(1) Find $\mathbf{a}+\mathbf{b}$, $4\mathbf{a}+2\mathbf{b}$, $|\mathbf{a}|$, and $|\mathbf{a}-\mathbf{b}|$.

(i) $\mathbf{a}=\langle -3,4\rangle, \quad \mathbf{b}=\langle 9,-1\rangle$

(ii) $\mathbf{a}=4\mathbf{i}-3\mathbf{j}+2\mathbf{k}, \ \ \mathbf{b}=2\mathbf{i}-4\mathbf{k}$

(2) Find a unit vector that has the same direction as the given vector.

$$6\mathbf{i}+2\mathbf{j}-3\mathbf{k}$$

(3) Find a vector of length 2 whose direction is the opposite of the direction of the vector $\langle -5, 3, -1 \rangle$.

(4) Are the vectors $\mathbf{v} = \langle -3, 1, 2 \rangle$ and $\mathbf{w} = \langle -2, 0, 1 \rangle$ parallel? Justify your answer.

(5) If $\mathbf{v}$ lies in the first quadrant and makes an angle $\pi/3$ with the positive x-axis and $|\mathbf{v}| = 4$, find $\mathbf{v}$ in component form.

(6) A 100-lb weight hangs from two wires as shown in the following figure. Find the tensions (forces) **T1** and **T2** in both wires and the magnitudes of the tensions.