

Math 101, Alternate Midterm 1

February 7, 2017

Name: _____ UNL Student ID Number: _____

Indicate your section/instructor.

<input type="checkbox"/> Section 001 Nir	<input type="checkbox"/> Section 002 Hong
<input type="checkbox"/> Section 003 Egging	<input type="checkbox"/> Section 004 Funk
<input type="checkbox"/> Section 005 Wakefield	<input type="checkbox"/> Section 006 Holmes
<input type="checkbox"/> Section 007 Martin	<input type="checkbox"/> Section 008 DeClerk
<input type="checkbox"/> Section 009 Miller	<input type="checkbox"/> Section 010 Reichenbach
<input type="checkbox"/> Section 011 Longo	<input type="checkbox"/> Section 101 Huben
<input type="checkbox"/> Section 171 Bills	

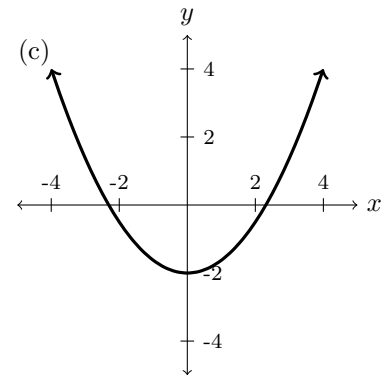
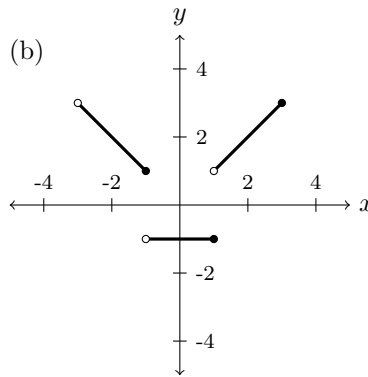
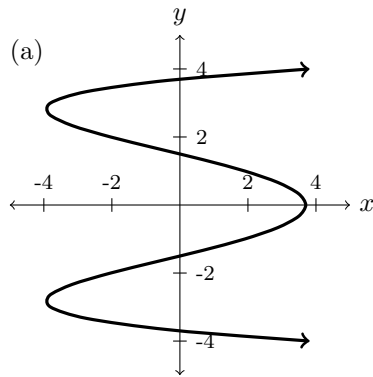
Question	Points	Score
1	9	
2	10	
3	15	
4	8	
5	16	
6	12	
7	16	
8	14	
Total:	100	

Answer the questions in the spaces provided on the question sheets. Show an appropriate amount of work (including appropriate explanation) for each problem, so that graders can see not only your answer but also how you obtained it. Include units in your answer when possible. You may receive 0 points for a problem where you show no work.

Instructions:

1. Do not open this exam until told to do so.
2. No books or notes may be used on the exam.
3. Credit or partial credit will be given only when the appropriate explanation and/or algebra is shown.
4. Make sure your answer is clearly marked.
5. Read and follow directions carefully.
6. This exam has 8 questions, for a total of 100 points. There are 7 pages. Make sure you have them all.
7. You will have 90 minutes to complete the exam.
8. All cell phones and electronic devices (other than calculators) must be turned off during the exam.
9. Do not separate the pages of this exam. If they do become separated, write your name on every page and point this out to your instructor when you hand in the exam.
10. You may only use an *approved* calculator on the exam. No calculators with a CAS or QWERTY keyboards are allowed.
11. If you use graphs or tables to find an answer, be sure to include an explanation and sketch of the graph, and to write out the entries of the table that you use.

1. [9 points]



For **each** of the above graphs, use the definition of a function to explain whether or not it represents a function. *Write your explanation in a complete sentence.*

(a)

(b)

(c)

2. [10 points] Let $f(x) = 4 + x^2$ and $g(x) = 3 - 2x$.(a) Evaluate $g(g(2))$.(b) Evaluate $f(g(-1))$.(c) Write an equation for $g(f(x))$.

