

Math 120 - Fall 2009

Exam 2

November 19, 2009

Name: _____

Section: _____

Student ID Number: _____

1	12	
2	12	
3	12	
4	14	
Total	50	

- You are allowed to use a scientific calculator (**NO GRAPHING CALCULATORS**) and one **hand-written** 8.5 by 11 inch page of notes. Put your name on your sheet of notes and turn it in with the exam.
- Check that your exam contains all the problems listed above.
- You must show your work on all problems. The correct answer with no supporting work may result in no credit. Unless otherwise indicated, your **final answer** must be correct to two digits after the decimal.
- Guess and check methods are not sufficient, you must use appropriate methods from class.
- If you need more room, use the backs of the pages and indicate to the grader that you have done so.
- Raise your hand if you have a question.
- There may be multiple versions of the exam. Any student found engaging in academic misconduct will receive a score of 0 on this exam (we take this very seriously, if you are found cheating you will at least get academic probation or you may be expelled from school).
- You have 50 minutes to complete the exam.
START BY LOOKING THROUGH ALL THE PROBLEMS AND USE YOUR TIME WISELY.
Check your time after you complete each problem and manage your time accordingly. Remember that significant partial credit may be given to correct work, so show me what you know!
SPEND NO MORE THAN 10 MINUTES PER PAGE!

GOOD LUCK!

1. (12 points) Lily's height, y , is a **linear-to-linear rational** function of her age, x .
At age 2, she is 35 inches tall.
At age 10, she is 55 inches tall.
As she gets older and older, her height increases and approaches (but never exceeds) 64 inches.

(a) Find the linear-to-linear model for height, y , in terms of age, x .

(b) At what age is Lily exactly 50 inches tall?

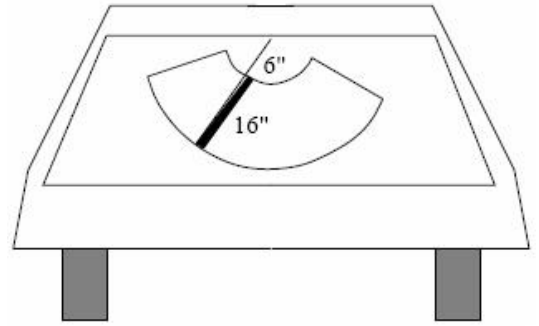
2. (12 points) Michael and Jim are trying to decide on the price for a ream of paper. Using customer surveys and previous year data, they have the following information:
If the price is \$205.00 per ream, they sell 300 reams in a year (for a revenue of \$61,500).
If the price is \$225.00 per ream, they sell 285 reams in a year (for a revenue of \$64,125).
The number of reams sold, y , is a linear function of the price, x .

(a) Give the maximum revenue.

(b) In the previous year, Michael and Jim sold 150 reams of paper.
Find the revenue in the previous year.

3. (12 points)

The rear window wiper blade on a station wagon has a length of 16 inches. The wiper blade is mounted on a 22 inch arm, 6 inches from the pivot point (as illustrated). If the wiper turns through an angle of 105° , how much area is swept clean?



(a) If $f(x) = 3x + c$ and $f(f(x)) = 9x - 10$, find the value of c .

(b) Find the inverse function of $f(x) = \frac{(\sqrt{x} - 1)^2}{3}$ when restricted to the domain $0 \leq x \leq 1$.

4. (14 points) The human population of the city of Boom is growing exponentially. Let x be the years since 2000 and $B(x)$ be the human population in Boom. In 2000 ($x=0$), the human population of Boom was 1250. The human population of Boom doubles every 5 years.

(a) Give the value of x when the population of Boom will be 15,000.

(b) As more people inhabit the city, the population of deer within the city limits is decreasing according to an exponential model.

In 2003 ($x=3$), the population of deer was 9000. In 2006, the population of deer was 8000. For what value of x will there be twice as many people as deer.