Math 120 A - Winter 2018
Midterm Exam Number One
January 25th, 2018

Name: _____   Student ID no. : _____

Signature: _____   Section: _____

| 1	12	
2	12	
3	12	
4	12	
5	12	
Total	60	

- This exam consists of FIVE problems on THREE double-sided pages.

- Show all work for full credit.

- You may use a TI-30X IIS calculator during this exam. Other calculators and electronic devices 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.

- $\boxed{\text{Draw a box}}$ around your final answer to each problem.

- **Do not write within 1 centimeter of the edge!** Your exam will be scanned for grading.

- If you run out of room, write on the back of the last page and indicate that you have done so. If you still need more room, ask your TA for an extra page to staple to your exam.

- You may use one hand-written double-sided 8.5″ by 11″ page of notes.

- You have 50 minutes to complete the exam.

1. **[12 points]** Elend stands at the westernmost point of a circular forest of radius 65 miles.

Vin is 39 miles north and 2 miles west of Elend.

Vin drives due east for 100 miles, then turns and drives due south for 100 miles. She drives at a constant speed of 65 miles per hour.

How much time does Vin spend inside the forest? **Give your answer in minutes.**
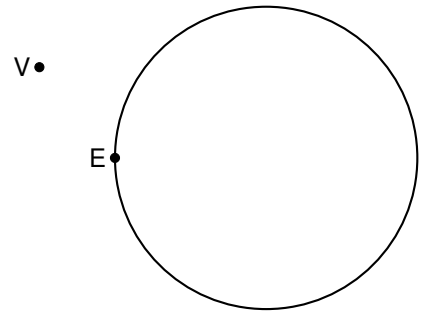
2. **[12 points]** Florence is 5 meters east and 2 meters north of Paris.

Derek is 12 meters west and 9 meters north of Florence.

Florence walks in a straight line towards Derek. At the point on her journey where she's closest to Paris, she turns and walks directly to Paris.

How far does Florence walk, in total?

3. **[6 points per part]** Gomba is walking around the coordinate plane.

   At time $t = 0$, Gomba begins walking from the point $(8, -2)$ towards the point $(-3, 7)$, reaching it in 7 seconds.

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

   (b) How long does it take Gomba to walk from the x-axis to the y-axis?

4. **[12 points]** Here are the graphs of $f(x)$ (a line) and $g(x)$ (a semicircle).
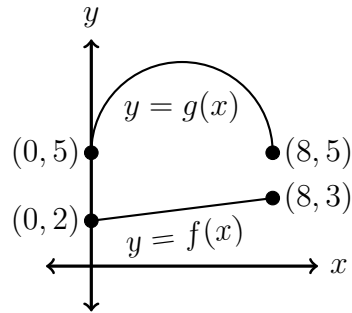
Write a function $v(x)$ for the vertical distance between $y = f(x)$ and $y = g(x)$ at x.

5. **[12 points]** Consider the following multipart function $h(x)$:

$$h(x) = \begin{cases} 2x^2 - 5x & \text{if } x \leq 0 \\ 8 & \text{if } 0 < x \leq 2 \\ 2x + 8 & \text{if } x > 2 \end{cases}$$

Find all values of x such that $h(x) = 4x + 5$.