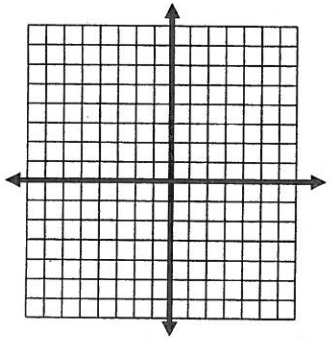
Day 5 Classwork

Part I. Carefully graph each of the following. Identify whether or not he graph is a function. Then, evaluate the graph at any specified domain value. You may use your calculators to help you graph, but you must sketch it carefully on the grid!

1. $f(x)=\begin{cases} x+5 & x<-2 \\ x^2+2x+3 & x\geq -2 \end{cases}$



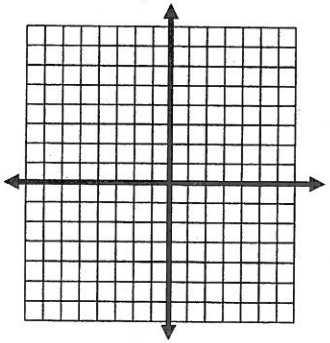
Function? Yes or No

$f(3)=$

$f(-4)=$

$f(-2)=$

2. $f(x)=\begin{cases} 2x+1 & x\geq 1 \\ x^2+3 & x<1 \end{cases}$



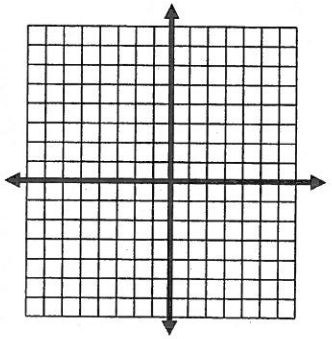
Function? Yes or No

$f(-2)=$

$f(6)=$

$f(1)=$

3. $f(x)=\begin{cases} -2x+1 & x\leq 2 \\ 5x-4 & x>2 \end{cases}$



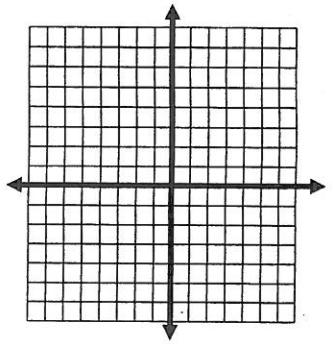
Function? Yes or No

$f(-4)=$

$f(8)=$

$f(2)=$

4. $f(x)=\begin{cases} x^2-1 & x\leq 0 \\ 2x-1 & 0<x\leq 5 \\ 3 & x>5 \end{cases}$



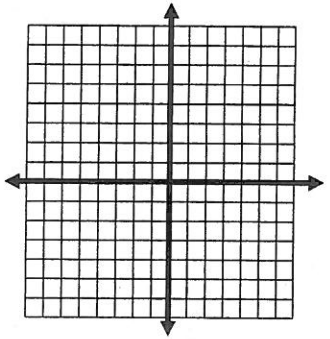
Function? Yes or No

$f(-2)=$

$f(0)=$

$f(5)=$

5. $f(x)=\begin{cases} x^2 & x\leq 0 \\ -x^2+4 & x>0 \end{cases}$



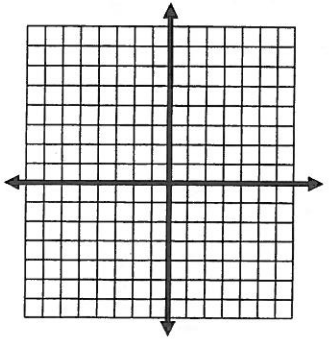
Function? Yes or No

$f(-4)=$

$f(0)=$

$f(3)=$

6. $f(x)=\begin{cases} 5 & x\leq -3 \\ -2x-3 & x>-3 \end{cases}$



Function? Yes or No

$f(-4)=$

$f(0)=$

$f(3)=$

Applications of Piecewise:

Think About It . . .

A car company charges $45 plus $0.20 per mile over 50 miles.

Give the equation for the cost of driving $0 \le m \le 50$ miles.

Give an equation to determine the cost of driving MORE than 50 miles ($m > 50$).

Put this together as a piecewise function . . .

How much will it cost you if you drive 20 miles? 50 miles?

51 miles? 200 miles?

A cell phone company charges a monthly fee of $9.95, and a usage fee as follows:

Less than 150 minutes: $0.40 per min

150 to 300 minutes: $0.20 per min

Over 300 minutes: $0.10 per min

Write the piecewise function, $C(m)$, for the cost of using m minutes.

What is the total charge if you use 200 minutes? 350 minutes?

Day 6 Notes

Applications of Piecewise Functions

1. A long distance telephone charges 99 cents for any call up to 20 minutes in length and 7 cents for each additional minute. Use bracket notation to write a formula for the cost, C, of a call as a function of its length time, t, in minutes. Graph the function. How much does it cost to talk for 10 minutes? 25 minutes?

2. Suppose a carpet store sells carpet for $10 per square yard for the 100 sq yards purchased, and then lowers the price to $7 per square yard after the first 100 yards have been purchased. Find a function, $C = f(x)$, that gives the cost of purchasing any number of square yards of carpet between 0 and 200 square yards. How much does it cost for 50 square yards? 150 square yards?

3. A company charges $200 a month to organize a company's payroll for up to 20 employees and an additional $100 a month for each 20 employees over 20. Find a function, $P = f(x)$, that gives the payroll amount for 100 employees in one month. Graph the function.

Day 6 Classwork

1. You are a buyer for a grocery store and you are asked to purchase potatoes for the grocery store. The distributor of potatoes tells you that if you buy up to 50 bushels of potatoes, you will pay $40 per bushel; and for each bushel you purchase above 50 bushels, you will pay $30 per bushel.
   a. How much will your grocery store pay in total if you decide to purchase 40 bushels? 60 bushels? 100 bushels?
   b. Write a function which has as its input values (x-values) the number of bushels of potatoes purchased and outputs the total amount of money that your grocery store will pay for the potatoes.

2. A certain country taxes the first $20,000 of an individual's income at a rate of 15%, and all income over $20,000 is taxed at 20%.
   a. Al makes $16,000. Betty makes $36,000. How much is each taxed?
   b. Write a piecewise function T that specifies the total tax on an income of x dollars.
   c. Make a graph of T. Be sure to plot the points from part a!
   d. Catina is taxed $5000. What is her income?

3. A paperback sells for $12. The author is paid royalties of 10% on the first 10,000 copies sold, and 15% on any additional copies.
   a. When the 6,000th book is sold, how much will the author earn on that sale?
   b. Also, what will the author's total royalties be at that point?
   c. When the 12,000th book is sold, how much will the author earn on that sale?
   d. Also, what will the author's total royalties be at that point?
   e. Let x be the number of copies sold. Write a piecewise function for R (the royalty payment earned on that sale) in terms of x.
   f. How many copies have to be sold in order for the author to have earned $30,000?