3. [15 points] Determine whether the following tables could represent a linear function. If so, find a possible formula for the linear function. If not, explain why not. *Write your explanation in a complete sentence.*

(a)

x	0	5	10	15
$f(x)$	-50	-10	40	80

(b)

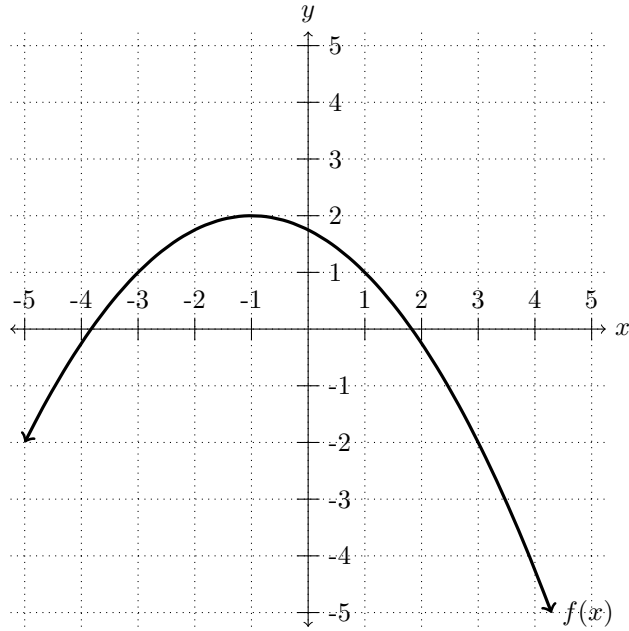
t	0	2	4	6
$s(t)$	36	18	0	-18

(c)

n	0	2	4	5
$p(n)$	-12	-8	-4	-2

4. [8 points]

(a) Compute the average rate of change of the function $f(x)$, graphed below, on the interval $[-1, 3]$.

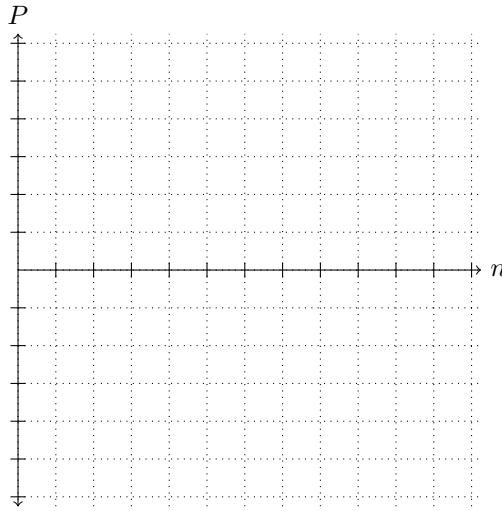


(b) Compute the average rate of change of the function $g(x) = \frac{3}{2-x}$ on the interval $[-3, 3]$.

5. [16 points] Anne sells gourmet oatmeal at the Lincoln Haymarket Farmer's Market for \$6 a bowl. It costs \$2 to make each bowl and \$557 to have a stall at the market.

(a) Write a linear function that gives P , the profit that Anne makes, in terms of n , the number of bowls she sells. *Recall that profit is the amount of money earned after costs have been accounted for.*

(b) Graph the function from (a) on the plane below. *Graph **both** the horizontal and vertical intercepts **and** label their coordinates.*



(c) Interpret the slope, vertical intercept, **and** horizontal intercept of $P(n)$. *Write your interpretation in a complete sentence.*

(d) How many bowls would Anne need to sell in order to make a profit of at least \$500? *Make sure that your answer includes units and makes sense in the context of the problem.*

