

Math 120AB - Winter 2004
Mid-Term Exam Number Two
February 26, 2004

Name: _____

Section: _____

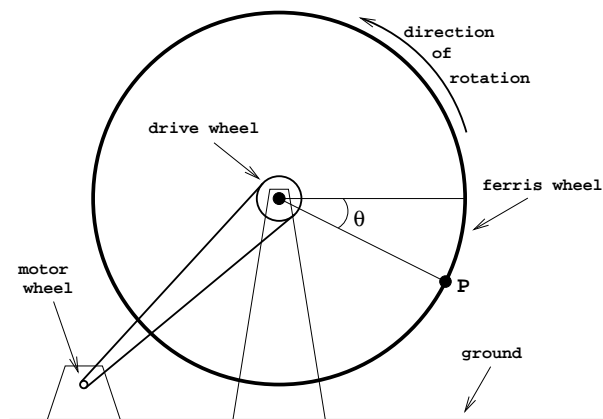
1	10	
2	10	
3	10	
4	10	
5	10	
Total	50	

- Complete all questions.
- You may use a calculator during this examination. Other calculating devices are not allowed.
- If you use a trial-and-error or guess-and-check method, or read a numerical solution from a graph on your calculator when an algebraic method is available, you will not receive full credit.
- You may use one hand-written 8.5 by 11 inch page of notes.
- Show all work for full credit.
- You have 50 minutes to complete the exam.

1. Let $f(x) = \sqrt{x} + \sqrt{x+2}$. Find $f^{-1}(x)$.

2. Sue has a tree in her yard which has a height determined by a linear-to-linear rational function of time. When the tree was planted, it had a height of zero feet (it was just a seed). Ten years later, it had a height of 30 feet. Twenty years after it was planted, its height was 55 feet. In the long run, how tall will the tree be?

3. Paul is riding a ferris wheel with a diameter of 250 feet. It is powered by a 1.2 foot diameter motor wheel, which is attached by a chain to a 26 foot diameter drive wheel, as shown in the diagram. The drive wheel is attached to the same axle as the ferris wheel. The axle of the ferris wheel is 140 feet above the ground.



- (a) How fast is the motor wheel turning if Paul is moving 25 feet per second?
- (b) Suppose Paul is moving 25 feet per second and the wheel is rotating counter-clockwise. If $\theta = 23^\circ$, how high above the ground is Paul 3 seconds after being at point P?

4. At a certain point in the desert, the temperature is given by a sinusoidal function of time. The high and low daily temperatures occur exactly once each per day. The low daily temperature is 35° and it occurs at 3 AM. The high daily temperature is 104° and it occurs at 3 PM.

What is the temperature at noon?

5. You are watching a rocket launch. A short time after take-off, the rocket appears to be 68° high (i.e., a line from you to the rocket makes a 68° angle with the horizontal). A little later, the rocket has climbed an additional 100 meters, and now appears to be 70° high. How far are you from the launch pad?