

Math 120 Winter 2001 Midterm 2

Read all questions carefully; if a question is not clear, ask your TA.
Write clearly and legibly. Show all your work. You must justify all your answers to receive credit.

This exam contains 5 pages and is worth a total of 50 points.

By signing below you understand that we may photocopy exams prior to returning.

Signature_____

NAME:_____ SECTION:_____

Problem 1:_____

Problem 2:_____

Problem 3:_____

Total:_____

Problem 1 Let $f(x) = -(x - 1)^2 + 10$ and $g(x) = \frac{x}{x+1}$.

a)(5 points) Compute $f(g(x))$

b)(5 points) Find an inverse for $f(x)$ on the domain $x \leq 1$

c)(5 points) Suppose that $f(x)$, for $0 \leq x \leq 1$, gives you the altitude, at time x , of a ball that has been launched in the air. Time x is measured in seconds and altitude $f(x)$ in meters. Explain in words the meaning of $f^{-1}(0.5)$ (You do not need to compute the value of $f^{-1}(0.5)$)

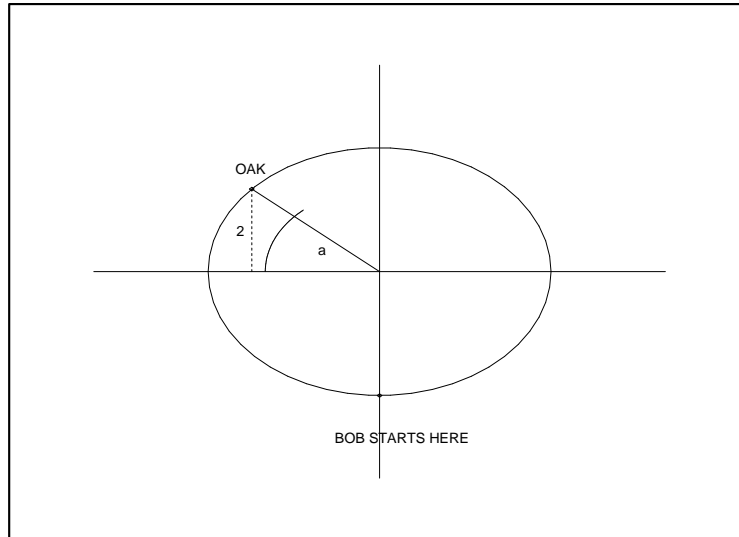
Problem 2 During the year 2000 the price of a share of Amazon.com oscillated between a high of \$110 in March and a low of \$40 in August.

a)(8 points) Assuming sinusoidal behaviour, write a formula for $P(t)$, the price of one share of Amazon.com, where t is months after January 2000 (that is $t = 0$ corresponds to January 2000, $t = 2$ to March 2000, and $t = 7$ to August 2000).

b)(5 points) Assuming the same sinusoidal behaviour continues in 2001, when would it be the best to buy Amazon in 2001? (that is, when does $P(t)$ reach its minimum during 2001, which corresponds to the interval $12 \leq t \leq 23$?)

c)(7 points) Approximately when in 2001 would one share of Amazon.com cost \$61? *You need to show your work. An approximate answer based only on your graphing calculator will receive no credit.*

Problem 3 Bob is running counterclockwise around a circular track of radius 3 miles. Along the track there is a beautiful oak tree (see picture below). Bob's angular velocity is 4 rad/hour.



a)(5 points)What are Bob's coordinates after 30 minutes ?

b)(5 points) Find a (a is the angle in the picture above)

4)(5 points)When does Bob first reach the oak tree?