Physics Grade 11

Experiment 1

Finding the Components of a Vector

Time for activity 40-60 minutes

Resources

The Virtual Lab https://phet.colorado.edu/sims/html/vector-addition/latest/vector-addition_en.html

Paper. Pencil, Calculator

Software Requirements

The new HTML5 sims can run on iPads and Chromebooks, as well as PC, Mac, and Linux systems.

iPad:
iOS 11+ Safari
iPad compatible sims

Android:
Not officially supported. If you are using the HTML5 sims on Android, we recommend using the latest version of Google Chrome.

Chromebook:
Latest version of Google Chrome
The HTML5 and Flash PhET sims are supported on all Chromebooks.
Chromebook compatible sims

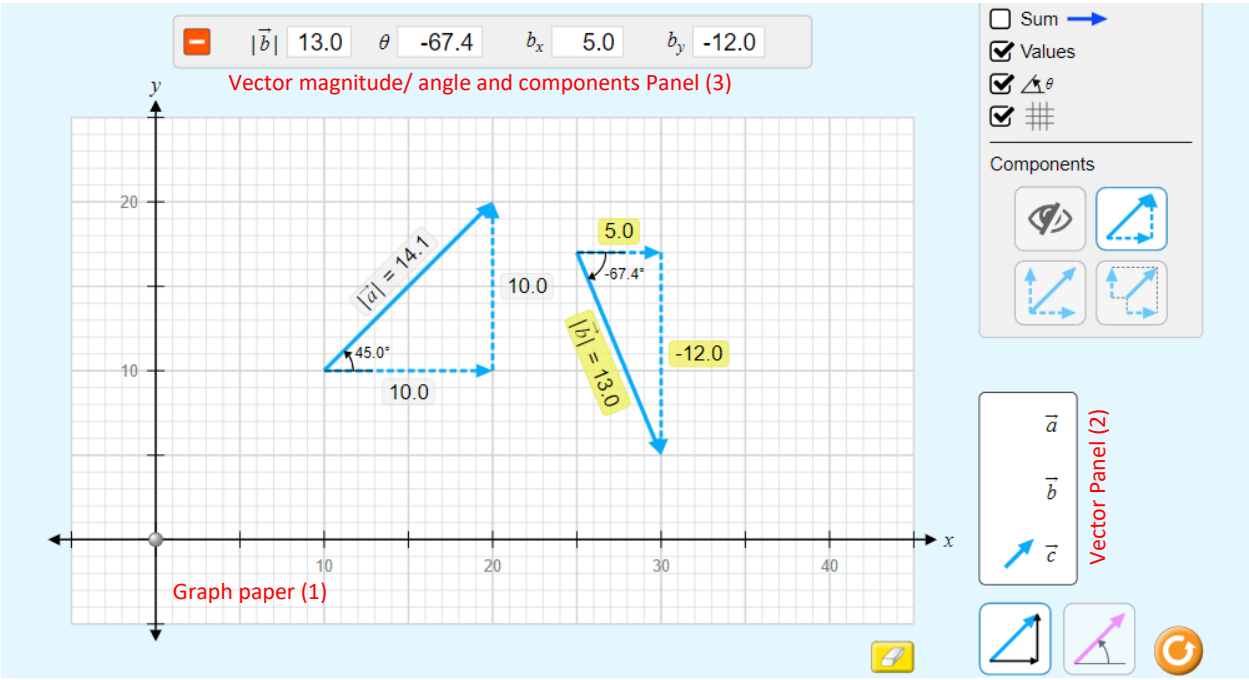
Windows Systems:
Microsoft Edge and Internet Explorer 11, latest version of Firefox, latest version of Google Chrome.

Macintosh Systems:
macOS 10.9.5+, Safari 9+, latest version of Chrome.

Linux Systems:
Not officially supported. Please contact phethelp@colorado.edu with troubleshooting issues.

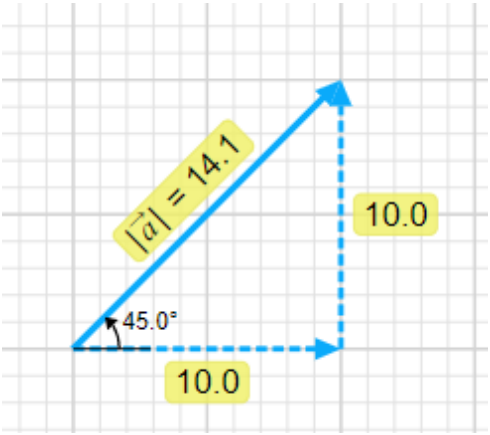
The Lab Environment

Spend a few minutes to understand/ explore the functionalities of the different tabs/panels.



Finding the Components of a Vector

1. Drag a vector $\vec{a}$ from vector panel (2) to graph paper (1). And adjust its suitable length and the orientation. Note down the magnitude and the angle θ it makes with the x-axis and record the observations in the column 3 and column 4 of the Table 1 (below).
2. Find the x-component of the vector $\vec{a}$ by suing the formula $\vec{a}_x = a\cos\theta$ and record the result in the column 5 of Table 1.
3. Find the y-component of the vector $\vec{a}$ by using the formula $\vec{a}_y = a\sin\theta$ and record the result in the column 6 of Table 1.
4. Now note down the x and y-components of the vector $\vec{a}$ from the panel (3) and record the observations in the columns 7 and 8 respectively.
5. Repeat the experiment (steps 1 – 4) five times by taking different vectors and record the calculations and the observations in the Table 1.
6. A sample calculation has been done for you.



Verification

The value of the x-component recorded in the column 5 must be same as the value of the observed x-component recorded in the column 6.

The value of the y-component recorded in the column 7 must be same as the value of the observed y-component recorded in the column 8.

Physics Grade 11

Experiment 1

Finding the Components of a Vector

Student's Name_____

Observations and calculations

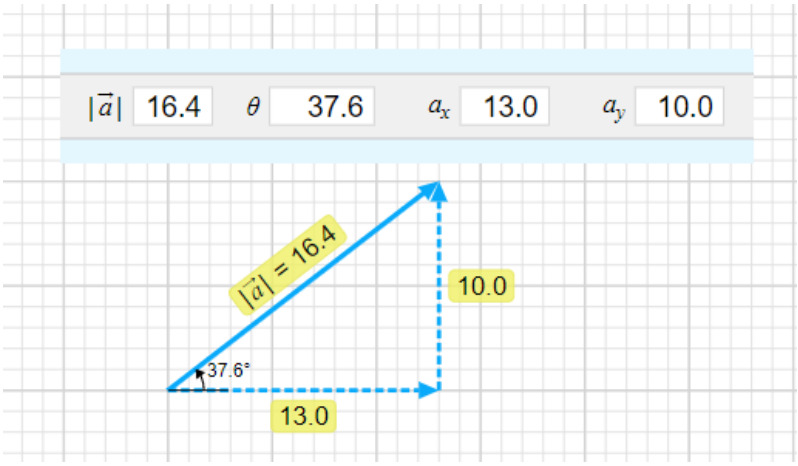


Table 1: Components of a Vector

No. of Obs	Vector	Magnitude	Angle	x-component		y-component	
		$\lvert\vec{a}\rvert$	θ^o	Calculated $a_x = a\cos\theta$	From Panel (3) $\vec{a}_x$	Calculated $a_y = a\sin\theta$	From Panel (3) $\vec{a}_y$
1	$\vec{a}$	16.4	37.6	$16.4\cos 37.6 \approx 12.99$	13	$16.4\sin 37.6 \approx 10.006$	10
2							
3							
4							
5							
6							