1. Draw Venn diagrams with two circles showing the relationship between the following pairs of sets.

   (a) words and verbs. (2 pts)

   ![Venn Diagram for words and verbs]

   Figure 1: The set of verbs is a subset of the set of words because every verb is a word.

   (b) negative integers and natural numbers. (2 pts)

   ![Venn Diagram for negative integers and natural numbers]

   Figure 2: It’s a disjoint pair since natural numbers and negative integers have no common elements.

2. What does the word *per* mean? (2 pts)

   (a.) Divided by.
   (b.) Multiplied by.
   (c.) In addition to.

   Divided by.
3. Convert

(a.) 3 years to hours. (2 pts)

\[
3 \text{ years} \times \frac{365 \text{ days}}{1 \text{ year}} \times \frac{24 \text{ hr}}{1 \text{ day}} = 26,280 \text{ hr}
\]

(b.) 60 miles per hour to units of miles per minute. (2 pts)

\[
\frac{60 \text{ mi}}{1 \text{ hr}} \times \frac{1 \text{ hr}}{60 \text{ min}} = 1 \text{ mi/min}
\]

(c.) 24 feet to inches. (2 pts)

\[
24 \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} = 288 \text{ in.}
\]

4. A hose fills a hot tub at a rate of 3.2 gallons per minute. How many hours will it take to fill a 300-gallon hot tub? (3 pts)

\[
300 \text{ gal} \times \frac{1 \text{ min}}{3.2 \text{ gal}} \times \frac{1 \text{ hr}}{60 \text{ min}} = 1.5625 \text{ hr}
\]

5. An air conditioning system can circulate 320 cubic feet of air per minute. How many cubic yards of air can it circulate per minute? (1 yard = 3 feet.) (3 pts)

\[
1 \text{ yd} = 3 \text{ ft} \Rightarrow 1 \text{ yd}^3 = 27 \text{ ft}^3, \text{ by cubing both sides of the first equation. Therefore},
\]

\[
\frac{320 \text{ ft}^3}{1 \text{ min}} \times \frac{1 \text{ yd}^3}{27 \text{ ft}^3} = 11.85 \text{ yd}^3/\text{min}
\]