Math 213 Exam 3A Fall 2016 Name\_

- You must show all work for each part of every question to receive full credit.
- Unless stated otherwise, you should use the approximation 3.14 for  $\pi$ .
- Unless stated otherwise, please round final answers to the nearest hundredth.

1(10). A wire is bent into the shape of an equilateral triangle. The area enclosed by the triangle is  $\sqrt{3}$  cm<sup>2</sup> and the height of the triangle is  $\sqrt{3}$  cm.

a. Find the perimeter of the triangle in centimeters. Show all work.

b. Express the answer to part a in millimeters. Use a sketch and the meaning of multiplication or the meaning of division to justify your answer.

2(5). A piece of wire 4 inches long is bent into a circle. Find the radius of the circle.



3(8). A certain rectangular prism has total surface area 94 cm<sup>2</sup>. The width of its rectangular base is 3 cm, while the length is 4 cm. Find the height of the prism.



4(24). The new Superwoman Softball Stadium is to be built using the diagram at right.

ACF is an isosceles right triangle. AC = AF = 355 ft.

CDEF is an isosceles trapezoid with height 55 ft. and DE = 390 ft.

AB =95 ft, which is the radius of the unshaded quartercircle; the center of the quarter-circle is A.



a. The outfield is the shaded area above. Find the area of the outfield in square feet. Show all work.

b. Convert the area found in part a to square yards. Show work, including a diagram to help explain the relationship between square feet and square yards.

c. The outfield is to be seeded with Bermuda grass. If each bag of seed covers 1500 square yards, how many bags of seed will be needed? Show work.

5(25). Consider the child's building block shown at right.

Assume the overall dimensions of the block are 6 cm by 3 cm by 3 cm.

Assume the curved cut-out portion is a half-cylinder with radius 2 cm.



a. Find the entire surface area of this block. (Note: There are a total of 8 faces). Include appropriate units. Show all work.

b. Find the volume of this block. Include appropriate units.

c. Convert the volume of the block to cubic inches. Use the fact that 2.54 cm = 1 inch (as linear measures) in your calculation.

6(8). Find the area of the lattice polygon below. Annotate the diagram so your way of thinking is clear.



7(20). Consider the shapes below.



- a. Which of the shapes above are polyhedra?
- b. Which of the shapes above are prisms?
- c. Which of the shapes above are convex?
- d. Which of the shapes above are Platonic solids?