Name (Print): ____________________

Username.#: ____________________

Lecturer: ____________________

Rec. Instructor: ____________________

Rec. Time: ____________________

Math 1130
Autumn 2015
Exam 1 - Form A
9/24/15

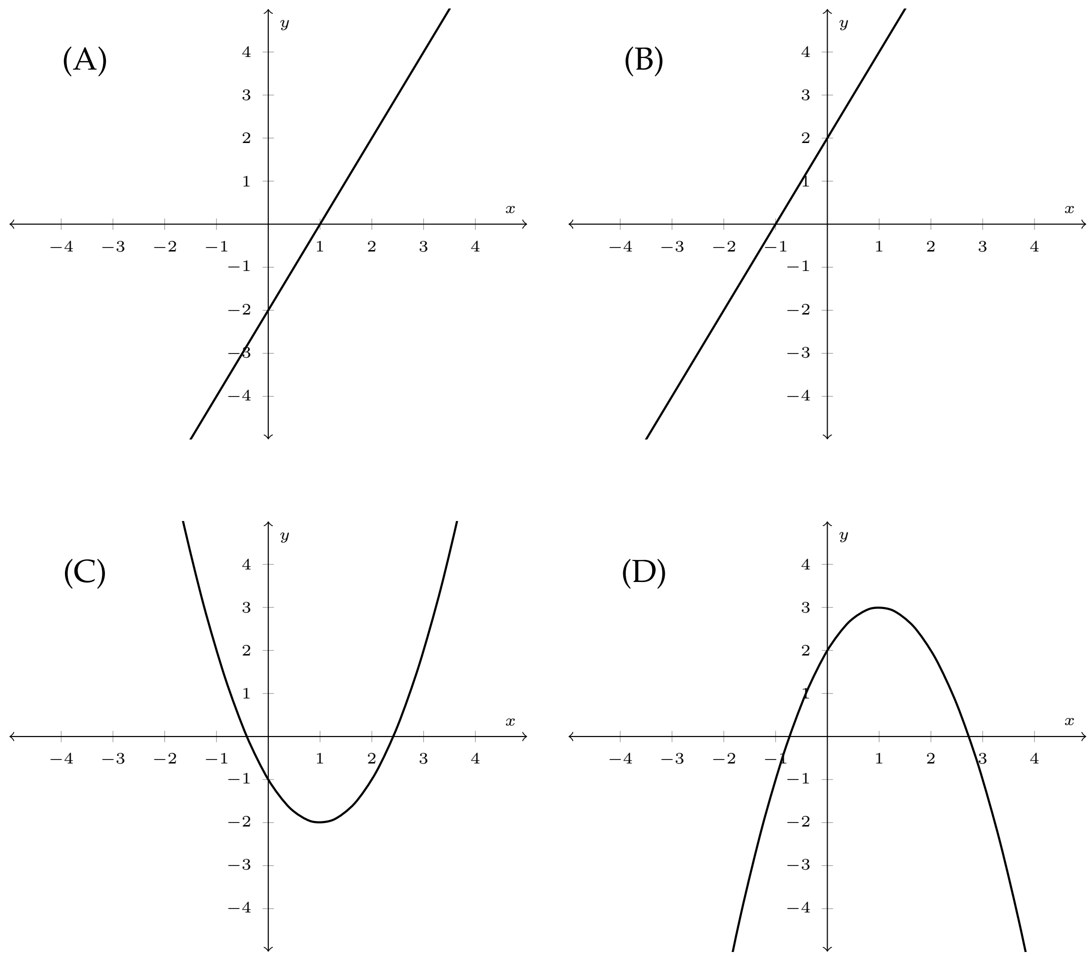
This exam contains 9 pages (including this cover page) and 6 problems. Check to see if any pages are missing. The exam is worth 100 points. The value of each question is listed below.

The following rules apply:

- You have **55 Minutes** to complete this exam.
- You may **not** use your books or notes on this exam.
- Please write clearly.
- **Partial Credit**: You are required to show your work on each problem of this exam. Incorrect answers with supporting work may receive partial credit. Any questions without supporting work will receive no credit. Partial credit might not be awarded on some questions.
- Calculators are permitted with the exception of calculators that have symbolic algebra or calculus capabilities. In particular, the following calculators (and their upgrades) are not permitted: TI-89, TI-92, and HP-49. In addition, neither PDAs, laptops, nor cell phones are permitted.
- Unless otherwise specified, make sure your answers are in **exact form** (i.e. not a decimal approximation).
- Please write your answers in the boxes provided unless otherwise instructed.
- A random sample of graded exams will be copied before being returned.

