MATH 1280 Spring 2016 | Mike McCraith
Exam 1 | February 16, 2016

DO NOT TURN THIS PAGE UNTIL YOU ARE INSTRUCTED TO DO SO

- Write your name below on the space provided.
- This test has a total of 5 pages.
- Work the problem in the space provided. If you need more space, write on the back of the test.
- To insure maximum credit, show your work. In general, full credit will not be given for unsupported answers.
- Look only at your test. Don't give me the impression that you are cheating.
- Be sure to write neatly. If I cannot read what was written, do not expect the problem to be graded. Also, you must use a pencil. Otherwise, the test will not be graded.
- If you finish early, go over the test again.

Good luck!

Number	Maximum	Score
1	6	
2	8	
3	6	
4	12	
5	2	
6	9	
7	12	
8	8	
9	2	
10	3	
11	10	
12	6	
13	8	
14	6	
15	2	
Total	100	

Name _____

circle final answers

1) (3 points each) Solve for the variable and write your answer in interval notation:

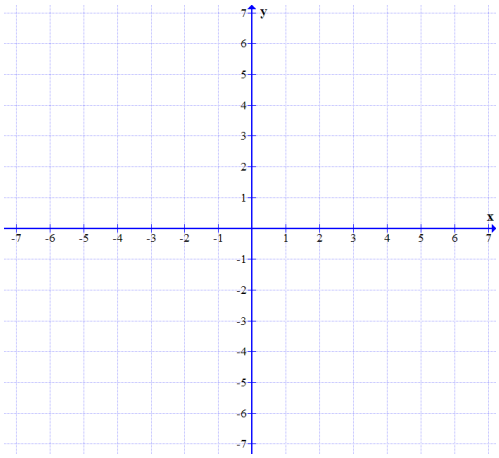
a) $5x + 7 \geq 2x - 12$

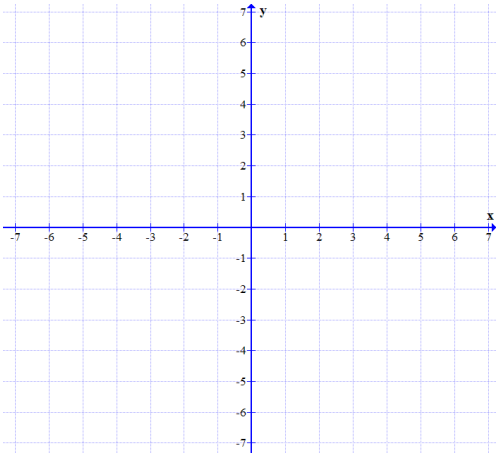
b) $4 < 2x + 3 \leq 11$

2) Sketch a graph of the following inequalities. Be sure to shade your final answer the darkest:

a) (3 points) $5x + 6y \leq 30$

b) (5 points) $\begin{cases} -x + 2y \leq 6 \\ x \leq 4 \\ x + y \geq -5 \end{cases}$





3) (6 points) For the following situation, define the necessary variables and write the corresponding system of equations. Give three ordered pairs that satisfy the system.

Michele di San Gimignano, a gelateria in northern Italy, offers several gourmet gelatos. Two of the top selling gelatos are the chocolate hazelnut and the coffee flavors. Each two-quart batch of the chocolate hazelnut gelato needs 2 cups of heavy cream, 1 cup of sugar, and 6 eggs. Each two-quart batch of the coffee gelato requires 1 cup of heavy cream, 2 cups of sugar, and 6 eggs. On a particular day, the gelateria has at most 13 cups of heavy cream, 14 cups of sugar, and 48 eggs available.

4) (4 points each) Divide:

a) $\dfrac{4a^2b^3+12ab^4-7a^3b^2}{2a^2b^2}$

b) $\dfrac{4x^3+2x^2-x+1}{x^2+x+2}$

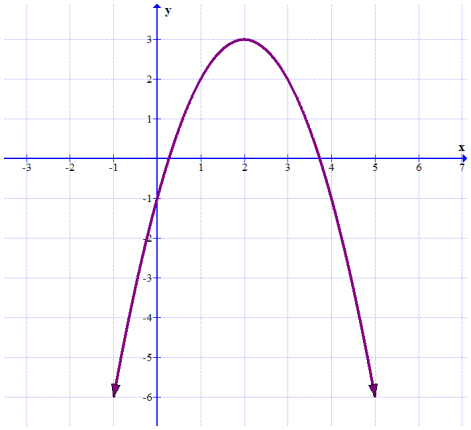
c) $\dfrac{3x^4+5x^3-2x+6}{x-2}$ (Use Synthetic Division)

5) (2 points) Referring to 4c, was $x-2$ a factor of $3x^4+5x^3-2x+6$? Why or why not?

