

MATH 120 A
Exam 2 - Version 1
February 22, 2002

Name _____

Section _____

1	10	
2	8	
3	10	
4	10	
5	12	
Total	50	

- You are allowed to use a scientific calculator with no graphing capabilities and one 8.5×11 sheet of notes.
- Complete all questions.
- Show all your work.
- You have 50 minutes to complete the exam.

GOOD LUCK!

1. (10 points) Find the domain, the zero(s), the y -intercept, the horizontal asymptote, and the vertical asymptote(s) of the following rational function:

$$f(x) = \frac{4(x-5)(x-1)}{3(x-3)(x+1)}$$

domain:

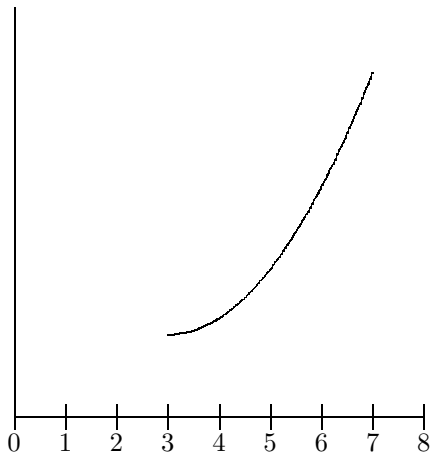
zero(s):

y -intercept:

horizontal asymptote:

vertical asymptote(s):

2. (8 points) The following is the graph of the function $y = f(x) = (x - 3)^2 + 5$ on the domain $3 \leq x \leq 7$.



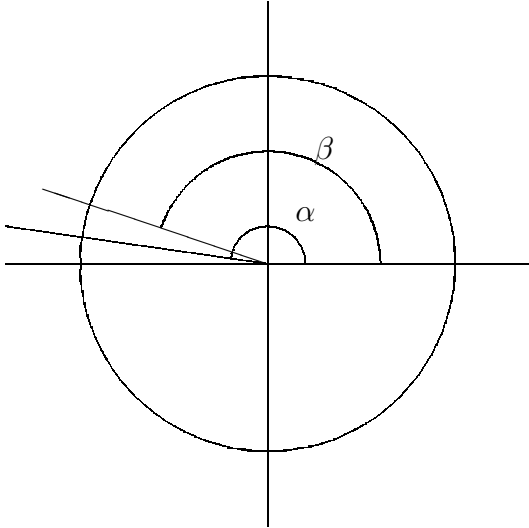
(a) What is the range of $y = f(x)$?

(b) Find a formula for $f^{-1}(x)$.

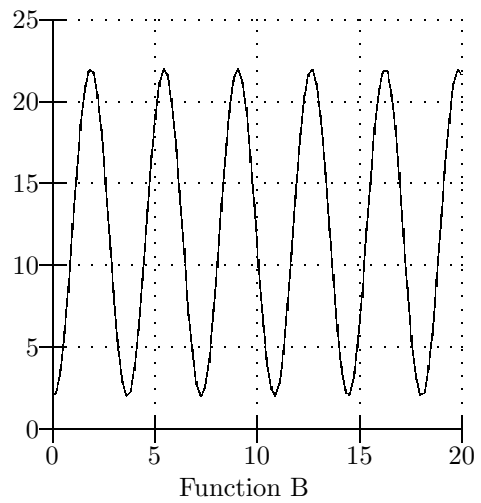
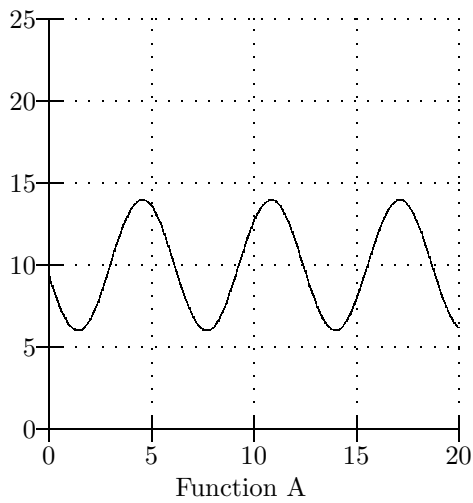
(c) Sketch a graph of $f^{-1}(x)$, clearly indicating the domain and range.

3. (10 points)

- (a) The angles in the following picture have measures 170° and 2.8 radians. Determine which angle has which measure. Justify your answer.



- (b) Which of the following functions has the larger period? Justify your answer.

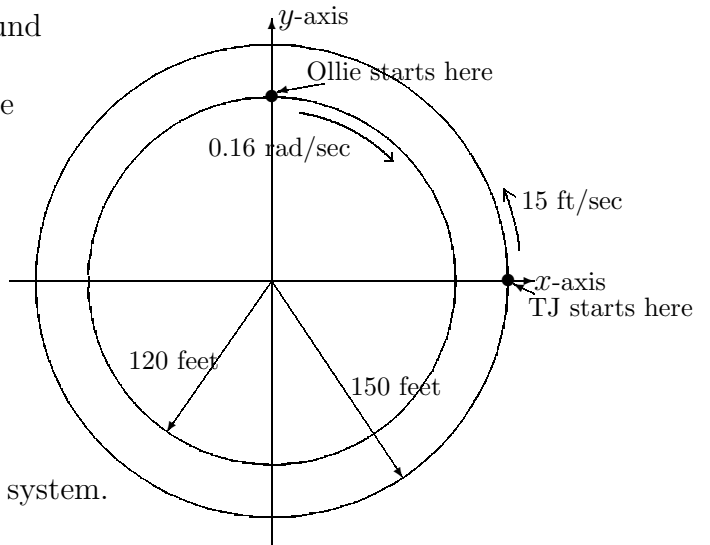


4. (10 points) The height of Elastic Man can be represented by a sinusoidal function of time. His maximum height is 7.4 feet. His minimum height is 3.4 feet. At 8 AM today, he was 5.4 feet tall and he was getting taller. He will not be 5.4 feet tall again until noon tomorrow.

(a) Write a sinusoidal function that represents Elastic Man's height as a function of time t in hours **since midnight last night**. Write your function in standard form.

(b) Describe two points in time when Elastic Man is exactly 7 feet tall.

5. (12 points) Two dogs are moving around a circular track. Tiny Jim runs **counterclockwise** around the outside lane, which is a circle of radius 150 feet, with a linear speed of 15 feet per second. Ollie runs **clockwise** around the inside lane, which is a circle of radius 120 feet, with an angular speed of 0.16 radians per second. Given is a picture, viewed from above, of the track and the starting position of the dogs on an imposed coordinate system.



- (a) What is Tiny Jim's angular speed in radians per second?
- (b) Where is Tiny Jim located after 30 seconds? (Give TJ's x - and y -coordinates.)
- (c) Where is Ollie located after 20 seconds? (Give Ollie's x - and y -coordinates.)
- (d) Find the first time when Ollie and Tiny Jim pass each other. (HINT: They will pass each other when the angle between them is 0.)