Mth 30, Homework 1 on sections 1.1, 1.2, 1.3

Due by Mon, Feb 10 (or the following class).

Here are 11 questions for you to try. Write all your working out and answers by hand on your own notepaper and hand them to me next week. Please use lots of space and as many pages as you want, so I can include corrections or comments - otherwise I may deduct points or ask you to redo it. It must be your own note paper, not a printout of this. You do not need to write the questions, but it is very important that you show clearly any work you had to do to get your answers. Most questions are worth 3 points each.

Section 1.1 Functions and Function Notation

(1) For the function $f(x) = x^2 + 3x - 2$, evaluate

- **(a)** $f(0)$
- **(b)** $f(4)$
- **(c)** $f(-2)$

(You should get -4 for part (c).)

(2) For the function $g(x) = 5x^2 + 8x$, evaluate these by substituting for x and simplifying

- **(a)** $g(-3)$
- **(b)** $g(4w)$

(3) Fill in this table of values for the function $f(x) = x - 1$. Then plot these 5 points and

x	$y = f(x)$
-2	
-1	
0	
1	
2	

draw the graph of $f(x)$. Do this carefully and neatly, showing the x and y axes clearly with evenly marked off numbers.

(4) Explain in your own words what the vertical line test is and what it tells you.

Section 1.2 Domain and Range

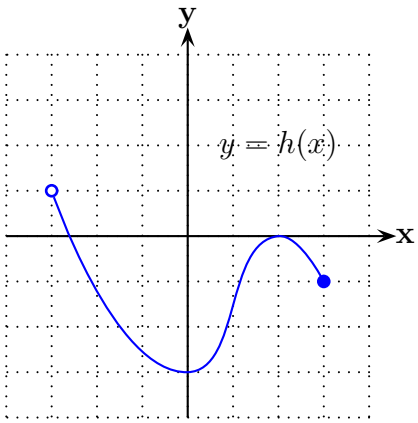
(5) Use interval notation to write the set of all real numbers between -1 and 14 where we include -1 but not 14.

(6) Use interval notation to write the set of all real numbers greater than or equal to 3.

(7) What is the domain of this function: $f(x) = -3\sqrt{x+16}$

(Remember that the numbers inside the square root must be $\geqslant 0$.)

(8) For this graph of $h(x)$,



answer the following questions, using interval notation for parts (c), (d):

(a) Find $h(2)$

(b) Find $h(-2)$

(Hint: From -2 on the x axis go straight down until you hit the graph. Give this y value, it's close to -1.)

(c) Give the domain of h (Hint: if you shine lights from above and below, where is the shadow on the x axis?)

(d) Give the range of h

Section 1.3 Rates of Change and Behavior of Graphs

(9) For the same graph as in the last question:

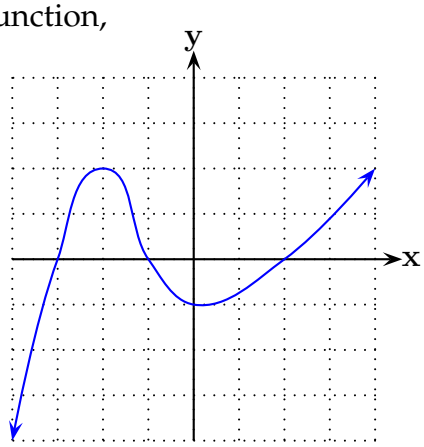
(a) Where is h increasing? Use interval notation for your answer. (Hint: look at x between 0 and 2.)

(b) Where is h decreasing?

(c) Give the coordinates of any local maximums and minimums. (These cannot be end points.)

(d) Is h one-to-one? (Use the horizontal line test.)

(10) (7 points) For this graph of a function,



answer these questions, using interval notation for parts (c) to (g):

(a) Find all its x-intercepts

(b) Find its y-intercept

(c) Give its domain (remember, those arrows mean it goes forever in that direction)

(d) Give its range

(e) Where is it increasing?

(f) Where is it decreasing?

(g) Where is it positive?
(Hint: give the xs where the graph is above the x axis.)

(11) Draw an example of a graph that is decreasing on $(-\infty, -1)$, increasing on $(-1, 3)$ and decreasing again on $(3, \infty)$.

If you get stuck on a question or aren't sure if you understand it:

- Go over the relevant class notes and section in the textbook.
- Check if you get the right answer for a similar odd-numbered question in the textbook (answers at the back of the book).
- Ask me about it after class.
- Come to my office hours: Mon 2:00 - 3:00, Wed 2:00 - 3:00 in CP 317.
- Go to the Math Tutorial Lab in-person in CP 303 or online.