Name (Print): _____

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Lecturer: _____

Rec. Instructor: _____

Rec. Time: _____

Math 1130
Spring 2019
Sample Exam 1b
1/31/19

This exam contains 10 pages (including this cover page) and 9 problems. Check to see if any pages are missing. The exam is worth 100 points. The value of each question is listed below.

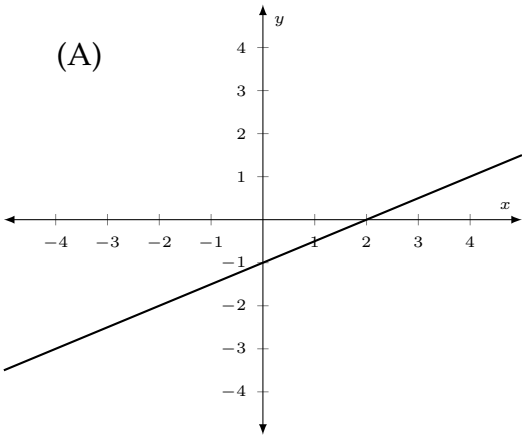
The following rules apply:

- 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, TI-Nspire CX CAS, 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.

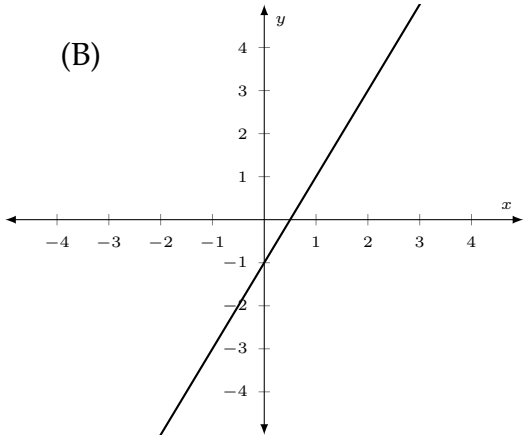
Page	Points	Score
2	12	
3	12	
4	20	
5	12	
6	10	
7	14	
8	14	
9	6	
Total:	100	

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.

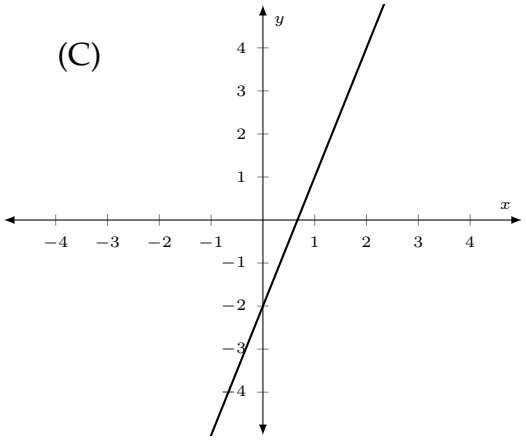
(A)



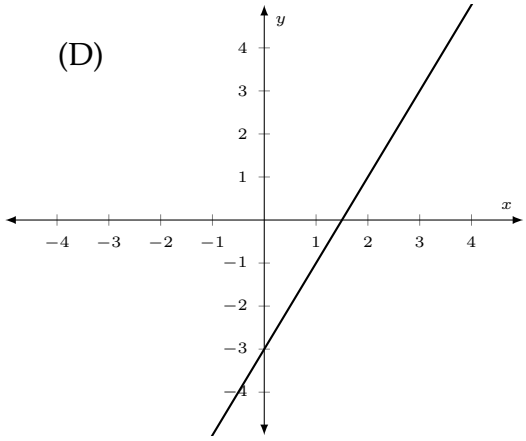
(B)



(C)



(D)



(a) (4 points) Which graph best describes a graph that is a line with x-intercept at 2?

(b) (4 points) Which graph best describes a graph that is a line with y-intercept at -3?

(c) (4 points) Which two graphs best describe lines that are parallel?

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

   (a) (6 points) $\sqrt{y} + \sqrt{y+4} = 3$. Write your answer as a fraction.

$y =$ [ ]

   (b) (6 points) Solve for r in the equation $s = rt + 2p$ for $t \neq 0$.

$r =$ [ ]

3. Let $f(x) = \dfrac{x+4}{x-1}$ and $g(x) = \sqrt{x}$.

   (a) (6 points) Determine the composition $(f \circ g)(x)$.

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

   (b) (6 points) Evaluate your result from the previous part at $x = 9$.

$$(f \circ g)(9) = \boxed{}$$

4. (8 points) Let $f(x) = -x^2 + 3x$. Simplify the expression for $\dfrac{f(x+h) - f(x)}{h}$ ($h \neq 0$), by eliminating the h in the denominator and combining all like terms.

$$\frac{f(x+h) - f(x)}{h} = \boxed{}$$

5. At $\$5.58$ per burrito, the annual supply of burritos is 3.4 (in billions). When the price increases to $\$7.38$, the annual supply of burritos increases to 5.8 (in billions). 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. Write in the form $p_{supply} = aq + b$, and write a and b as **exact values** (i.e. no rounding).

$p_{supply} =$ ____

   (b) (6 points) Using your supply equation, determine the quantity of burritos supplied (in billions) given a price of $\$6$. **Give your answer to two decimal places**.

$q =$ ____

(c) (4 points) Suppose that the demand equation on burritos is $p = 10.11 - 1.25q$. Determine the revenue equation.

$r =$ ☐

(d) (6 points) Total costs on burritos are given by the equation $c = 1 + q$. Determine the profit equation. Use the result of part (c) if necessary.

$P =$ ☐

6. Painters are often paid either by the hour or on a per-job basis. The rate they receive can affect their working speed. They can be paid in one of two ways:

   (i) They can be paid hourly, earning \$15/hour,

   (ii) or they can earn \$554 plus \$8 for every hour less than 40 hours.

   (a) (4 points) Write the function, $f(t)$, that describes the amount a painter earns under option (i).

   (b) (4 points) Write the piecewise function, $g(t)$, that describes the amount a painter earns under option (ii).

   (c) (6 points) At what value(s) t do both options pay the same?

$t =$ [ ]

7. (8 points) Suppose that the equation of a line is $y = -2x + 3$. The perpendicular line passing through the point $(3, 4)$ is given by the equation $y = mx + b$. Determine the values of m and b.

$m =$ $\square$

$b =$ $\square$

8. (6 points) Determine the domain of the following function. Give your answer in interval notation.

$$f(x) = \frac{1}{x^2 + 3x - 10}$$

The domain is $\square$

9. (6 points) Algebraically solve for x in the equation below. Calculator solutions will receive no credit.

$$x^6 - 7x^3 - 8 = 0$$

$x =$ [ ]

Scrap work