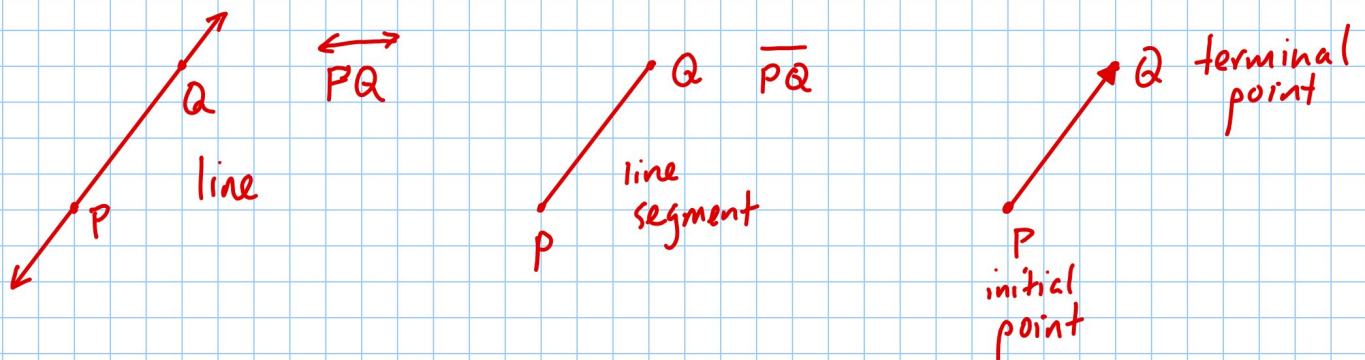


Section 8.4 Vectors

A vector is a quantity that has both direction and magnitude. An arrow indicates direction and the magnitude is the length.

We represent vectors with directed line segments.



Two vectors are equal if they have the same direction and magnitude.

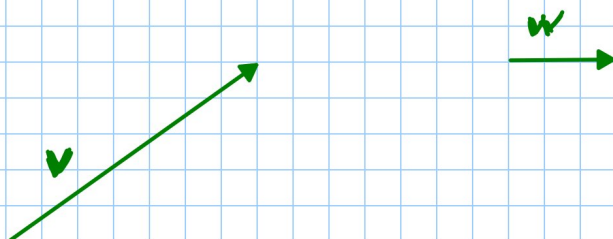
Vector \overrightarrow{CP} = vector \overrightarrow{LM}

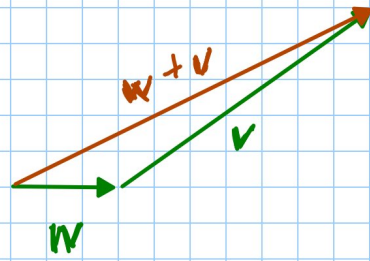
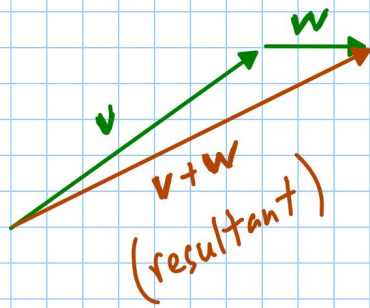


We use bold letters to indicate a vector.

So if $\mathbf{v} = \overrightarrow{CP}$ and $\mathbf{w} = \overrightarrow{LM}$ then $\mathbf{v} = \mathbf{w}$

Adding vectors

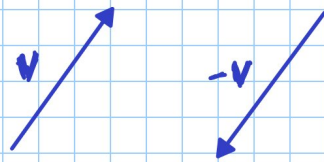




Commutative: $v + w = w + v$

Associative: $(u + v) + w = u + (v + w)$

$-v$ has the same magnitude as v but has opposite direction

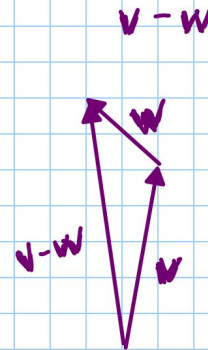


$$v + (-v) = \mathbf{0}$$

↑
zero vector

which is a vector with no magnitude

So $v - w = v + (-w)$



If α is a scalar (a real number), the scalar product

$\alpha \mathbf{v}$ is:

- 1) If $\alpha > 0$, $\alpha \mathbf{v}$ is in the same direction as \mathbf{v} with a magnitude α times that of \mathbf{v} .
- 2) If $\alpha < 0$, $\alpha \mathbf{v}$ is in the opposite direction as \mathbf{v} with a magnitude $|\alpha|$ times that of \mathbf{v} .
- 3) If $\alpha = 0$, then $\alpha \mathbf{v} = \mathbf{0}$

p628 1-7 odd, 9-16 all