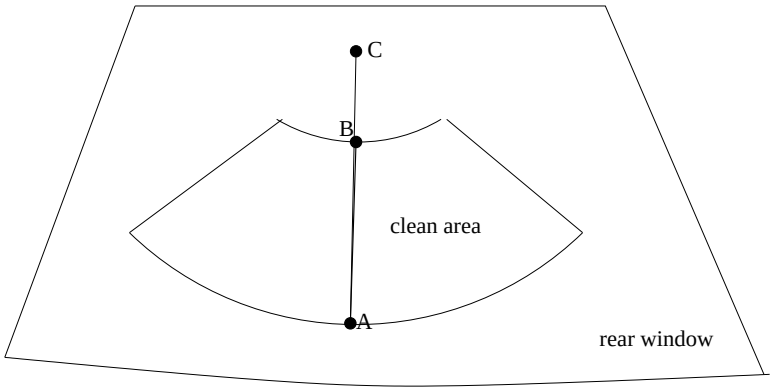
Name _____

Math 120E (QUIZ 4, October 23, 1997)

Instructions: You have 25 minutes for this quiz. **Show your work; NO CREDIT for answers only.** If you use a calculator function or program to obtain an answer, briefly state what program you used. Note that the quiz is on **both sides** of the paper.

1. (6 points total) Consider a rear-window windshield wiper, as pictured below. The wiper turns through an angle of 120°. The wiper is mounted 6 inches from the pivot point and has length h. That is, the length from B to C is 6 inches and the length from A to B is h inches.



   (a) (1 point) If $h = 14$ inches, what is the perimeter of the clean area?

   (b) (1 point) If the area of the clean area is 450 square inches, what is h?

   (c) (2 point) Suppose $h = 16$. The edge of the wiper blade labelled A travels 6 inches every second. How many inches does the point labelled B travel each second?

(d) (1 point) Let $A(h)$ be the function that gives the total area that the wiper blade will clean off as a function of the h. Write down the formula for $A(h)$.

(e) (1 point) Give a reasonable domain for $A(h)$ and state whether or not the function is invertible on this domain.

2. (2 points) Find the inverse to

$$f(x) = \frac{1}{x^3 - 2}$$

and state the domain and range of $f(x)$.

3. (2 points) Find all of the roots of the polynomial

$$p(x) = 2x^3 - 5x^2 - 4x + 3$$

Hint: $p(3) = 0$.