

MEI How to Guides for GeoGebra

Mechanics: Creating a position/velocity diagram in 2D in GeoGebra

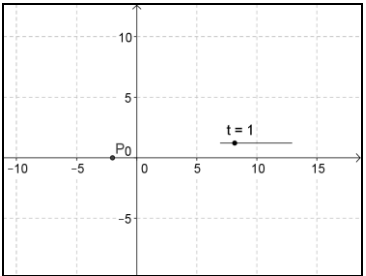
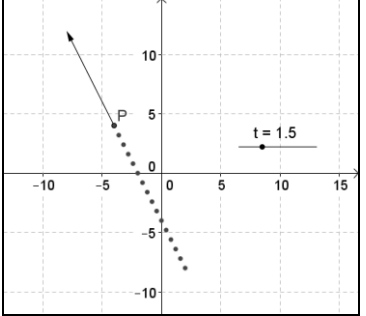
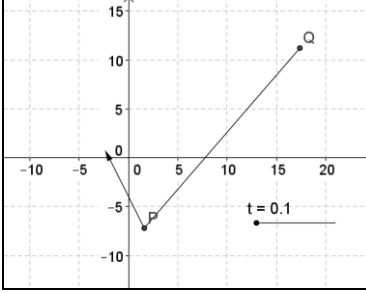
Problem:

A boat P has position vector $(2\mathbf{i}-8\mathbf{j})$ km when $t = 0$ and is moving with constant velocity $(-4\mathbf{i}+8\mathbf{j})$ km h⁻¹.

- (i) At time t hours the position vector \mathbf{p} . Write down \mathbf{p} in terms of t . Calculate the speed of P.

A second boat Q has position vector $\mathbf{q} = 18\mathbf{i} + 12\mathbf{j} - t(6\mathbf{i} + 8\mathbf{j})$.

- (ii) Find the value of t when P is due west of Q and the distance between P and Q when P is due west of Q.

<p>Adding a slider for the time and displaying the particle</p> <p>1 Add a slider for the time (10th menu). Set the name to t and set the min to 0.</p> <p>2 Using the input bar enter: $\mathbf{P}=(2-4t,-8+8t)$.</p>	
<p>Creating the velocity vector (from the origin) and translating it to the particle</p> <p>3 Using the input bar enter: $\mathbf{v}=(-4,8)$</p> <p>4 Select "Vector from Point" (3rd menu) then select P and \mathbf{v}.</p> <p>5 Hide the vector \mathbf{v} (at the origin) and the point P'.</p> <p>6 Right-click on P and select Trace On</p> <p>7 Using the input bar enter: $\text{Speed}=\text{Length}[\mathbf{v}]$</p>	
<p>Displaying the second particle and finding the distance</p> <p>9 Using the input bar enter: $\mathbf{Q}=(18-6t,12-8t)$</p> <p>10 Use Segment between Two Points to create the line segment PQ.</p>	

View on GeoGebraTube: <https://tube.geogebra.org/material/show/id/218291>