

Math 120 A Spring 2017
Mid-Term Exam Number One
April 20, 2017

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.
- The only calculator you may use during this exam is a TI-30XIIs. All 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, two-sided, 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. Tristan and Iseult are traveling in the xy -plane. They travel with constant speeds and directions along lines. They both start at midnight.

Tristan starts at the point $(10, -3)$ and at 2 AM, Tristan's location is $(7, 8)$.

Iseult starts at the point $(5, 4)$ and reaches the point $(11, 6)$ at 3 AM.

(a) Find the parametric equations for Tristan's motion.

(b) Find the parametric equations for Iseult's motion.

(c) When will Tristan and Iseult be closest together? Give your answer in hours after midnight.

2. Anna is searching for buried treasure. At noon, she starts walking due East at 2 km per hour. She walks due East for 3 hours, and then turns and walks due North at 3 km per hour for 1 hour. She then turns and walks due East again at 5 km per hour for 2 hours.

The path she follows looks like this:



Express her distance from her starting point as a multipart function of t , the time since she started walking.

3. A particular radar buoy off the coast can detect any ship within a radius of 10 miles. Erik is in his sailboat located 3 miles north and 13 miles west of the buoy. Erik sails due east at a constant speed of 8 miles per hour. After 45 minute, he turns due south and continues sailing at the same constant speed forever.

How long (in hours) is Erik within the radar region?

4. For each of the functions below, find the expression for

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

Simplify each of your expressions far enough so that plugging in $h = 0$ would be allowed.

(a) $f(x) = 1 - 3x$

(b) $f(x) = 5x^2 + x$