

Math 120 C - Autumn 2017
Midterm Exam Number One
October 19th, 2017

Name: _____

Student ID no. : _____

Signature: _____

Section: _____

1	15	
2	15	
3	15	
4	15	
Total	60	

- This exam consists of FOUR problems on FIVE pages, including this cover sheet.
- Show all work for full credit.
- You may use a TI-30X IIS calculator during this exam. Other calculators and electronic device are not permitted.
- You do not need to simplify your answers.
- If you use a trial-and-error or guess-and-check method when a more rigorous method is available, you will not receive full credit.
- If you write on the back of the page, please indicate that you have done so!
- You may use one hand-written double-sided 8.5" by 11" page of notes.
- You have 50 minutes to complete the exam.

1. **[15 points]** Alex is at the *northernmost* point of a circular parking lot with radius 26 feet. Dylan stands 22.4 feet west and 27 feet south of the *southernmost* point of the parking lot. Dylan walks due north until he hits the edge of the parking lot. Then, he turns and walks in a straight line towards the *easternmost* point of the parking lot. How close does Dylan get to Alex?

2. [5 points per part] Chidi and Tahani are walking around the coordinate plane.

Chidi begins at the point $(6, -4)$ and walks towards $(-2, 2)$ in a straight line at constant speed, reaching it in 10 seconds.

Tahani begins at the point $(5, 8)$ and also walks in as straight line at constant speed.

One second after Chidi crosses the y -axis, Tahani also crosses the y -axis at the same place.

(a) Write parametric equations for Chidi's coordinates after t seconds.

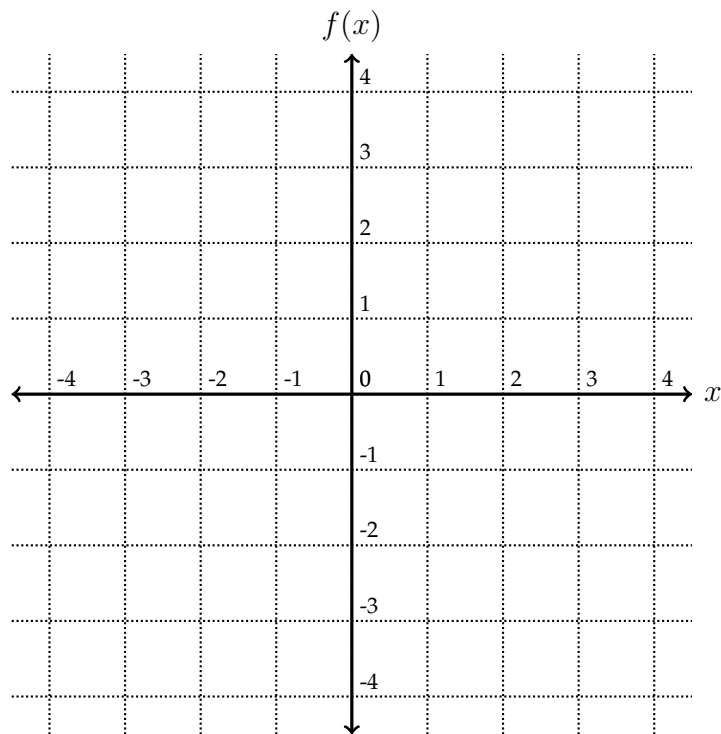
(b) *Where* and *when* does Chidi cross the y -axis?

(c) What is Tahani's speed?

3. Consider the following multipart function f :

$$f(x) = \begin{cases} -2x - 5 & \text{if } -4 \leq x < -1 \\ -1 & \text{if } -1 \leq x \leq 2 \\ 1 + \sqrt{4 - (x - 2)^2} & \text{if } 2 < x \leq 4 \end{cases}$$

(a) [7 points] Sketch a graph of $f(x)$ below.



(b) [8 points] Find all values of x such that $f(x) = \frac{1}{2}x + 1$.

4. The temperature in Paraboland is modeled by a quadratic function of time.

Right now, the temperature is 20° .

In 2 days, the temperature will be 27° .

In 10 days, the temperature will be 51° .

(a) **[12 points]** Write a function $f(x)$ for the temperature in Paraboland x days from now.

(b) **[3 points]** What will the maximum temperature be?