Exercise 9

Let $\mathbf{v} = 2\mathbf{i} + \mathbf{j}$ and $\mathbf{w} = \mathbf{i} + 2\mathbf{j}$. Sketch $\mathbf{v}$, $\mathbf{w}$, $\mathbf{v} + \mathbf{w}$, $2\mathbf{w}$, and $\mathbf{v} - \mathbf{w}$ in the plane.

Solution

These are the same vectors from Exercise 5.

$$\mathbf{v} = (2, 1)$$
$$\mathbf{w} = (1, 2)$$

To add two vectors geometrically, form the parallelogram they make and draw the bisecting diagonal. Multiplying a vector by a number changes its length by the same factor.