

Math 120A Exam II

Fall 2004, Thursday, November 18th.

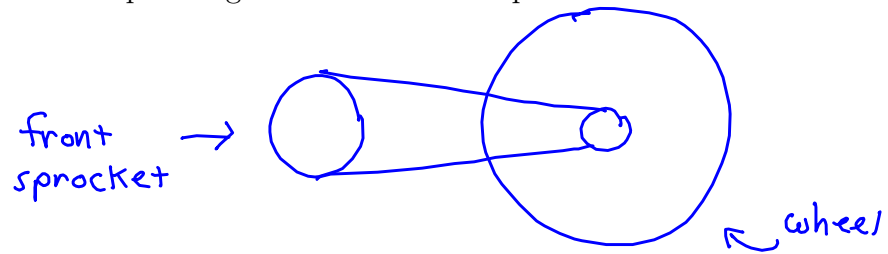
Section: _____ Name: _____

Instructions:

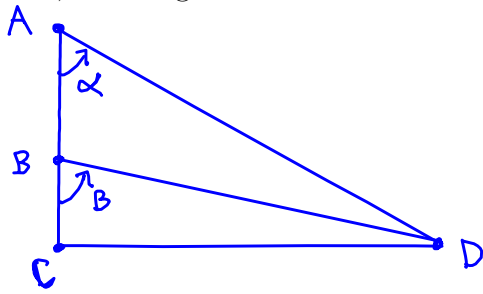
- You have 50 minutes for this exam.
- One 8.5 by 11 inch page of handwritten notes (front and back) is allowed.
- Write your name and section on your page of notes. Turn your page of notes in with your exam.
- Calculators (scientific or graphing) are allowed.
- You must show your work for full credit. Answers obtained by guessing or reading a numerical solution from a graph on your calculator when an algebraic method is available do not receive full credit.
- Clearly indicate your answers (e.g., by boxing them).
- There are 4 problems, and 5 pages to the exam. Check to make sure your exam is complete.

Problem	Total Points	Points
1	12	
2	12	
3	12	
4	12	
Total	48	

Problem 1 [12 pts] Suppose John is riding a bike at 25 miles and hour. The wheels of the bike are 28 inches in diameter. The front sprocket of the bike has a radius of 6 inches. John is pedaling at 1.7 revolutions per second. What is the radius of the rear sprocket?



Problem 2 [12 pts] In the figure below, suppose that the length of line segment AB is 24 feet, that angle α is 32° and that angle β is 54° . Find the length of line segment CD .



Problem 3 [12 pts] Let $u(t)$ be the basic step function:

$$u(t) = \begin{cases} 0 & \text{if } t < 0 \\ 1 & \text{if } 0 \leq t \leq 1 \\ 0 & \text{if } 1 < t \end{cases}$$

a) [4 pts] Find the multipart rule for $f(t) = \frac{2}{5}u(\frac{1}{2}(t - 2))$

b) [5 pts] Find the multipart rule for $g(t) = (t + 2)u(\frac{1}{3}(t + 1))$.

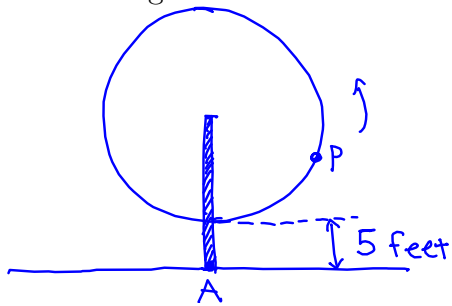
c) [3 pts] Let $h(t) = g(t) - f(t)$. Find the following

$$h(-1) =$$

$$h(2) =$$

$$h(4) =$$

Problem 4 [12 pts] Suppose you are on a ferris wheel that makes two complete revolutions, in a counter clockwise direction, every three minutes. At time $t = 0$, you are at some point P on the ferris wheel. It takes 25 seconds for you to reach the very top of the ferris wheel. The ferris wheel has a diameter of 80 feet. Assume the bottom of the ferris wheel is 5 feet above the ground.



(a) [8 pts] What is your height above the ground, as a function of t , where t is in minutes?

(b) [4 pts] After 55 seconds, what is your distance from point A ? (Note that point A is on the ground, at the base of the ferris wheel.)