

NAME: _____

Student ID #: _____

QUIZ SECTION: _____

Math 120A
Midterm I
April 19, 2012

Problem 1	14	
Problem 2	8	
Problem 3	12	
Problem 4	16	
Total:	50	

- You are allowed to use a non-graphing calculator and one double-sided sheet of notes.
- Your exam should contain 4 problems on 4 pages. Check that your test is complete!
- Unless otherwise stated, you **must show how you get your answers. Answers with incorrect or missing supporting work may result in little credit, even if the answer happens to be correct.**
- Please place your answers in the provided spaces, or box your **final answer**.
- You may round off your final answer to 2 or more decimal digits.
- If you need more room, use the backs of pages and indicate to the grader that you have done so.
- Raise your hand if you have a question.

GOOD LUCK!

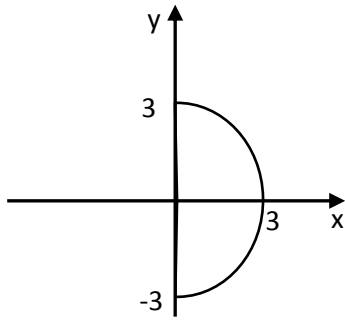
1. (14 pts) **Mary's sailboat** is sitting still at a location **5 miles North and 3 miles East of the city of Kingston**. A ferry has just left Kingston and is traveling in a straight line to Edmonds. **Edmonds is located 1 mile North and 5 miles East of Kingston**.
- a) (8 pts) Draw a picture and compute where the ferry will be located when it is closest to Mary's sailboat.

ANSWER: Ferry will be _____ miles East and _____ miles North of Kingston

- b) (6 pts) Suppose the ferry travels at a uniform speed of **14 feet per second**. How long does the ferry take to reach Edmonds? Give your answer in minutes.

ANSWER: _____ minutes

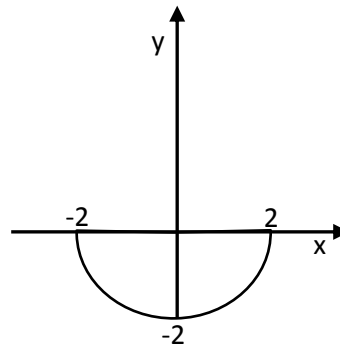
2. (8 pts) For each box (A)-(D) below, determine if the given graph establishes a function relationship, with y a function of x . There is no need to show work or justify your answers..



(A) Is this a function? Circle YES or NO

If YES, list its domain: _____

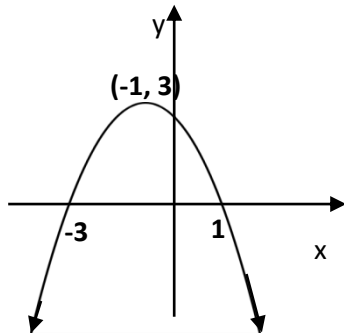
& range: _____



(B) Is this a function? Circle YES or NO

If YES, list its domain: _____

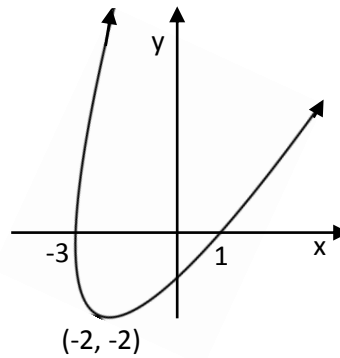
& range: _____



(C) Is this a function? Circle YES or NO

If YES, list its domain: _____

& range: _____



(D) Is this a function? Circle YES or NO

If YES, list its domain: _____

& range: _____

3. (12 pts) Ryan starts walking due South at 3 feet per second from a point 90 feet North of an intersection. At the same time, Lucas starts walking due East at 2 feet per second from a point 100 feet West from the intersection.
- a) (6 pts) Draw a picture and write an expression in t for the distance $d(t)$ between Ryan and Lucas t seconds after they start walking.

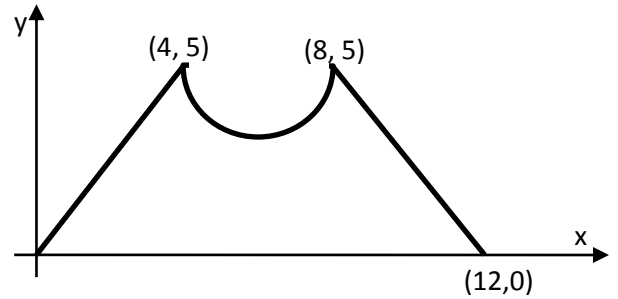
ANSWER: $d(t) =$ _____

- b) (6 pts) When are Ryan and Lucas closest? What is the shortest distance between them?

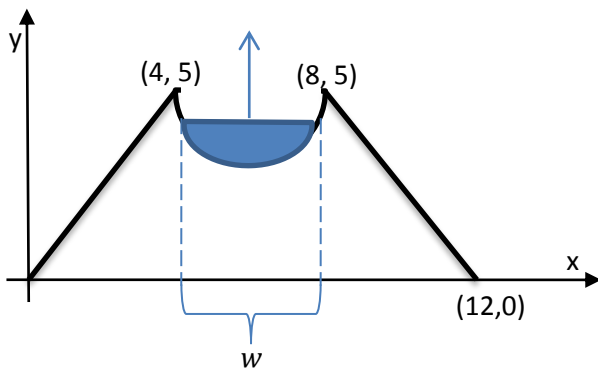
Answer: They're closest at _____ seconds, when they are _____ feet apart.

4. (16 pts) The vertical cross-section of a toy volcano is given in the picture. The coordinates of certain points are listed on the picture. All units are in inches

Assume the sides of the volcano are line segments, and the pit of the volcano is the lower half of a circle.



- a) (7 pts) Find a multipart function $y = f(x)$ that models the vertical cross-section of this volcano. (No need to show work, but write your answer in correct bracket notation for multipart functions.)
- b) (6 pts) Solve the equation $f(x) = 1.5$, where $f(x)$ is the function modeling the cross-section of the volcano.
- c) (5 pts) Suppose the pit of the volcano is filling with fake lava, and the depth of the lava in the pit rises at a rate of 0.02 inches per second. What is the width w of the filled portion of the pit after 1 minute?



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