

Show all work neatly, LABEL and circle your answers.

1. A butterfly house at the local zoo is a rectangular prism with dimensions 20' x 15' x 10', and it contains 625 butterflies.

a. What is the volume of the butterfly house? Show your work.

b. If there were nothing else in the exhibit, how much space would each butterfly have?

c. **Density** is the quantity of something per unit measure, especially length, area, or volume. You might talk about the density of birds on a power wire (maybe a flock lands with 7 birds per meter of wire), or population density (the population density of Singapore is 7301 people per square kilometer), or the mass density of an element (the density of iron is  $\approx 7874$  kilograms per cubic meter).

Assuming that the butterflies are evenly distributed inside the butterfly house, what is the density of butterflies? Explain.

2. A restaurant has a giant fish tank that is a cylinder with radius 4' and height 7'.

a. In exact form, what is the volume of the tank in cubic feet and in cubic inches? Use these calculations to help answer the next two questions.

- b. If there are 1250 fish in the tank, how much space does each fish have in cubic feet? Round your final answer to the nearest hundredth.
- c. If there are 1250 fish in the tank, how much space does each fish have in cubic inches? Round your final answer to the nearest hundredth.
- d. What is the density of fish per cubic foot? Round your final answer to the nearest hundredth.
- e. What is the density of fish per cubic inch? Round your final answer to the nearest thousandth.