Partnered with: KAPLAN

PHYSICS 1 (1111/1211/1251)

Exam Review

Topics Covered: **Chapter 3 – Vectors**

Having Trouble? Come to our weekly workshops and get ahead! Workshops are $20 each and last 1-2 hours. All the workshops are recorded and available for viewing on demand during our normal business hours.

Need Help All Semester? Register for the Semester Plan which includes all workshops, exam reviews, final exam lab review and office hours. The Semester Plan price is only $200 for the whole semester.

ScienceGuyz Hours of Operation: Mon-Thurs 1:30-8:30PM, Fri 1:30-5:30PM, Sun as scheduled

Tutor Contact Info: Kellie.Sappington@scienceguyz.com

Tutor Office Hours: See Master Calendar at ScienceGuyz.com

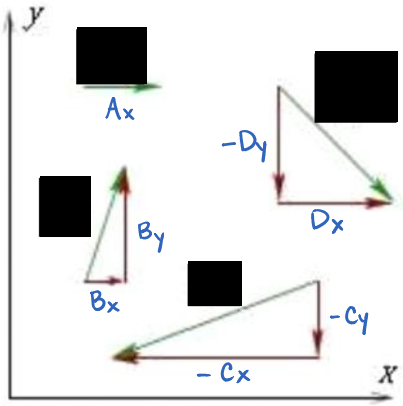
Classes Tutored by Science Guyz

- Intro Biochemistry - BCMB3100
- General Chemistry 1 & 2 - CHEM1211/CHEM1212
- Organic Chemistry 1 & 2 - CHEM2211/CHEM2212
- Legal Studies - LEGL2700
- Calculus 1 - MATH2200/MATH2250
- Physics 1 - PHYS1111/PHYS1211/PHYS1251
- Physics 2 - PHYS1112/PHYS1212/PHYS1252

Chapter 3 – Vectors in Physics

[redacted]

[redacted]



$\vec{A} = A_x\,\hat{x} + 0\,\hat{y}$

$\vec{B} = B_x\,\hat{x} + B_y\,\hat{y}$

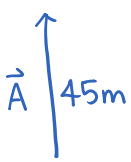
$\vec{C} = -C_x\,\hat{x} - C_y\,\hat{y}$

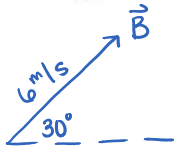
$\vec{D} = D_x\,\hat{x} - D_y\,\hat{y}$

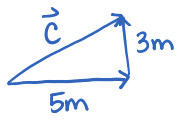
[redacted]

Example: [redacted]

[redacted]







$C = \sqrt{5^2 + 3^2}$

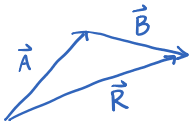
Adding Vectors

[redacted]

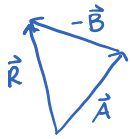
[redacted] tail to tip [redacted]

[redacted] resultant

Example: [redacted]



$\vec{A} + \vec{B} = \vec{R}$



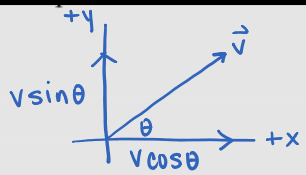
$\vec{A} - \vec{B} = \vec{R}$

$\vec{A} - \vec{B} =$
$\vec{A} + (-\vec{B})$

[redacted]

Scalars
** Use magnitudes only!!

[redacted]



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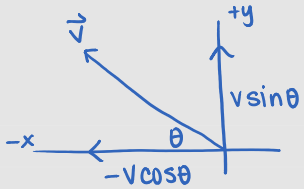


[redacted]

Example: [redacted]

[redacted]

$\vec{A} = 0\hat{x} + 45\hat{y}$

[redacted]

$\vec{B} = 6\cos 30^\circ \hat{x} + 6\sin 30^\circ \hat{y}$

$= 5.2\hat{x} + 3\hat{y}$

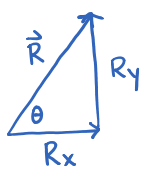
[redacted]

