

Math 113

EXAM I, Oct. 12, 2005, (60 minutes).

NAME:

SECTION:

Instructor:

I	II	III	IV	V	Total

TO RECEIVE CREDIT FOR AN ANSWER,  
YOU MUST SHOW WORK JUSTIFYING THAT ANSWER.

I. (NO CALCULATOR) (10 points) Find EXACT values of  $\alpha$  in radians and  $\beta$  in degrees, for

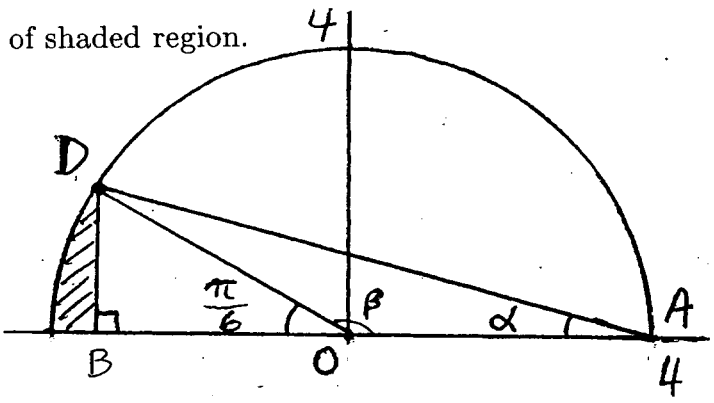
$\alpha = 16^\circ =$

$\beta = 3$  (radians) =

II. (NO CALCULATOR)

1) (5 points) Find the EXACT value of the arc from A to D (with angle  $\beta$ ).

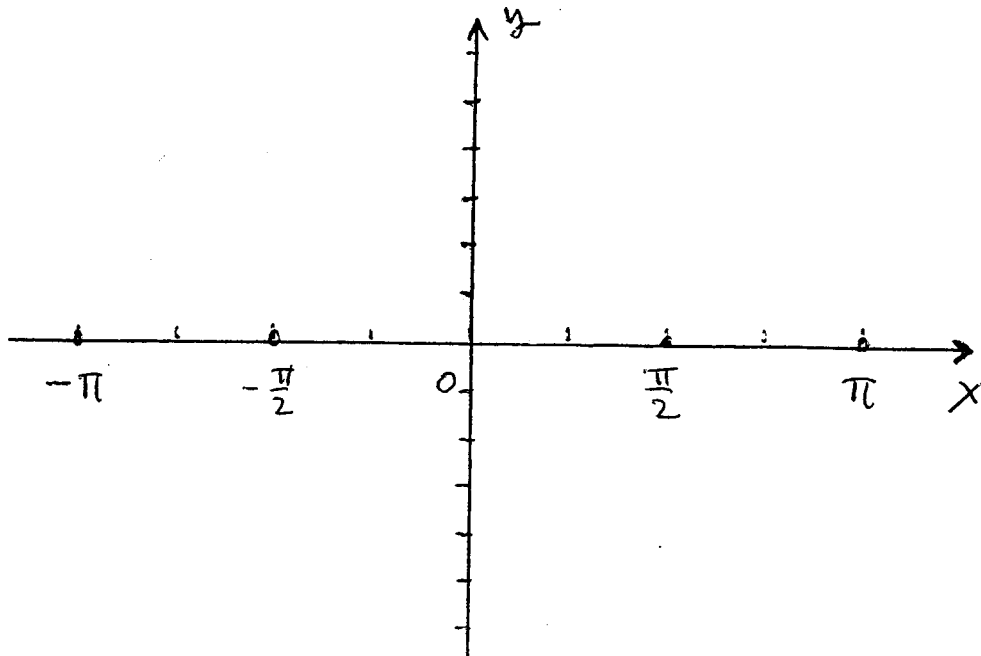
2) (10 points) Find the EXACT value of the area of shaded region.



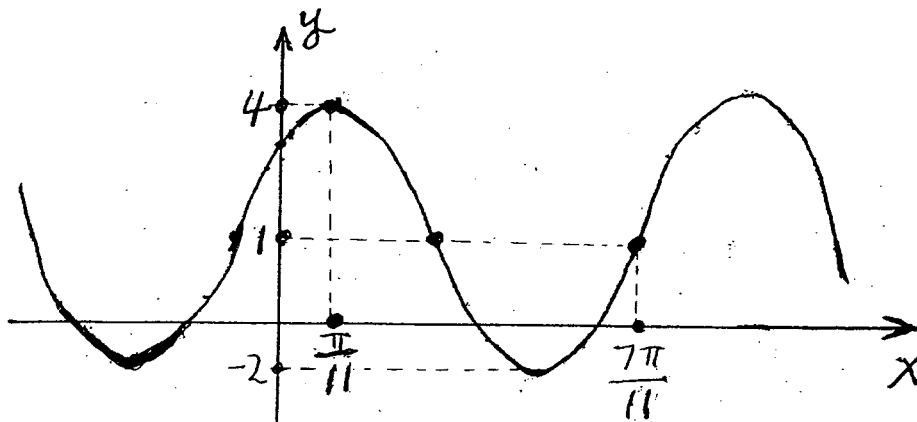
3) (5 points) Find the EXACT value of  $\tan \alpha$ .

**III.** (25 points) On an airplane 10000 feet above the ocean, you see an island at an angle of depression (to the island)  $22^\circ$  and a ship at an angle of depression  $20^\circ$ . Assuming the airplane is directly above the line connecting the ship and island, find the distance between the ship and island. (*Method imposed: Solve this problem with the tools of Chapter 2 (Right Triangles, definition of sine, cosine and tangent). Do not use tools such as the law of sines and the law of cosines to be seen in Chapter 9.*)

IV. (NO CALCULATOR) 1) (15 points) Sketch the graph of  $y = 2 \cos(2x) - 3$  for  $-\pi \leq x \leq \pi$ . On the  $x$  axis, mark and write down all EXACT values of  $x$  (between  $-\pi$  and  $\pi$ ) at which  $y = -2$ .



2) (10 points) The graph of  $y = 1 + A \sin(Bx + C)$  with  $A > 0$ ,  $B > 0$  is drawn below. Find the EXACT values of  $A, B, C$ .



V. (NO CALCULATOR) 1) (5 points) Find the EXACT value of  $\tan(\sin^{-1}(\frac{-1}{3}))$ .

2) (5 points) Let  $\sin x = \frac{2}{3}$  and  $\tan x < 0$ . Find the EXACT value of  $\sin x$ .

2) (5 points) Using the given coordinates, CAREFULLY sketch an angle  $x$  in standard position satisfying 2).

3) (5 points) Find EXACT values of all possible  $x$  satisfying 2).

