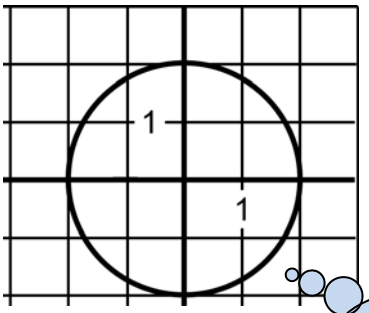
How does the graph of a function look different than any old relationship?

College Algebra
Class Notes
Graphs of Functions (section 3.2)

Recall a function is a special relationship where there is *exactly one* y *value* for each x value in the domain. So, how would this look graphically?



We saw this graph in the previous section as we worked on determining if a relationship was a function or not. Recall that we said it was *not* a function.

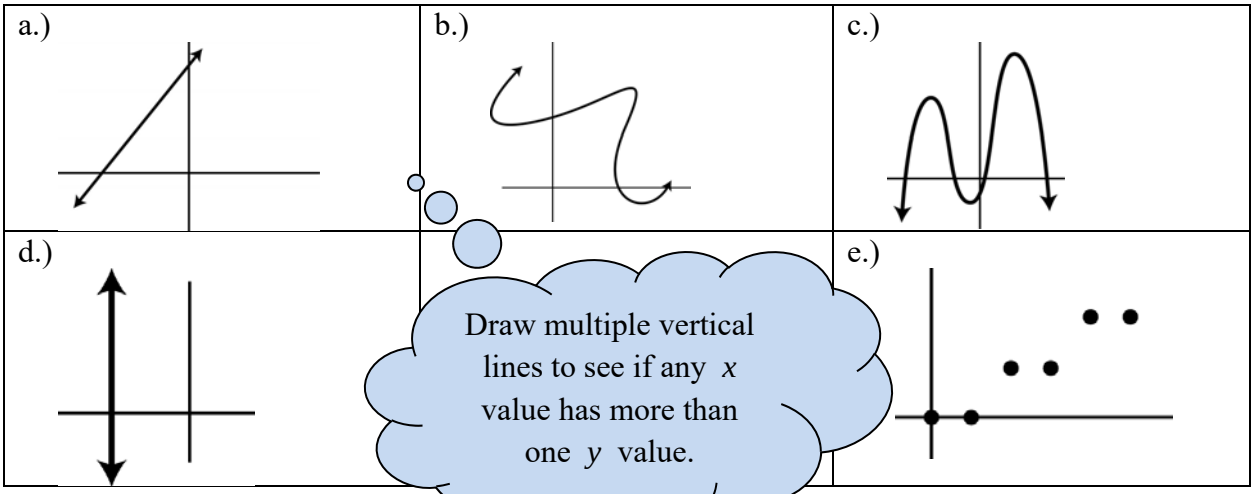
Draw a vertical line down through the circle to highlight the points whose x values are 1. Estimate these points in ordered pair notation.

Does the x value of 1 have *exactly* one y value associated with it?

This procedure leads us to an important tool.

Vertical Line Test: Given a graph, the vertical line test will tell you if it is a function. If any vertical line could be drawn so that it crosses the graph more than once, then it is ***not*** a function. (The vertical line represents a single x value. If this vertical line hits the graph more than once, that x value has more than one y value and so the relation is *not* a function.)

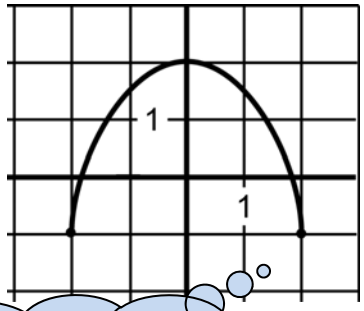
expl 1: Use the vertical line test to determine if the following are functions.



Draw multiple vertical lines to see if any x value has more than one y value.

Obtaining Information from the Graph of a Function:

expl 2: Use the graph of the function $f(x)$ to the right. Find the following values. Estimate if needed.



a.) $f(-1)$

b.) $f(0)$

c.) Find x such that $f(x) = 0$.

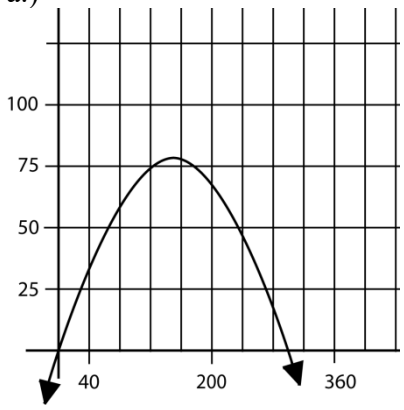
If $f(x)$ is another name for y, then these points are in the form $(x, f(x))$.

