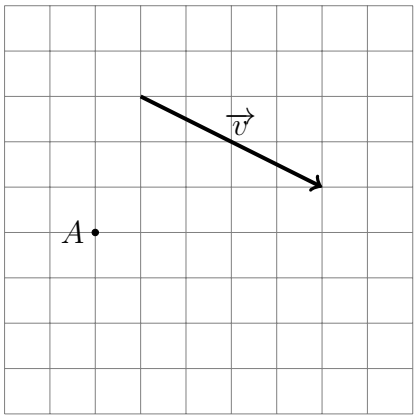
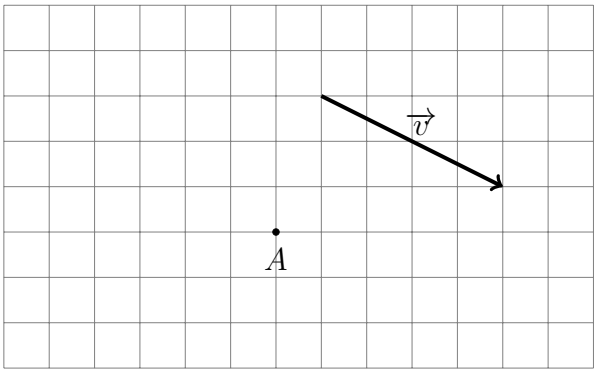
# Vector Geometry Lesson 3

## Back to vector algebra

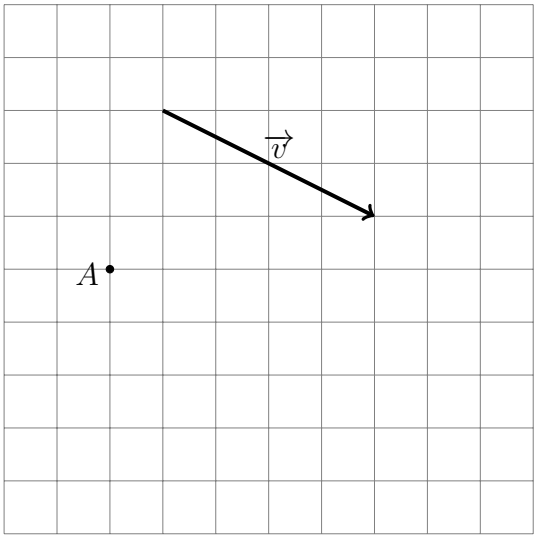
**Problem 1** *For the given vector $\overrightarrow{v}$ and point $A$, construct the vector $\overrightarrow{w} = \overrightarrow{v}$ having $A$ as its initial point on the graph paper below. Use the grid instead of a compass and ruler.*



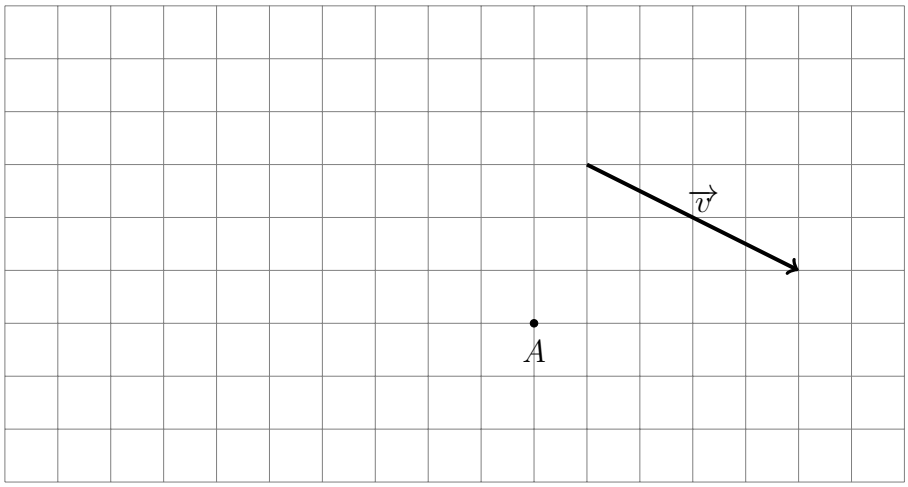

**Problem 2** *For the given vector $\overrightarrow{v}$ and point $A$, construct the vector $\overrightarrow{w} = -\overrightarrow{v}$ having $A$ as its initial point on the graph paper below.*



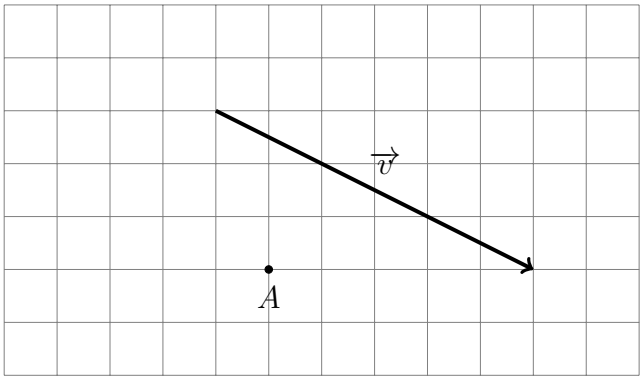
**Problem 3** *For the given vector $\overrightarrow{v}$ and point $A$, construct the vector $\overrightarrow{w} = 1.5\overrightarrow{v}$ having $A$ as its initial point on the graph paper below.*