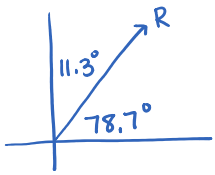
$R_x = A_x + B_x + C_x = 0 + 5.2 + 5 = 10.2\,m$

$R_y = A_y + B_y + C_y = 45 + 3 + 3 = 51\,m$

$R = \sqrt{R_x^2 + R_y^2} = \sqrt{10.2^2 + 51^2} = \boxed{52\,m}$

$\theta = \tan^{-1}\left(\frac{R_y}{R_x}\right) = \tan^{-1}\left(\frac{51}{10.2}\right) = \boxed{78.7^\circ}$





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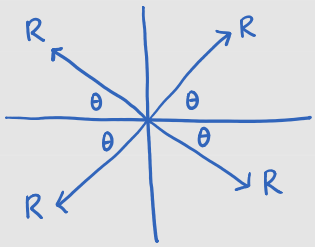


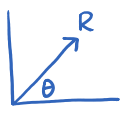
[redacted]

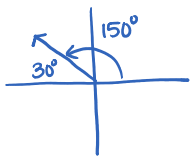
Example: [redacted]

$2\vec{A} = 2(3m\hat{x} + 4m\hat{y}) = 6m\hat{x} + 8m\hat{y}$

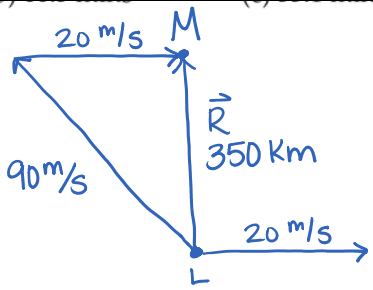
$\sqrt{6^2 + 8^2} = 10 = 2(5)$

$\theta = \tan^{-1}\left(\frac{8}{6}\right) = 55.1^\circ$





1. Manchester is 35 [redacted]



$20^2 + R^2 = 90^2$

$R = \sqrt{90^2 - 20^2}$

$= 87.7 \text{ m/s}$

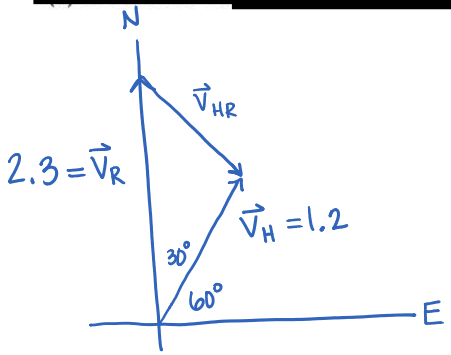
speed rel to ground

Constant Speed ($a = 0$)

$\text{speed} = \frac{\text{dist}}{\text{time}} \Rightarrow \text{time} = \frac{\text{dist}}{\text{speed}} = \frac{350 \times 10^3 \text{ m}}{87.7 \text{ m/s}} = 3988.6 \text{ s}$

$3988.6 \text{ s} \cdot \frac{1 \text{ min}}{60 \text{ s}} = \boxed{66.5 \text{ min}} \cdot \frac{1 \text{ hr}}{60 \text{ min}} = \boxed{1.11 \text{ hr}}$

2. Helen and Rick [redacted]



$\vec{R} = 2.30\ m/s$ at 90°
$\vec{H} = 1.20\ m/s$ at 60°

$\vec{V}_R + \vec{V}_{HR} = \vec{V}_H$
$\vec{V}_{HR} = \vec{V}_H - \vec{V}_R$

x-component:
$1.2 \cos 60° - 0 = 0.6\ m/s$

y-component:
$1.2 \sin 60° - 2.3 = -1.26\ m/s$

$V_{HR} = \sqrt{0.6^2 + 1.26^2}$
$= \boxed{1.40\ m/s}$

speed $= \frac{\text{distance}}{\text{time}}$ $\Rightarrow$ speed (time) = distance
$(1.40\ m/s)(49\ s) = \boxed{68.6\ m}$

[redacted]

$\vec{V}_{12}$ = "velocity of 1 w/respect to 2"