

Math 120 C and E - Autumn 2004
Mid-Term Exam Number Two
November 18, 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 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. Shirley knows that the more weight she loads on her bicycle, the slower she will have to ride up Morgan's Hill. If she carries no load, she can ride 12 feet per second up the hill. With a load of 50 pounds, her speed drops to 6 feet per second. With a load of 100 pounds, her speed is 5 feet per second.

Assuming her speed is a linear-to-linear rational function of her load, what will her speed be at a load of 25 pounds?

2. Let $f(x)$ be defined by

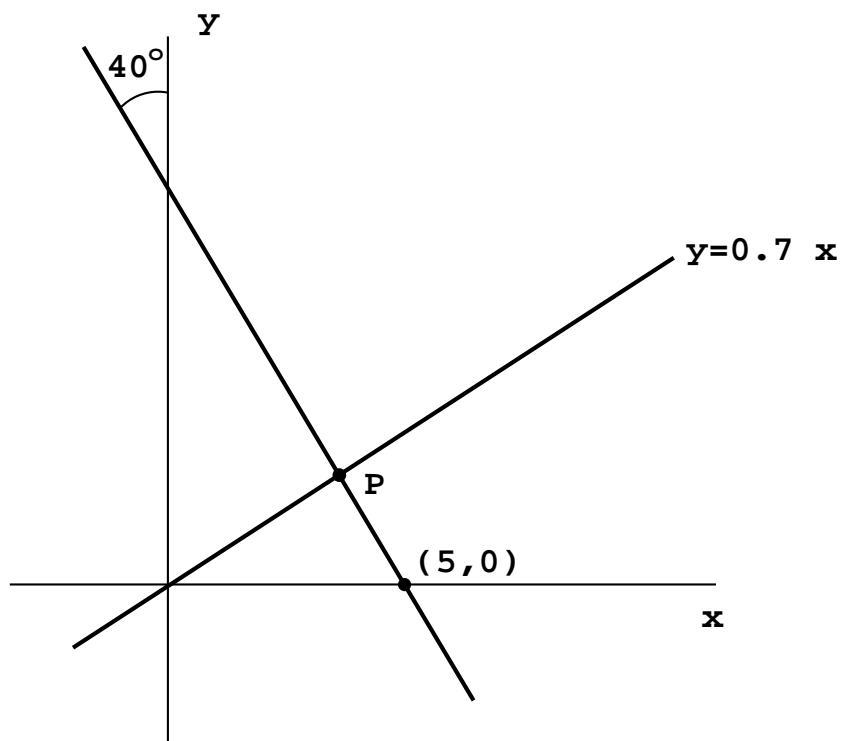
$$f(x) = \frac{3x + 5}{x - 6}.$$

Find $f^{-1}(x)$.

3. A scientist in the arctic noticed one day that the thickness of the ice at a certain point on the sea was varying sinusoidally. She found that the ice reached its minimum thickness of 90cm at 1:30 PM. It then grew to its maximum thickness of 180cm at 4:00 PM.

How thick was the ice at 6:15 PM?

4. Find the coordinates of the point P in the figure below.



5. Susanne took a ride on a ferris wheel which had a radius of 22 meters. She began her ride at the lowest point on the wheel, just 4 meters above the ground. During her ride, her linear speed was 14 meters per second. How high above the ground was she 86 seconds into her ride?