

MA 202 - Math for Elementary Teachers

Exam 3

5 April 2007

Name:_____

Score:_____ /100 Points

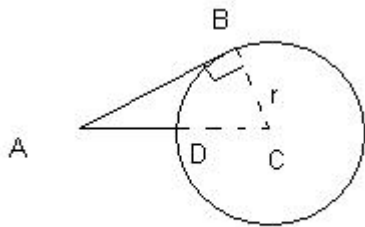
Instructions:

- You may not use any outside assistance on this exam. You may not use books, notebooks, other people's exams, or any other materials to cheat on this exam.
- You may not use a graphing calculator on this exam.
- The use of electronic equipment such as mp3 players, ipods, cell phones and other electronic devices during the exam is prohibited.
- If you are caught cheating on the exam, you will be given a 0 for a grade.
- Write clearly during the exam and fully erase or mark out anything you do not want graded.
- You must give exact answers and fully reduce fractions to receive full credit. Approximate and unreduced answers will receive only partial credit.
- **You must show all your work to receive full credit unless otherwise stated.**

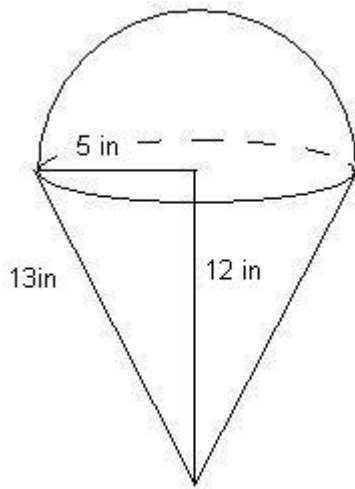
1. Please fill in the appropriate numbers in the chart below to make the conversions correct. (5 points each)

$5in$	=	_____	ft
$0.325km$	=	_____	cm
$1m^2$	=	_____	km^2
$1ft^3$	=	_____	yd^3

2. Consider the picture below of a right triangle and a circle. If the distance from A to D is 8cm and the distance from A to B is 12cm, what is the radius of the circle? (10 points)



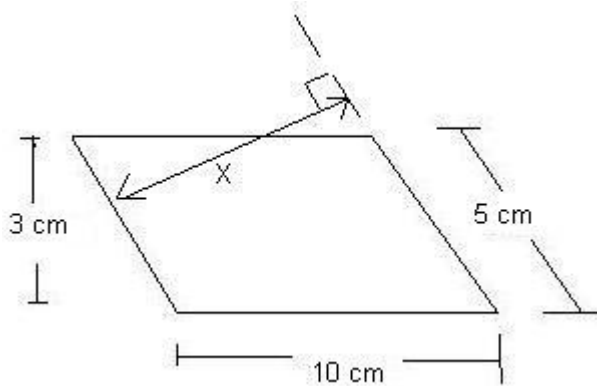
3. Consider the figure below. You may assume the dome is a semisphere of radius 5in and the bottom has a base radius of 5in and height of 12in.



- (a) Find the volume of the figure. (7 points)

- (b) If the slant height of the cone is 13in, what is the surface area of the entire figure? (8 points)

6. Consider the parallelogram below.

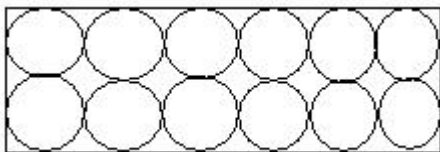


(a) What is the area of the above parallelogram? (5 points)

(b) What is the length x ? (5 points)

7. Prove that the area of a trapezoid is given by the formula: $A = \frac{1}{2}(a + b)h$ where a and b are the lengths of the parallel sides of the trapezoid and h is the height. You may use any other area formulas from class in your proof. Be sure label all pictures, variables, etc. (10 points)

8. Imagine there are twelve cans of root beer on your instructor's desk arranged inside a rectangular box with a bottom but no top. A bird's eye view of the soda and box is provided below. Each can of soda is a cylinder with a flat bottom and flat top and the cans are packed tightly inside the box. The radius of the top face of any can is uniformly 1.5 inches and each can is uniformly 5 inches tall.



- (a) What are the dimensions of the box described above containing the twelve soda can? Show all work and explain each dimension briefly. (5 points)
- (b) How much cardboard, in square inches, will it take to produce the box holding the twelve soda cans? Assume there is no thickness to the cardboard. (6 points)
- (c) Assume now you want to arrange the cans into 3 rows of 4 cans each. If you construct a box to hold the cans in this formation, how much cardboard will you use? (7 points)

9. Extra Credit: What is the ratio of the area of the inscribed square to the area of the square circumscribed about the same circle? (Hint: Begin by defining the radius of the circle to be r .) (5 points)

