

Math 120 A - Spring 2005
Mid-Term Exam Number Two
May 19, 2005

Name: _____

Section: _____

1	10	
2	15	
3	10	
4	10	
Total	45	

- Complete all questions.
- You may use a calculator during this examination. Other electronic devices are not allowed, and should be turned off for the duration of the exam.
- 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. Bo is growing his hair out. Today, his hair is 30 cm long. One year from today, it will be 35 cm long. Five years from today, it will be 40 cm long. If his hair's length is a **linear-to-linear rational function** of time, how many years from today will it be before his hair is 41 cm long?

2. Nadia is a robot that can continuously adjust the length of its hair so that its length is a sinusoidal function of time. At its shortest, it's 6 cm long. At its longest, it's 24 cm long. Today, Nadia's hair is 15 cm long and the length is decreasing. The hair will decrease in shortness until it reaches the minimum length exactly four days from now.

(a) How long will Nadia's hair be seven days from today?

(b) When will Nadia's hair be 17 cm long for the **second** time?

3. Godzilla is approaching at 5 feet per second. From the ground, you measure the angle to the top of Godzilla's head to be 17 degrees (that is, the angle between Godzilla's head, you, and the horizon is 17 degrees). One minute later, you measure the angle again, and find it to be 23 degrees.

Assuming that Godzilla's height is constant, how tall is Godzilla?

4. Angel and Bernard start running around a circular track. The track has radius 50 meters. They start at the same point, but run in opposite directions. Angel runs at 4 meters per second, and Bernard runs at 5 meters per second.

After running for 10 minutes, how far are they (in a straight line) from each other?