

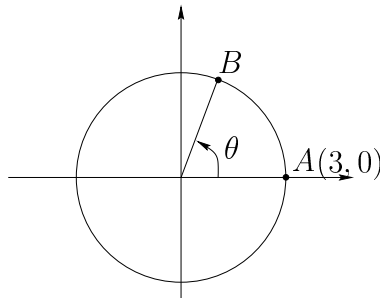
Math 120  
Autumn 1999  
Quiz 5

Name: \_\_\_\_\_

**Instructions:**

- You will have 30 minutes.
  - Closed book, but you are allowed one page of notes (both sides) in your own handwriting.
  - You must SHOW YOUR WORK to receive credit.
  - Give exact answers to all problems. For example, if the answer to a problem is  $\frac{1}{3}$  or  $\sqrt{2}$ , do not write .33 or 1.414, etc. If you wish to give a decimal approximation after your exact answer, that's okay.
  - The point value of each problem is shown in parentheses to the left.
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1. The figure below shows an angle  $\theta$  of  $72^\circ$ .



(1) (a) Express the angle  $\theta$  in radians.

(1) (b) Express  $\theta$  in revolutions.

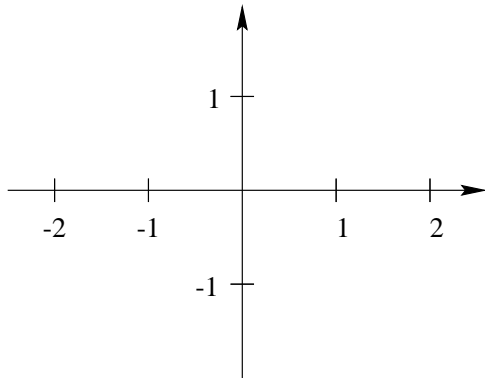
(1) (c) Find the length of the arc along the circle from  $A$  to  $B$ .

2. The step function  $u$  is defined by

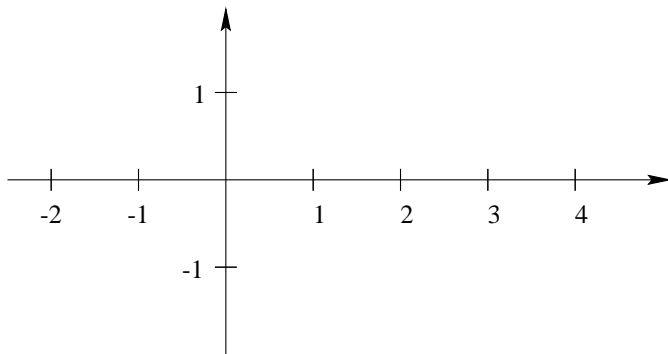
$$u(t) = \begin{cases} 0 & \text{if } t < 0 \\ 1 & \text{if } 0 \leq t \leq 1 \\ 0 & \text{if } t > 1 \end{cases} .$$

Sketch the graph for each function.

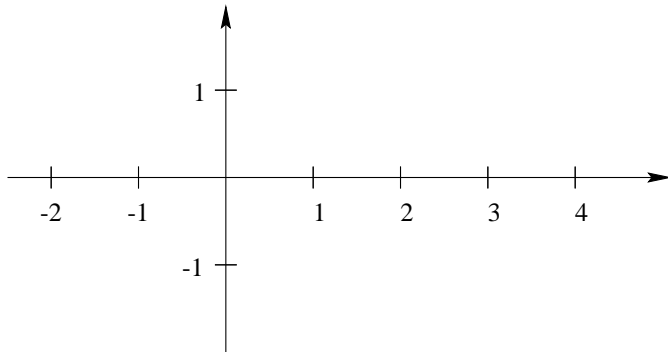
(3) (a)  $y = u(2t)$



(3) (b)  $y = u\left(\frac{1}{2}t - 1\right)$



(3) (c)  $y = u(2t) - u\left(\frac{1}{2}t - 1\right)$



3. Clovis is standing at the edge of a cliff which slopes 4 feet downward from him for every horizontal foot. He launches a small rocket from where he is standing. Also, with the origin of the coordinate system located where he is standing, the path of the rocket is given by  $y = -2x^2 + 80x$ ,  $x$  and  $y$  in feet.
- (2) (a) Give a function  $h = f(x)$  relating the height  $h$  of the rocket above the sloping ground to its  $x$ -coordinate.
- (3) (b) Find the maximum height of the rocket ABOVE THE SLOPING GROUND.
- (3) (c) While the rocket is on its way up to its highest point ABOVE THE SLOPING GROUND Clovis measures its height  $h$  ( $h$  is defined in (a)). Give a function  $x = g(h)$  relating the  $x$ -coordinate of the rocket to  $h$ .