

COLLEGE ALGEBRA


GPS # 15

2.3 A LIBRARY OF FUNCTIONS


NAME: Holly Gasper
 Class Time: TuTh 11:30 Date: 2-7-08


Library of Functions:


Square Function: $f(x) = x^2$ 
all even power

Cube Function: $f(x) = x^3$ 
all odd power


Power Function: $f(x) = x^n, n \neq 0$

Absolute Value Function: $f(x) = |x| = x$ 
 $|2| = 3$

Square Root Function: $f(x) = \sqrt{x} = x^{\frac{1}{2}}$ 

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

Root Function: $f(x) = \sqrt[n]{x} = x^{\frac{1}{n}}, n \geq 2$

Reciprocal Function: $f(x) = \frac{1}{x}$ 

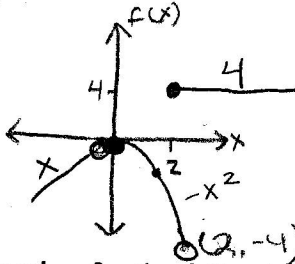
no
 $\angle 7 = 0$
 $\leq 2 = \bullet$
 $() = 0$
 $[\] = \bullet$

When functions are defined by more than one equation, they are called **piecewise-defined functions**.

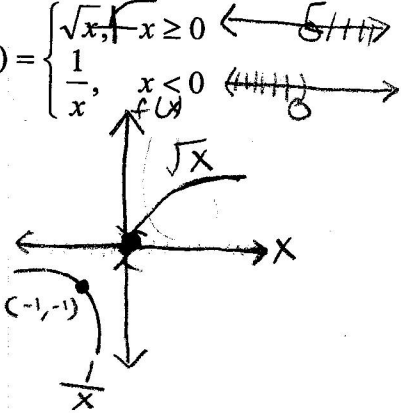
1. Sketch the graph of the following piecewise-defined functions. Label at least three points on the graph.

a) $f(x) = \begin{cases} x, & x < 0 \\ -x^2, & 0 \leq x < 2 \\ 4, & x \geq 2 \end{cases}$

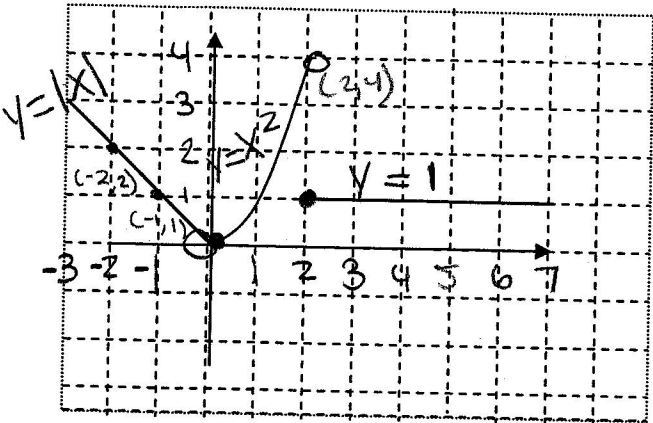
Handwritten notes:
 $x < 0$ (with a slash through the line)
 $0 \leq x < 2$ (with a slash through the line)
 $x \geq 2$ (with a slash through the line)
 $2, \infty$
 $-2^2 = -4$
 2



b) $f(x) = \begin{cases} \sqrt{x}, & x \geq 0 \\ \frac{1}{x}, & x < 0 \end{cases}$



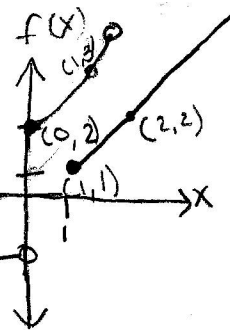
2. Give the piecewise-defined function for the following graph?



$$f(x) = \begin{cases} -x, & x < 0 \\ x^2, & 0 \leq x < 2 \\ 1, & x \geq 2 \end{cases}$$

3. The function f is defined as

$$f(x) = \begin{cases} -1, & x < 0 \\ x^2 + 2, & 0 \leq x < 1 \\ |x|, & x \geq 1 \end{cases}$$



(a) Find $f(0)$, $f(-2)$, and $f(3)$.

Handwritten: $f(0) = (0)^2 + 2 = 2$ $f(3) = |3| = 3$

Handwritten: $f(-2) = -1$

(b) Determine the domain of f .

Handwritten: $D: (-\infty, \infty)$

(c) Graph f .

(d) Use the graph to find the range of f .

Handwritten: $R: \{y \mid y = -1 \text{ or } y \geq 1\}$

Good nb!