Precalculus
Section 2:5 B
Piecewise-defined Functions

1. Piecewise-defined functions Functions defined by more than one equation

The function f is defined as

$$f(x) = \begin{cases} -x + 1 & \text{if } -1 \le x < 1 \\ 2 & \text{if } x = 1 \\ x^2 & \text{if } x > 1 \end{cases}$$

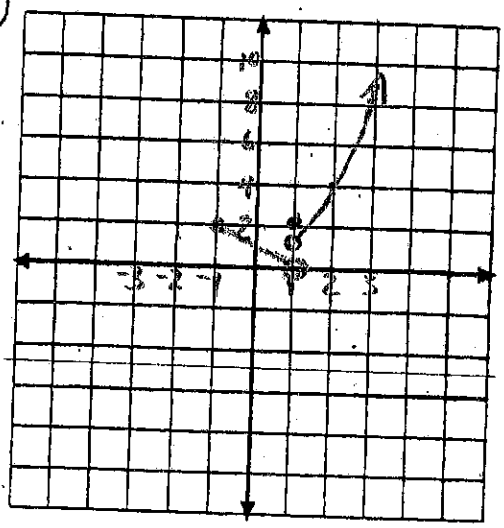
(a) Find $f(0)$, $f(1)$, and $f(2)$.
(b) Determine the domain of f.
(c) Graph f.
(d) Use the graph to find the range of f.

a.) $f(0) = -(0)+1 = \boxed{1}$
$f(1) = \boxed{2}$
$f(2) = (2)^2 = \boxed{4}$

b.) D: $[-1, \infty)$

d.) R: $y > 0$

c.)



2. In May 2004, Commonwealth Edison Company supplied electricity to residences for a monthly customer charge of \$7.13 plus 8.275¢ per kilowatt-hour (kWhr) for the first 400 kWhr supplied in the month and 6.208¢ per kWhr for all usage over 400 kWhr in the month.

A. What is the charge for using 300 kWhr in a month?

$C = 7.13 + .08275(300) = \boxed{\$31.96}$

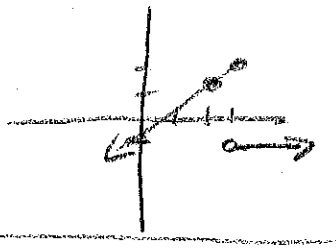
B. What is the charge for using 700 kWhr in a month?

$C = 7.13 + .08275(400) + .06208(300) = \boxed{\$58.85}$

C. If C is the monthly charge for x kWhr, express C as a function of x.

$$C = \begin{cases} 7.13 + 0.08275x, & 0 < x \le 400 \\ 7.13 + .08275(400) + .06208(x-400), & x > 400 \end{cases}$$

Ex.1 $f(x) = \begin{cases} x-1, & x \leq 3 \\ -1, & x > 3 \end{cases}$ Graph & identify Domain & Range

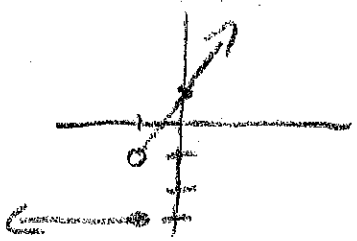


D: $(-\infty, \infty)$

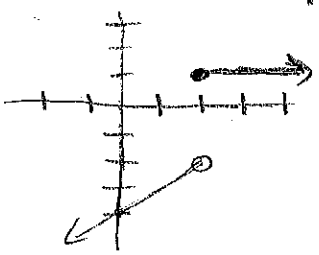
R: $(-\infty, 2]$

Ex.1 Check your progress $f(x) = \begin{cases} 2x+1, & x > -1 \\ -3, & x \leq -1 \end{cases}$

Graph & identify Domain

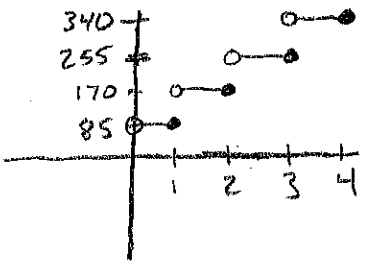


Ex.2 write the piecewise function.



$f(x) = \begin{cases} x-4, & x < 2 \\ 1, & x \geq 2 \end{cases}$

Real world ex.4 use a step function



85, $0 < x \leq 1$

170, $1 < x \leq 2$

255, $2 < x \leq 3$

340, $3 < x \leq 4$

" " " "

Word Problem - Audubon Gas

$$C = \begin{cases} 6.45 + .2012x + .7268x, & 0 < x \leq 20 \\ 6.45 + .1117x + .7268x, & 20 < x \leq 50 \\ 6.45 + .0374x + .7268x, & x > 50 \end{cases}$$

a.) $6.45 + .1117(40) + .7268(40) = \$39.99$

b.) $6.45 + .0374(202) + .7268(202) = \$160.82$

d.) graph on calculator use 2nd trace → value → up arrow until cursor goes on top of graph, then record y-value