

Math 20A (Shenk). Quiz 1. July 8, 2011.

Name \_\_\_\_\_

Work alone and use no books, notes, or calculators.

**Problem 1** Find the solution set of the inequality  $2x + 1 > 5x - 5$  and draw it on an  $x$ -axis.

**Problem 2** (a) Sketch the graph of

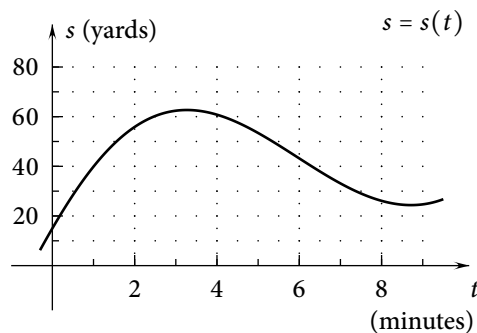
$$w(x) = \begin{cases} x^2 & \text{for } 0 \leq x < 2 \\ 2 & \text{for } x \geq 2. \end{cases}$$

Find the limits of  $w(x)$  (b) as  $x \rightarrow 0^+$ , (c) as  $x \rightarrow 1$ , (d) as  $x \rightarrow 2^-$ , (e) and as  $x \rightarrow 3$ .  
(f) Find all solutions  $x$  of  $w(x) = 3$ . (g) On what intervals is  $w$  continuous?

**Problem 3** Use the definition to find the derivative of  $f(x) = \frac{4}{x+2}$  at  $x = 2$ .

**Problem 4** The graph of an object's position  $s = s(t)$  on an  $s$ -axis as a function of the time  $t$  is shown.

- (a) What is the object's approximate velocity in the positive  $s$ -direction at  $t = 2$ ?  
(b) When is its velocity zero?



**Problem 5** Give an equation of the tangent line to  $y = \frac{x}{x+3}$  at  $x = 7$ .

**Problem 6** You have 2000 barrels of crude oil in storage from your oil well, which is producing oil at the rate of 100 barrels per day. The price of crude oil is 95 dollars per barrel and is falling at the rate of 5 dollars per barrel per day. At what rate is the value of your oil increasing or decreasing?