

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 α in radians and β in degrees, for

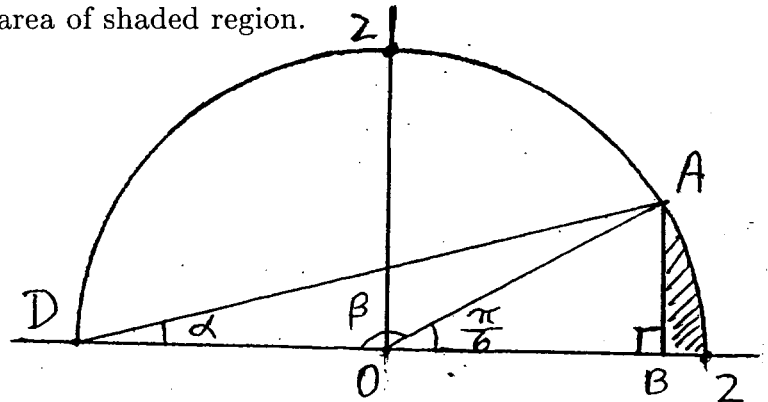
$$\alpha = 12^\circ =$$

$$\beta = 8 \text{ (radians)} =$$

II. (NO CALCULATOR)

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

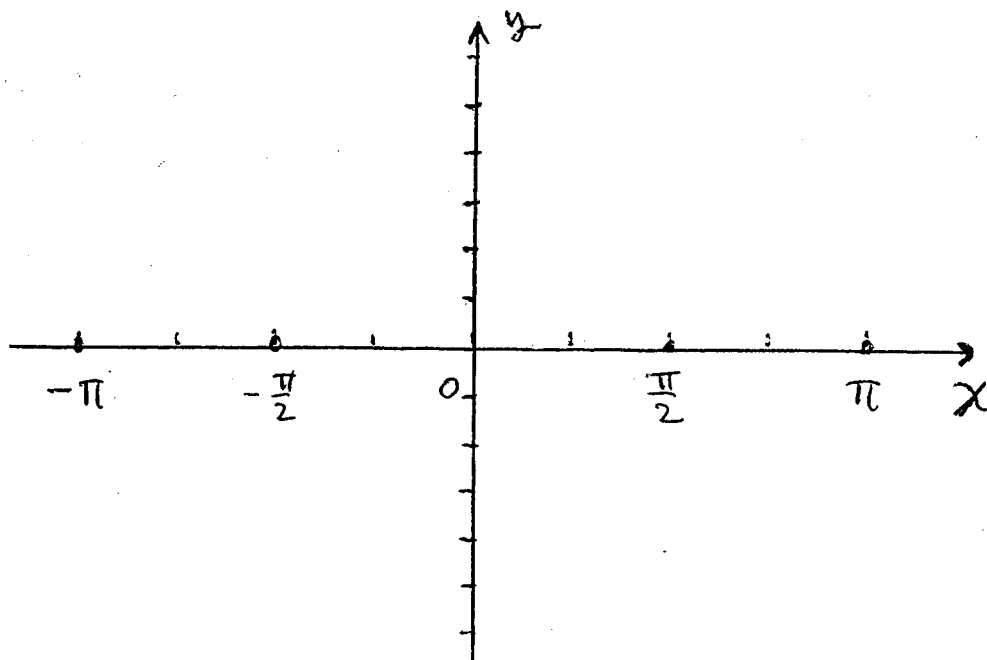
2) (10 points) Find the EXACT value of the area of shaded region.



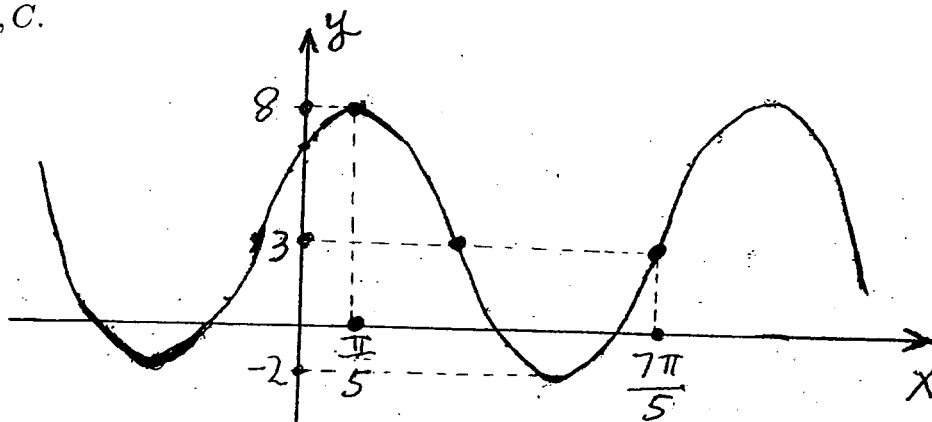
3) (5 points) Find the EXACT value of $\tan \alpha$.

III. (25 points) On an airplane 10000 feet above the ocean, you see an island at an angle of depression (to the island) 18° and a ship at an angle of depression 20° . 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 π) at which $y = 4$.



2) (10 points) The graph of $y = 3 + A \sin(Bx + C)$ 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 $\tan(\sin^{-1}(\frac{-1}{4}))$.

2) (5 points) Let $\cos x = \frac{2}{3}$ 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).

