

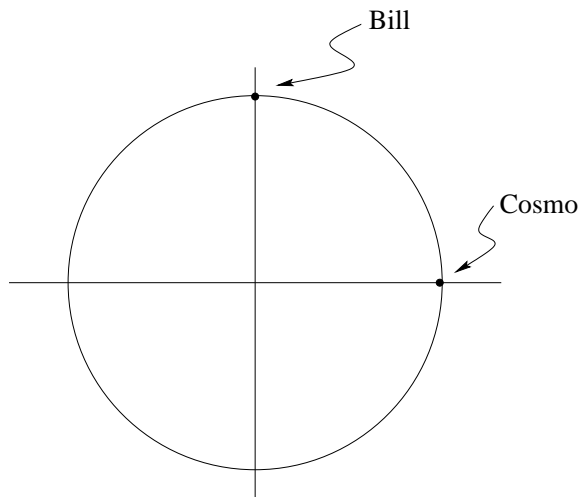
Math 120
Autumn 1999
Quiz 6

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. Cosmo the dog is chasing Bill the cat around a circular track 200 feet in diameter. Cosmo's angular rate is 1.5 revolutions per minute and Bill's angular rate is 0.8 rev./min. At time $t = 0$, Cosmo and Bill are located as shown in the figure below.



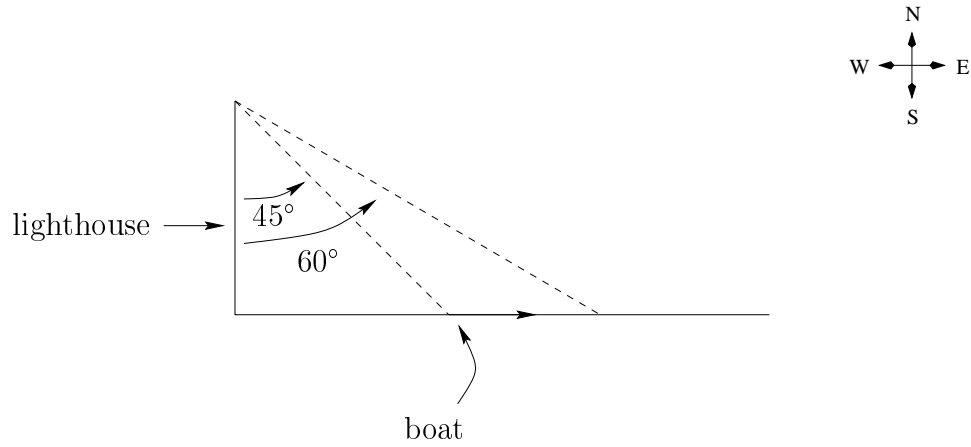
- (a) Find the angle in radians that Bill's position makes with the positive horizontal axis as a function of time t in seconds.

(b) Give Cosmo's position (x and y coordinates) after t seconds. Your answer should be an ordered pair.

(c) What is the angle in radians between Bill and Cosmo after 10 seconds?

(d) How far has Bill traveled along the circular track during that ten seconds?

2. The top of a lighthouse is 708 feet above the surface of the ocean. A boat is spotted and two measurements are made of the angle the boat makes with the lighthouse. The first measurement is $\alpha = 45^\circ$ and the second measurement is $\beta = 60^\circ$. The boat is moving east.



- (a) How far from the lighthouse was the boat when the first measurement was made?

- (b) How far did the boat travel during the time between the first and second measurements?