1. Draw the following segments. What do they have in common? from $(3, -1)$ to $(10, 3)$; from $(1.3, 0.8)$ to $(8.3, 4.8)$; from $(\pi, \sqrt{2})$ to $(7 + \pi, 4+ \sqrt{2})$.

The *directed segments* have the same length and the same direction. Each represents the *vector* $[7, 4]$. The components of the vector are the numbers 7 and 4.

2. (Continuation)

(a) Find another example of a directed segment that represents this vector. The initial point of your segment is called the *tail* of the vector, and the final point is called the *head*.

(b) Which of the following directed segments represents $[7, 4]$?

    i)   from $(-2, -3)$ to $(5, -1)$

    ii) from $(-3, -2)$ to $(11, 6)$

    iii) from $(10, 5)$ to $(3, 1)$

    iv) from $(-7, -4)$ to $(0, 0)$

3. Given the vector $[-5, 12]$, find the following vectors:

(a) same direction, twice as long   (b) same direction, length 1
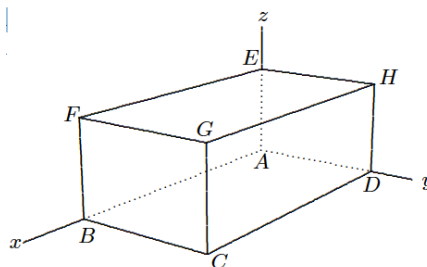
(c) opposite direction, length 10   (d) opposite direction, length c

4. The diagram shows a rectangular box named ABCDEFGH. Notice that A = (0, 0, 0), and that B, D, and E are on the coordinate axes. Given that G = (6, 3, 2), find

(a) coordinates for the other six vertices;

(b) the lengths AH, AC, AF, and AG.

5. The edges of a rectangular solid are parallel to the coordinate axes, and it has the points (0, 0, 0) and (8, 4, 4) as diagonally opposite vertices. Make a sketch, labeling each vertex with its coordinates, then find (a) the distance from (8, 4, 4) to (0, 0, 0) and (b) the distance from (8, 4, 4) to the z-axis.