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

$$4\mathbf{a} + 5\mathbf{b} = 4\,(3\,\mathbf{i} + \mathbf{j}) + 5\,(\mathbf{i} - 3\,\mathbf{j}) = 12\,\mathbf{i} + 4\,\mathbf{j} + 5\,\mathbf{i} - 15\,\mathbf{j} = 17\,\mathbf{i} - 11\mathbf{j}$$

$$|\mathbf{a}| = \sqrt{3^2 + 1^2} = \sqrt{10}$$

$$|\mathbf{a} - \mathbf{b}| = |(3\,\mathbf{i} + \mathbf{j}) - (\mathbf{i} - 3\,\mathbf{j})| = |2\,\mathbf{i} + 4\,\mathbf{j}| = \sqrt{2^2 + 4^2} = 2\sqrt{5}$$