

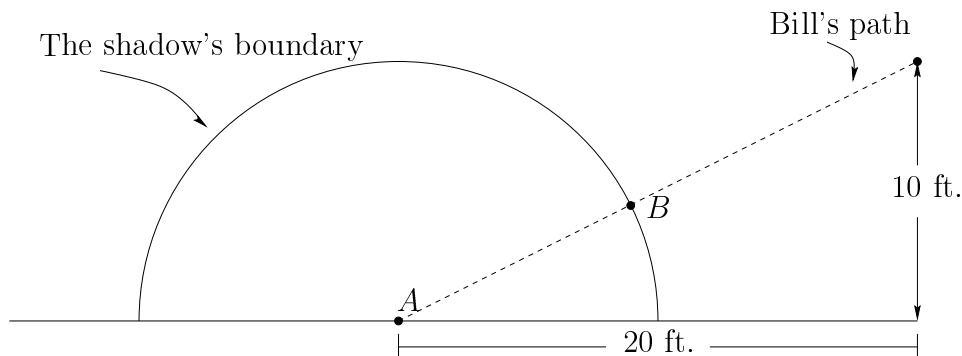
Math 120
Autumn 1999
Quiz 2

Name: _____

Instructions:

- You will have 30 minutes.
- Closed book, closed notes.
- You must SHOW YOUR WORK to receive credit.
- Give exact answers to all problems. For example, if the answer to a problem is $\sqrt{2}$ or $\frac{1}{3}$, do not write 1.414 or .33, etc.
- The point value of each problem is shown in parentheses to the left.

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1. An overhead light on the side of a building casts a semicircular shadow which has a radius of 10 feet. At time $t = 0$, Bill is located 20 feet east of and 10 feet north of the point A directly below the light. He starts walking toward the point A at the rate of 2 feet/sec. Impose coordinates in x and y with the origin at point A .



- (2) (a) Write an equation in x and y which describes Bill's path.

- (4) (b) Give the coordinates of the point B where Bill reaches the boundary of the shadow.

- (4) (c) How long does it take Bill to reach the shadow's boundary?

2. In this problem the function $y = f(x)$ is defined by the equation

$$\left(\frac{x-2}{a}\right)^2 + \left(\frac{y}{3}\right)^2 = 1 \quad (*)$$

where a is a positive constant. Assume that $f(x) \geq 0$ for all x in the domain of f .

- (4) (a) Solve the equation (*) above to get y in terms of x .
- (4) (b) Describe the largest possible domain of f . Express your answer in terms of inequalities.
- (2) (c) Find all solutions of $f(x) = 1$.