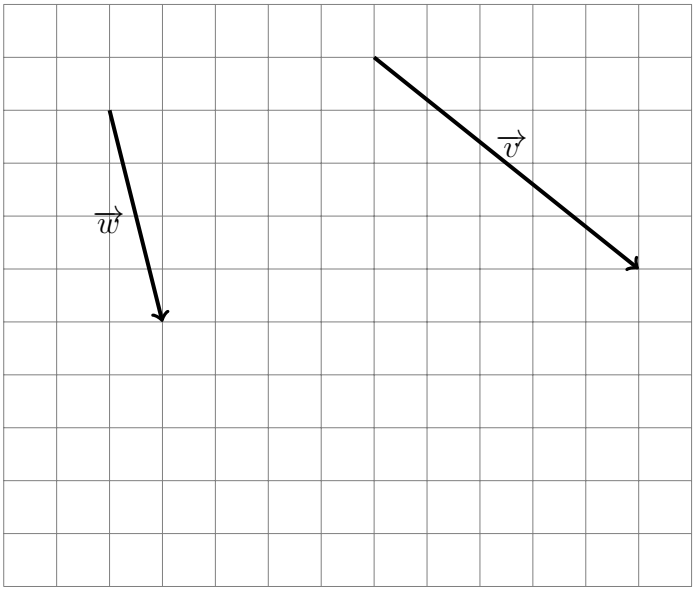

**Problem 4** *For the given vector $\overrightarrow{v}$ and point $A$, construct the vector $\overrightarrow{w} = -2\overrightarrow{v}$ having $A$ as its initial point on the graph paper below.*



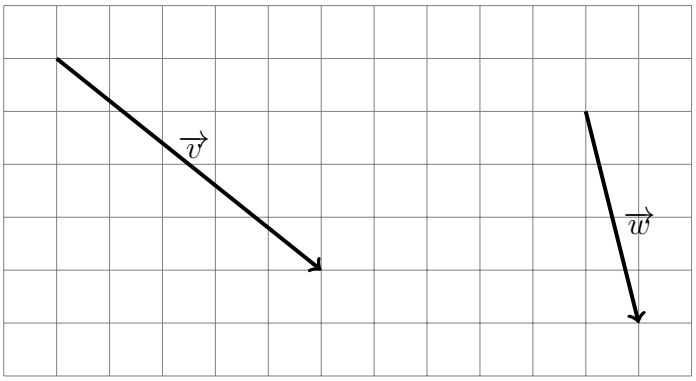
**Problem 5** *For the given vector $\overrightarrow{v}$ and point $A$, construct the vector $\overrightarrow{w} = -\frac{1}{3}\overrightarrow{v}$ having $A$ as its initial point on the graph paper below.*



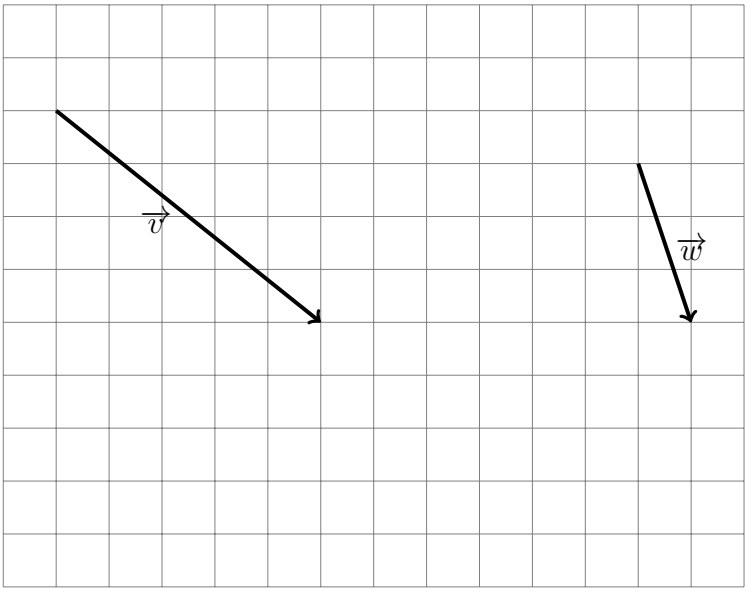

**Problem 6** *For the given vectors $\overrightarrow{v}$ and $\overrightarrow{w}$, construct the vector $\overrightarrow{w} + \overrightarrow{v}$ on the graph paper below.*



