

Math 1, Lecture 3
Precalculus

Midterm 1

Instructions: You have 50 minutes to complete the exam. There are five problems, worth a total of fifty points. You may not use any books, notes, or calculators. Partial credit will be given for progress toward correct solutions.

Write your solutions in the space below the questions. If you need more space use the back of the page. Do not forget to write your name in the space below.

Name: _____

UID: _____

Section: _____

Question	Points	Score
1	10	
2	10	
3	10	
4	10	
5	10	
Total:	50	

Problem 1.

Let $C(t)$ a function which describes the cost in dollars of your cell phone plan for the month based on the number of minutes you talk. Answer each of the following questions in a sentence.

- (a) [3pts.] What does $C(82) = 15$ mean?
- (b) [3pts.] What does $C^{-1}(20)$ represent?
- (c) [4pts.] What would it mean to say that a reasonable domain for $C(t)$ is $[0, 500]$?

Problem 2.

Let $f(x)$ be the function defined as follows:

$$f(x) = \begin{cases} 1 - x & x \leq -1 \\ 2\sqrt{x+1} & -1 < x < 3 \\ 4 & x \geq 3 \end{cases}$$

- (a) [5pts.] Sketch a graph of $f(x)$.
- (b) [5pts.] On what intervals is f increasing? Decreasing?

Problem 3.

Find a formula for each of the following lines.

- (a) [5pts.] The line perpendicular to the line $h(t) = 3t + 4$ and passing through the point $(3, 1)$.
- (b) [5pts.] The line describing your elevation in the following situation: You are climbing a mountain. You climb 40 feet per minute. Five minutes after you start, you are 1600 feet above sea level.

Problem 4.

- (a) [4pts.] Sketch a graph of the function $g(x)$ which is equal to the cubic function $f(x) = x^3$ compressed vertically by a factor of $\frac{1}{8}$ and shifted horizontally to the right by 3.
- (b) [2pts.] Give a formula for the function $g(x)$ you drew in part (a).
- (c) [4pts.] On what intervals is $g(x)$ concave up and concave down?

Problem 5.

Let $f(x) = 3|x + 1| - 4$.

(a) [5pts.] Solve the absolute value equality $f(x) = 8$.

(b) [5pts.] Let $g(x) = \frac{1}{x}$. Find the average rate of change of $g \circ f$ on $[1, 4]$.