6) (3 points each) Determine if the following are functions. If so, identify their domain and range. If not, explain why not.

a) $\{(4,5),(-2,3),(0,12),(1,9)\}$

b)



c) *Thirty days hath September, April, June, and November. Thirty-one hath all the rest, Except for February clear which has 28 and 29 in a leap year.*

7) (3 points each) For the functions $f(x) = 2x + 5$ and $g(x) = 3x^2 - 5$, find and simplify…

a) $f(4)$

b) $g(2)$

c) $f(-1) + g(3)$

d) $g(x+h)$

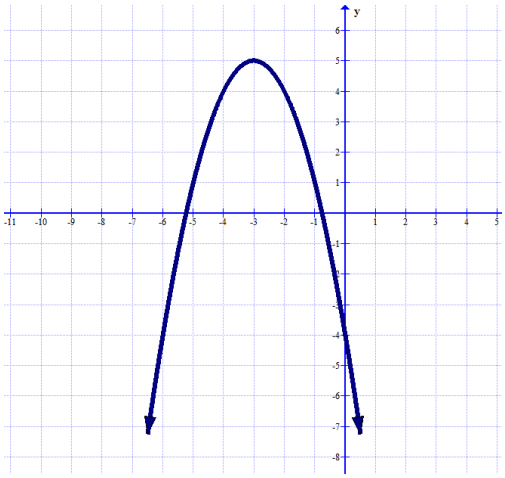
8) (4 points each) Find the domain of the following functions:

a) $f(x) = 6x^3 + 18x^2 - x - 3$

b) $g(x) = \dfrac{2x+1}{4x^2 + 5x - 6}$

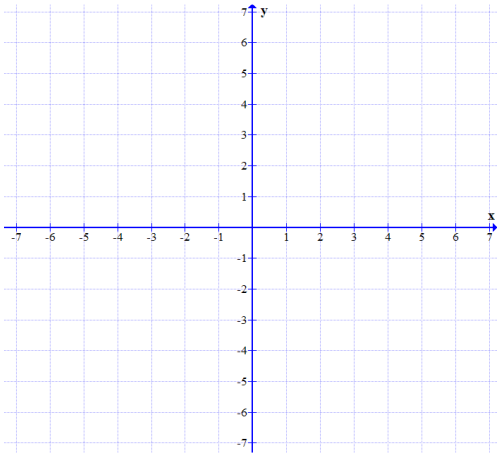
9) (2 points) Short Answer: Explain why you excluded certain numbers in the problem 8b:

10) (3 points) Determine the equation of the function shown in the graph to the right:

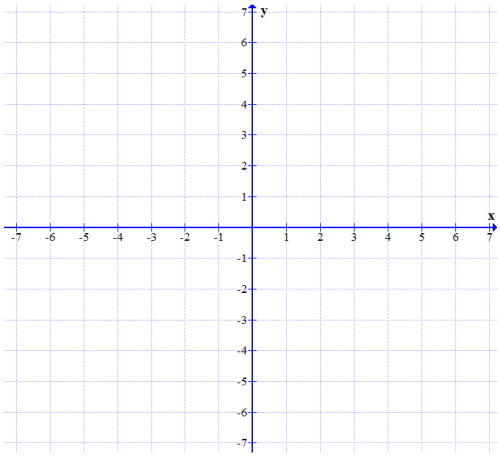


11) (5 points each) For each of the functions, explain the steps necessary to sketch the graph and then sketch the graph:

a) $f(x)=(x+2)^2-5$



b) $g(x)=-|x-3|+4$



12) (2 points each) For the sets $A=\{1,2,3,4,5,6\}$, $B=\{3,5,7,9\}$, and $C=\{x \mid x \text{ is an even natural number}\}$, find…

a) $A\cup B$

b) $B\cap C$

c) $A\cap B$

13) (4 points each) Solve the following compound inequalities. Be sure to draw the necessary number lines. Write answer in interval notation:

a) $5x+3\le 7x+9$ and $8x+1<13$

b) $7-2x\le 3$ or $6x+3<-12+x$

14) (3 points each) Solve for the variable. For part *b*, write your answer in interval notation:

a) $4-\frac{|x+3|}{5}=-2$

b) $-3|2x+1|+5>-10$

15) (2 points) Explain why $|x+4|\geq -5$ is always true and why $|x-6|\leq -3$ is always false: