

# Math 105 — First Midterm

October 11, 2010

Name: \_\_\_\_\_

Instructor: \_\_\_\_\_ Section: \_\_\_\_\_

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1. **Do not open this exam until you are told to do so.**
  2. This exam has 11 pages including this cover. There are 9 problems. Note that the problems are not of equal difficulty, so you may want to skip over and return to a problem on which you are stuck.
  3. 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.
  4. Please read the instructions for each individual problem carefully. One of the skills being tested on this exam is your ability to interpret mathematical questions, so instructors will not answer questions about exam problems during the exam.
  5. Show an appropriate amount of work (including appropriate explanation) for each problem, so that graders can see not only your answer but how you obtained it. Include units in your answer where that is appropriate.
  6. You may use any calculator except a TI-92 (or other calculator with a full alphanumeric keypad). However, you must show work for any calculation which we have learned how to do in this course.
  7. 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.
  8. **Turn off all cell phones and pagers, and remove all headphones.**
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| Problem | Points | Score |
|---------|--------|-------|
| 1       | 8      |       |
| 2       | 13     |       |
| 3       | 6      |       |
| 4       | 10     |       |
| 5       | 10     |       |
| 6       | 9      |       |
| 7       | 11     |       |
| 8       | 16     |       |
| 9       | 17     |       |
| Total   | 100    |       |

1. [8 points] For each of the functions below, determine which of the listed attributes could be true for the function on the given domain. Circle all the attributes that could be true, and if none of the listed attributes can be true, circle *NONE OF THESE*.

a. [4 points]

|        |       |    |      |       |
|--------|-------|----|------|-------|
| $x$    | -2    | 0  | 2    | 4     |
| $f(x)$ | 31.25 | 20 | 12.8 | 8.192 |

$f(x)$  could be

LINEAR

DECREASING

EXPONENTIAL

CONCAVE UP

INCREASING

CONCAVE DOWN

NONE OF THESE

b. [4 points]

|        |     |    |   |      |
|--------|-----|----|---|------|
| $x$    | -1  | 1  | 3 | 5    |
| $h(x)$ | -40 | 48 | 8 | -160 |

$h(x)$  could be

LINEAR

DECREASING

EXPONENTIAL

CONCAVE UP

INCREASING

CONCAVE DOWN

NONE OF THESE

2. [13 points] Values of functions  $f$  and  $g$  and a formula for a function  $h$  are given below.

|        |      |      |     |     |     |
|--------|------|------|-----|-----|-----|
| $x$    | -1.5 | 0    | 2.1 | 3.2 | 5.7 |
| $f(x)$ | 3.2  | 2.1  | 1.3 | 0   | -1  |
| $g(x)$ | -2.3 | -1.5 | 0   | 1.7 | 3.2 |

$$h(x) = 3x - 2.1$$

Carefully show your steps for each of the problems below. If it is not possible to determine the answer from the information provided above, write *cannot be determined*.

a. [3 points] Evaluate  $f(2.1) + 4g(3.2) - 1.1$ .

b. [2 points] Evaluate  $h(g(x))$  for  $x = 0$ .

c. [2 points] Evaluate  $g^{-1}(3.2)$ .

d. [3 points] Evaluate  $f^{-1}(g(5.7))$ .

e. [3 points] Solve  $h(x) = g(-1.5)$ .