Which x values give you points on the graph? Which y values are represented?

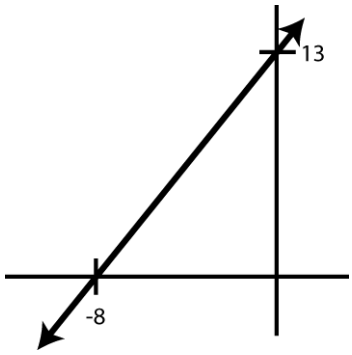
Finding domain and range:

expl 3: Find the domains and ranges for the various functions. Use interval notation.

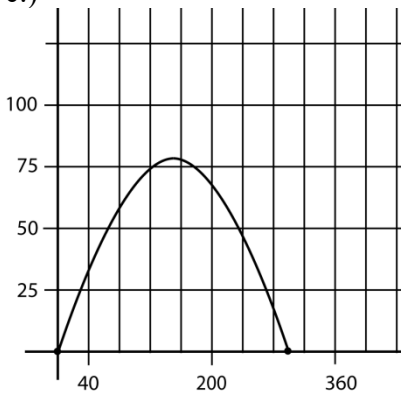
a.)



b.)



c.)



expl 4: Use the graphs to the right.

a.) Find the domain of g.

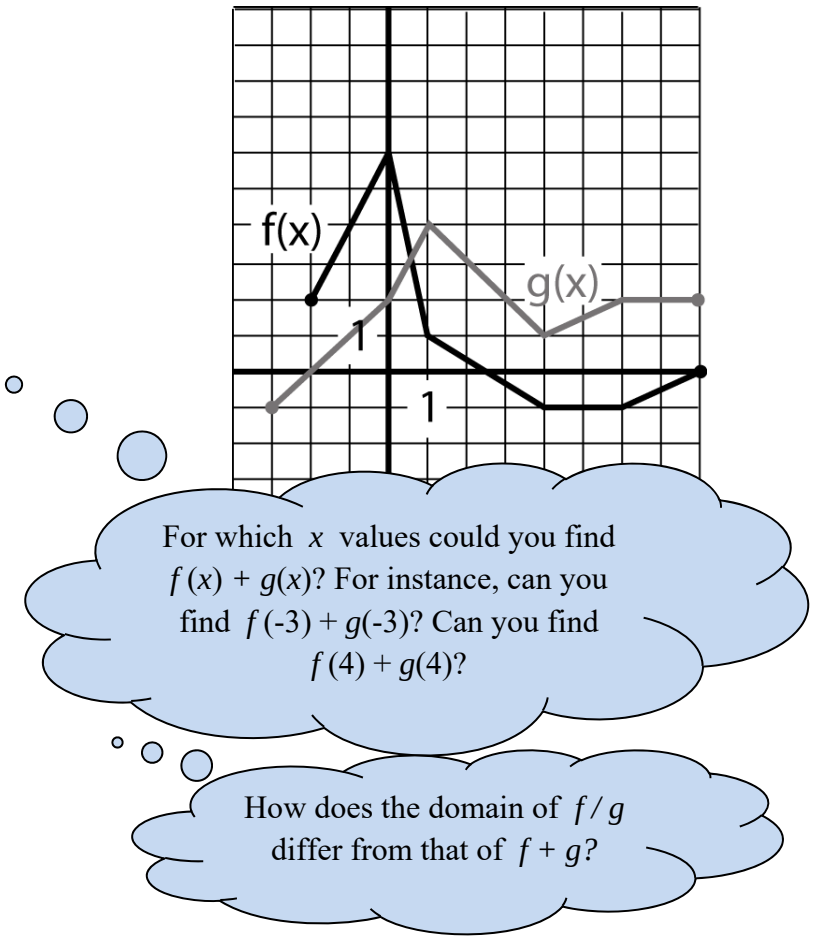
b.) Find the domain of f.

c.) Find the domain of $f + g$.

d.) Find the domain of f / g.

e.) Find $(f + g)(4)$.

f.) Find $(g - f)(6)$.



expl 5: Consider the function $f(x) = 2x^2 + 6x + 7$. If $f(x) = 3$, then what is x? What point(s) are on the graph of $f(x)$? Use ordered pair notation.