Question	Points	Score
1	12	
2	19	
3	18	
4	14	
5	21	
6	16	
Total:	100	

1. The graphs shown here (labeled (A)-(D)) satisfy certain characteristics. Match the description given in each part with one of the graphs shown here. Graphs may be used more than once.



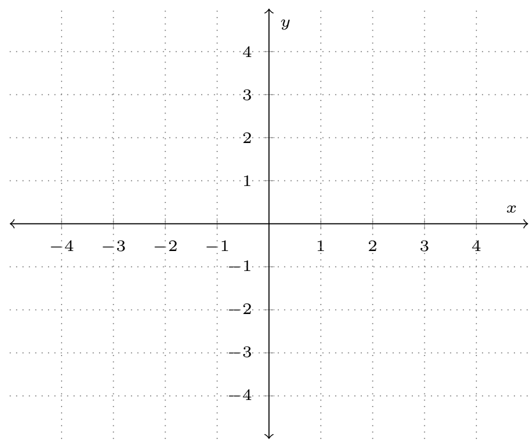
(a) (4 points) This graph is a line with slope 2 and y-intercept of 2. This best describes graph $\boxed{}$

(b) (4 points) This graph is a line with slope 2 and x-intercept of -1. This best describes graph $\boxed{}$

(c) (4 points) This graph is a parabola. It's vertex has an x-coordinate of 1 and a leading coefficient that is negative. This best describes graph $\boxed{}$

2. Let $f(x)$ be the piecewise defined function

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



(a) (8 points) Graph $f(x)$ on the axis above. Include all intercepts.

(b) (4 points) What is the domain of f? Write your answer in interval notation.

The domain of f is $\boxed{}$

(c) (4 points) What is the range of $f(x)$? Write your answer in interval notation.

The range of f is $\boxed{}$

(d) (3 points) What is the value of $f(0)$?

$f(0) = \boxed{}$

3. Solve the equations. Show all of your work. (Solutions by calculator will receive no credit.)

   (a) (6 points) $x = \dfrac{12}{x-4}$

   $x =$ $\boxed{}$

   (b) (6 points) $\sqrt{y} + \sqrt{y+3} = 2$

   $y =$ $\boxed{}$

   (c) (6 points) Solve for r: $S = P(1 + rt)$

   $r =$ $\boxed{}$

4. Let $f(x) = \sqrt{x}$ and $g(x) = \dfrac{x+11}{x+2}$.

   (a) (4 points) Determine the composition $(f \circ g)(x)$.

   $(f \circ g)(x) = \boxed{}$

   (b) (4 points) Determine the value of $(g \circ g)(1)$.

   $(g \circ g)(1) = \boxed{}$

   (c) (6 points) Let $F(x) = \dfrac{3}{x}$, $x \neq 0$. Determine the expression for $\dfrac{F(x+h) - F(x)}{h}$. Make sure to simplify your result.

   $\dfrac{F(x+h) - F(x)}{h} = \boxed{}$

5. At $\$5.13$ per burrito, the annual supply of burritos is 3.2 (in billions), and the annual demand of burritos is 6.1 (in billions). When the price increases to $\$6.93$ the annual supply of burritos increases to 5.6 (in billions), and the annual demand of burritos decreases to 5.2 (in billions). Assume that both the supply and demand equations are linear. Let p denote the price (in dollars) of a burrito, and let q denote the quantity of burritos (in billions).

   (a) (6 points) Determine the supply equation.

   $p_{supply} = \boxed{}$

   (b) (5 points) Determine the equation of a line perpendicular to the line you gave for in part (a) and passing through the point $(3, 3)$. Write your line in slope intercept form.

   $p = \boxed{}$

(c) (6 points) Determine the demand equation.

$p_{demand} = \boxed{}$

(d) (4 points) What is the demand for burritos if the price is $\$2.73$?

$q = \boxed{}$

6. The demand function for a manufacturer's product is $p = -6q + 120$, where p is the price (in dollars) per unit when q units (in thousands) are demanded. The revenue function is $R = q(-6q + 120)$ (in thousands of dollars). Include units in all your answers.

   (a) (6 points) At what production level(s) will the total revenue be zero?

   The production level(s) are

   (b) (6 points) Complete the square to determine the production level that will maximize revenue.

   The production level is

   (c) (4 points) What is the maximum revenue?

   The maximum revenue is

Scrap work