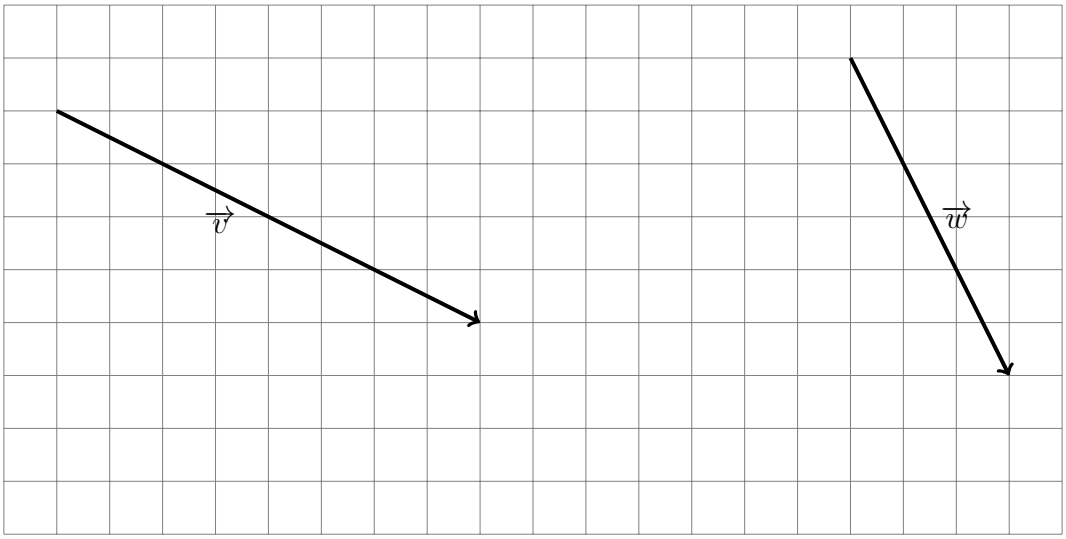
**Problem 7** *For the given vectors $\overrightarrow{v}$ and $\overrightarrow{w}$, construct the vector $\overrightarrow{w} - \overrightarrow{v}$ on the graph paper below.*



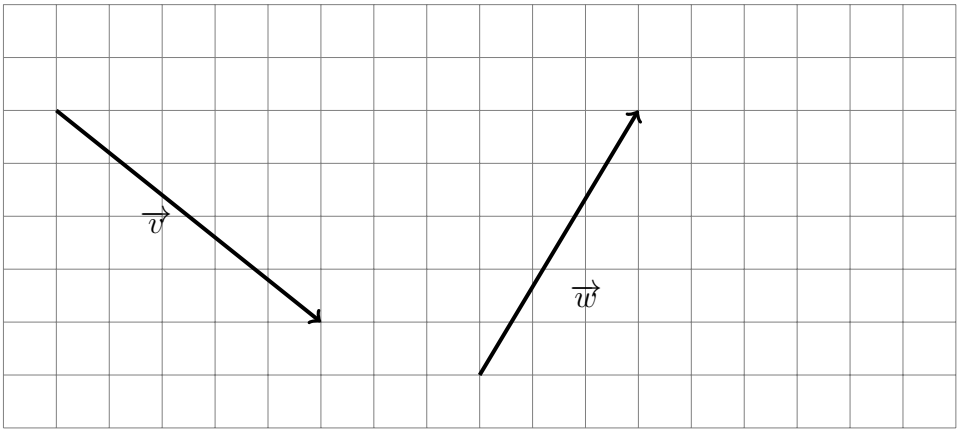

**Problem 8** *For the given vectors $\overrightarrow{v}$ and $\overrightarrow{w}$, construct the vector $2\overrightarrow{v} - 3\overrightarrow{w}$ on the graph paper below.*



**Problem 9** *For the given vectors $\overrightarrow{v}$ and $\overrightarrow{w}$, construct the vector $1.75\overrightarrow{v} - \frac{2}{3}\overrightarrow{w}$ on the graph paper below.*




**Problem 10** *For the given vectors $\overrightarrow{v}$ and $\overrightarrow{w}$, construct the vector $\overrightarrow{v} + \overrightarrow{w}$ originating at the same point as the vector $\overrightarrow{v}$ and the vector $\overrightarrow{w} + \overrightarrow{v}$ originating at the same point as the vector $\overrightarrow{w}$. Is $\overrightarrow{v} + \overrightarrow{w} = \overrightarrow{w} + \overrightarrow{v}$? Why or why not?*



**Problem 11** *A man is crossing a river in a boat. The speed of the boat is 5 meters per second. The speed of the water in the river is 3 meter per second. In what direction should the man steer the boat, if he wants the vessel to move perpendicular to the banks? To answer this question, please use a compass and a ruler to construct the velocity vector. Hint: use the Pythagorean theorem.*

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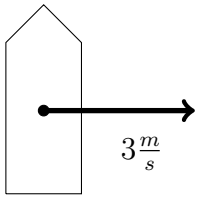


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*The width of the river is* 8 *meters. How long would it take the man to cross the river?*