MATH 243: SECTION 12.2 GROUPWORK

(1) Find the vector with the same direction as $\langle 3, 4, 12\rangle$ has length 2. Find the vector with the same direction as $\langle 3, 1, 4\rangle$ which has length π. If a, b, c are real numbers and d is any positive real number, find the vector with the same direction as $\langle a, b, c\rangle$ which has length d.
(2) Consider the line in the plane given by the equation $y = 3x - 4$. Determine a vector which is parallel to this line. Determine a vector which is perpendicular to this line. How many choices do you have for each of these vectors? Sketch a picture of the line and your two vectors.
(3) Consider four dimensional vectors $\langle a, b, c, d\rangle$. Define scalar multiplication and vector addition for these 4d vectors. Which of the properties of vectors from page 842 of your textbook apply to 4d vectors? Can you think of any real world situations you would represent with 4d vectors?