Math 120 **Midterm I, January 30th, 2020** **Winter 2020**

HONOR STATEMENT
I affirm that my work upholds the highest standards of honesty and academic integrity at the University of Washington, and that I have neither given nor received any unauthorized assistance on this exam.

Name

Signature

Student ID #

Please circle Section

AA AB AC
BA BB BC

	1.	2.	3.	4.	$\sum$
Possible	15	10	10	15	50
Points					

- Please turn off your cell phone and put it away.
- There are 4 problems on 8 pages. Check your copy of the exam for completeness. Note that front **and** back of the pages are printed on.
- You are allowed to use a hand written sheet of paper (8x11 in), back and front.
- The only calculator allowed is Ti-30x IIS
- When applicable, make a labeled sketch of the situation. It will grant you at least 1 point.
- Justify all your answers and show your work for full credit.

Do not open the test until everyone has a copy and the start of the test is announced.

GOOD LUCK!

Problem 1 (7+8 points) *A colorful duck is walking near a lake, which is of the shape of a perfect circle with radius 2km. The duck begins its walk 1km East and 2km North of the center of the lake and it is heading on a straight line to the westernmost point of the lake.*

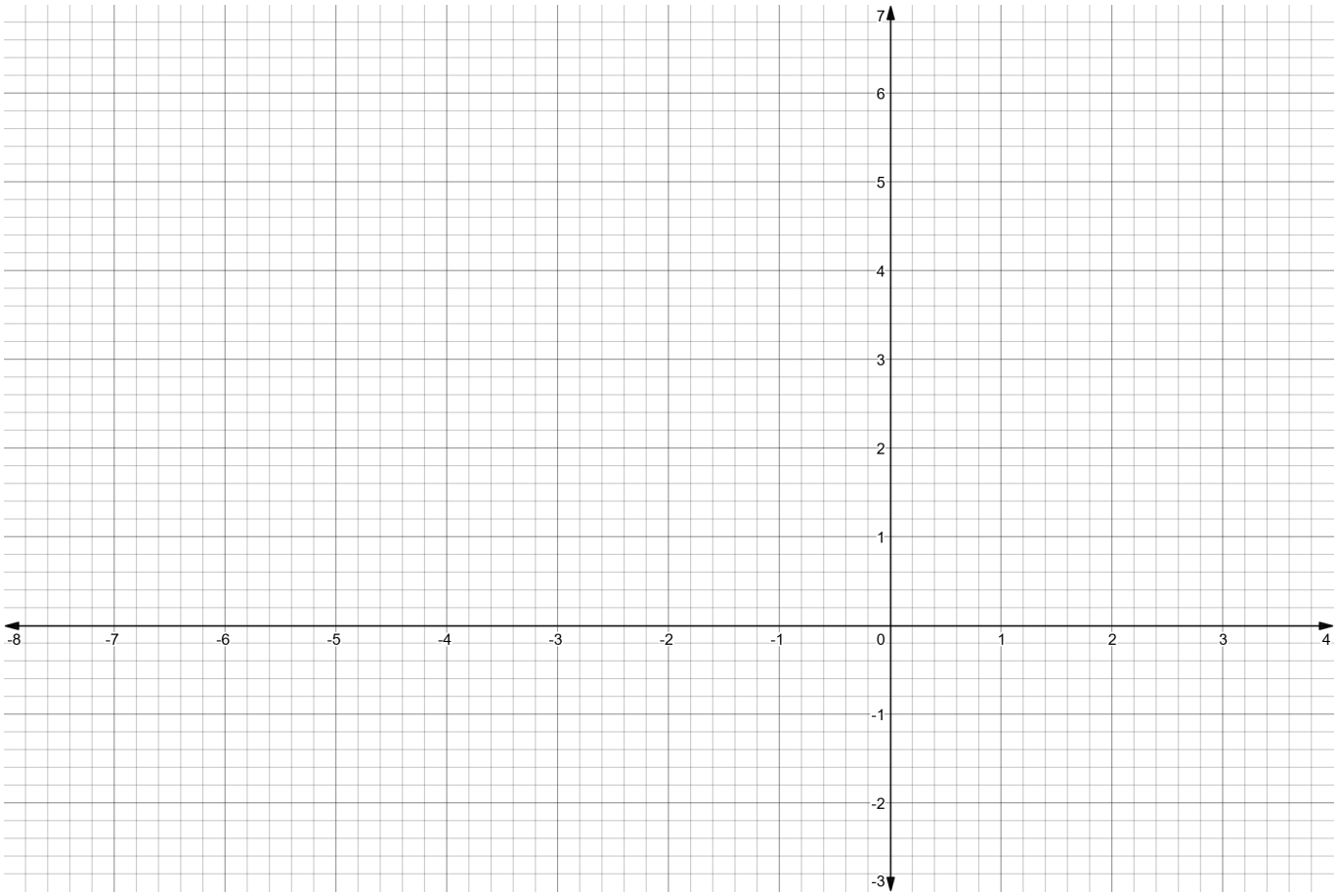
(a) Where will the duck enter the lake and start swimming? Don't round in this part.

(b) Assume that the duck walks at a speed of 2km/h and swims at a speed of 5km/h. When does the duck reach the closest point to the center of the lake? Round to the nearest thousandths.

Problem 2 (10 points) *Consider the function*

$$f(x) = \begin{cases} \sqrt{4-(x+4)^2}+2 & \textit{if} \quad -6 \le x < -4 \\ -\frac{1}{2}x + 2 & \textit{if} \quad -4 \le x < 0 \\ 2x+1 & \textit{if} \quad 0 \le x \le 2 \end{cases}$$

Find the graph of this function. Use the provided coordinate system. Label the axes.



Problem 3 (10 points) *You start running from a point 63 meters due EAST of a statue in a park and run directly toward a point 16 meters due NORTH of the statue. You run at a constant speed of 5 meters per second.*
Take the statue as the origin of a coordinate system. Find the parametric equations of your location after t seconds of running.

Problem 4 (11+4) *Assume the temperature on a sunny day in Seattle (I know...but let's just pretend) can be modeled through a quadratic function. Over the course of the day you measure the temperature three times, 5 hours apart from each other. The first measurement shows* $58°F$*, the second shows* $75.5°F$*, and the last shows* $68°F$*.*

(a) Determine the quadratic function that fits these three measurements.

(b) Assuming your first measurement is at 9am, when will the temperature reach its maximum?

Extra Paper