

Math 120 A, B - Winter 2010  
Mid-Term Exam Number One  
January 28, 2010

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

Student ID no. : \_\_\_\_\_

Signature: \_\_\_\_\_

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

1	10	
2	10	
3	10	
4	10	
Total	40	

- Complete all four questions.
- Show all work for full credit.
- You may use a scientific calculator during this examination. Graphic calculators are not allowed. Also, other electronic devices are not allowed, and should be turned off and put away for the duration of the exam.
- If you use a trial-and-error or guess-and-check method when an algebraic method is available, you will not receive full credit.
- You may use one hand-written 8.5 by 11 inch page of notes. Write your name on your notesheet and turn it in with your exam.
- You have 50 minutes to complete the exam.

1. Aiman and Hue are walking in the  $xy$ -coordinate plane, with units in kilometers. They move at constant speeds and they move linearly (i.e., their paths are straight lines). Aiman starts walking from the origin. Aiman will reach the point  $(5, 2)$  after walking for 2 hours. Hue started walking at the same time as Aiman. She started from the point  $(-3, -4)$  and will reach the point  $(6, 1)$  after walking for 2.5 hours.

(a) Write parametric equations for the coordinates of Aiman,  $t$  hours after she starts walking.

(b) Write parametric equations for the coordinates of Hue,  $t$  hours after she starts walking.

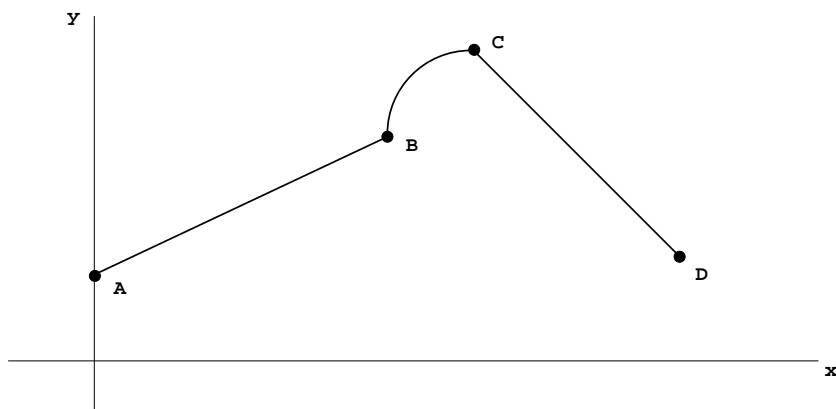
(c) After how many hours of walking will Aiman and Hue be 3 kilometers apart for the first time?

2. Aidan is walking in a straight line from his house to Cahal's house. Aidan's house is 8 km due north of Barra's house. Cahal's house is 5 km east and 7 km south of Barra's house. On Aidan's walk, how close does he come to Barra's house?

3. The figure below shows the graph of a multipart function,  $f(x)$ . The graph consists of two line segments and a quarter circle. The coordinates of the labeled are as shown in the table below.

- A (0,4)
- B (16,9)
- C (21,14)
- D (29,6)

The figure is not to scale.



Write the multipart rule for the function,  $f(x)$ .

4. For both parts of this problem,  $f(x) = -3x^2 - 5x + 12$ .

(a) What are the largest and smallest values of  $f(x)$  for  $x$  in the interval  $-1 \leq x \leq 2$ ?

(b) Suppose  $h \neq 0$ . Simplify the expression

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

as much as possible.