests,

§2.2 #s 1-6, 53-55, 57, 59, 73, 75, 76, 77

§2.3 #s 1-10, 35-39, 41, 42, 45, 48, 50, 53, A, B, C, D

See Solns.

Write Dark on Homework
I'm grading more thoroughly