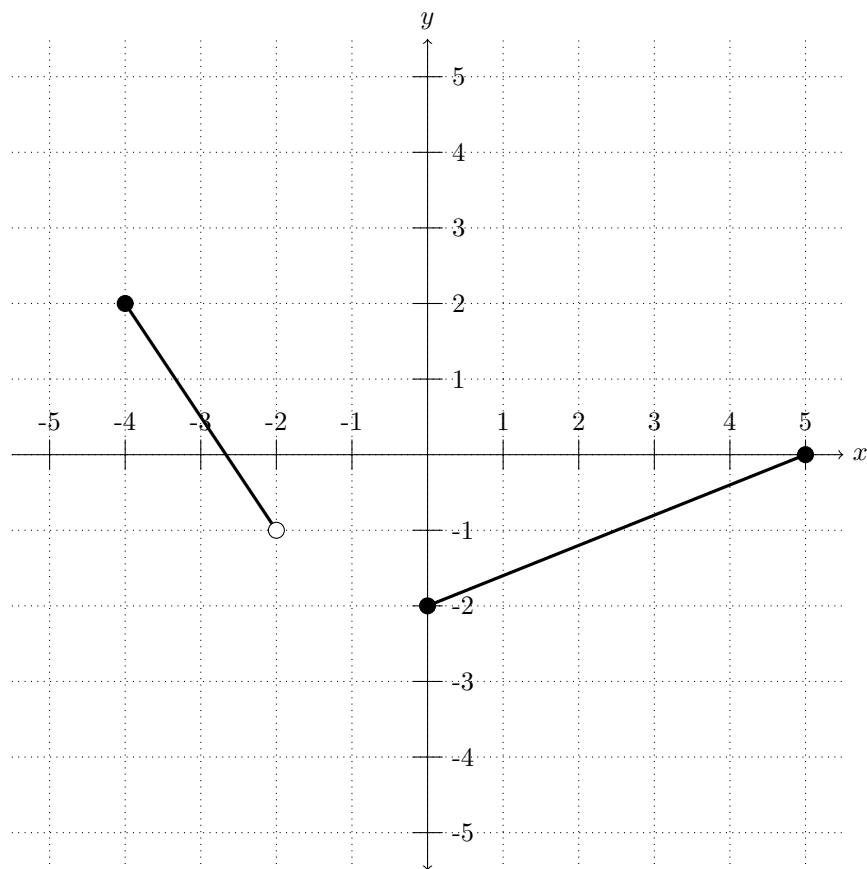
6. [12 points] Let P be the point $(2, -1)$ and $\ell(x) = \frac{1}{4}x - 3$.

(a) Find the equation of the line containing P and parallel to the line $\ell(x)$.

(b) Find the equation of the line containing P and perpendicular to the line $\ell(x)$.

(c) Find the point where the line $\ell(x)$ intersects the line $q(x) = 1 - \frac{3}{4}x$.

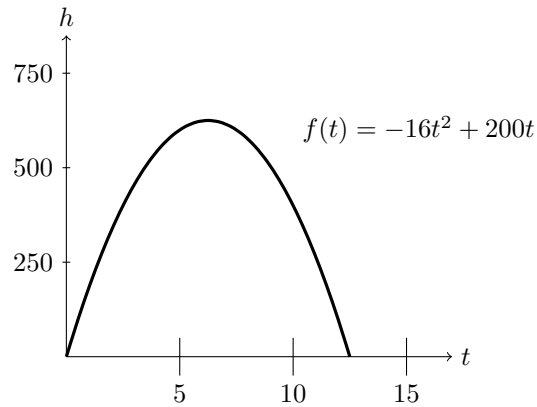
7. [16 points] Write a piecewise function for the graph of $f(x)$ shown below.



Note: Each blank represents a space for you to write either an expression, a number, or an inequality.

$$f(x) = \begin{cases} \underline{\hspace{2cm}} & \text{for } \underline{\hspace{1cm}} \leq x < \underline{\hspace{1cm}} \\ \underline{\hspace{2cm}} & \text{for } \underline{\hspace{1cm}} \leq x \leq \underline{\hspace{1cm}} \end{cases}$$

8. [14 points] A model rocket is launched into the air. The height of the rocket, in feet, at time t , in seconds, can be modeled by the equation below. We know that the rocket reaches its maximum height after 6.25 seconds and hits the ground after 12.5 seconds. *While you can use the graph to help answer the following questions, be sure to use the equation for $f(t)$ to get exact answers.*



- (a) What height was the rocket launched from? *Write your answer with units.*
- (b) Evaluate **and** interpret $f(3)$. *Write your interpretation in a complete sentence with units.*
- (c) Find the domain of $f(t)$ **and** explain what it represents. *Write your explanation in a complete sentence.*
- (d) Find the range of $f(t)$ **and** explain what it represents. *Write your explanation in a complete sentence.*