Name: _____ Phys 12

2.1 Describing Vectors: Horizontal and Vertical Components

Review: What's the difference between a vector and a scalar?

magnitude + direction — magnitude

Most of grade 11 we've dealt with motion in 1D. In grade 12, we will be analyzing motion in 2D. Before looking at breaking down 2D vectors, let's take a look at how we name them.

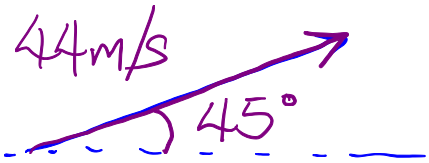
The name of your vector begins with the magnitude then direction.

Remember, vectors can point North, South, East, West AND up/down. Think of yourself playing a 3D video game.

When describing up/down vectors, the language looks like:

_____ at _____ _____ the horizontal.
(magnitude) (angle) (above/below)

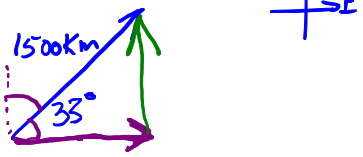
Ex. 1. 44m/s 45° above the horizontal



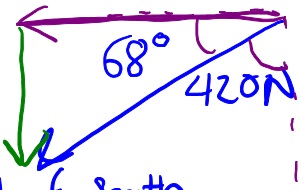
When dealing with North, South, East, and West, the language becomes more complicated…

_____ at _____ _____ of _____
(magnitude) (angle) (second arrow) (first arrow)

Ex. 2. 1500km 33° North of East



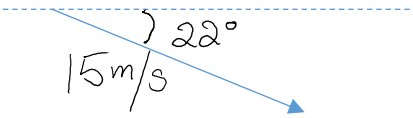
Ex. 3. 420N 68° South of West



Name the following vectors:

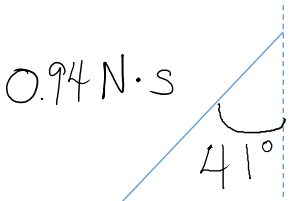
Ex. 4.

22° West of South



15m/s at 22° South of East

Ex. 5.



0.94 N·s @ 41° West of South.

Inquiry Question: Is there another way of describing the vectors you used above? How? Why does it work?

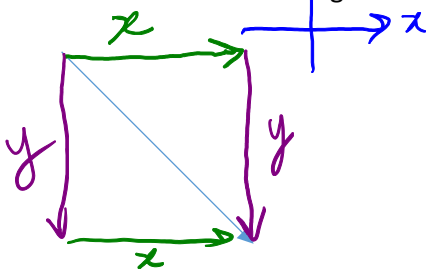
Ex. 3

Name: _____ Phys 12

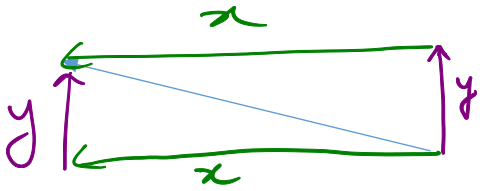
With 2D motion, we need to deal with 2 axes, namely the **horizontal** and the **vertical** axis. It is difficult to analyze motion in 2D in a linear fashion, so we need to break our 2D motion into **2 components**, the **horizontal (x)** and the **vertical (y)** direction.

Ex. 6. Break each of the following vectors into their horizontal and the vertical components.

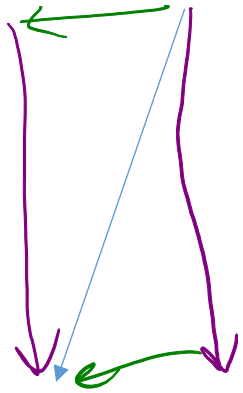
a)



b)



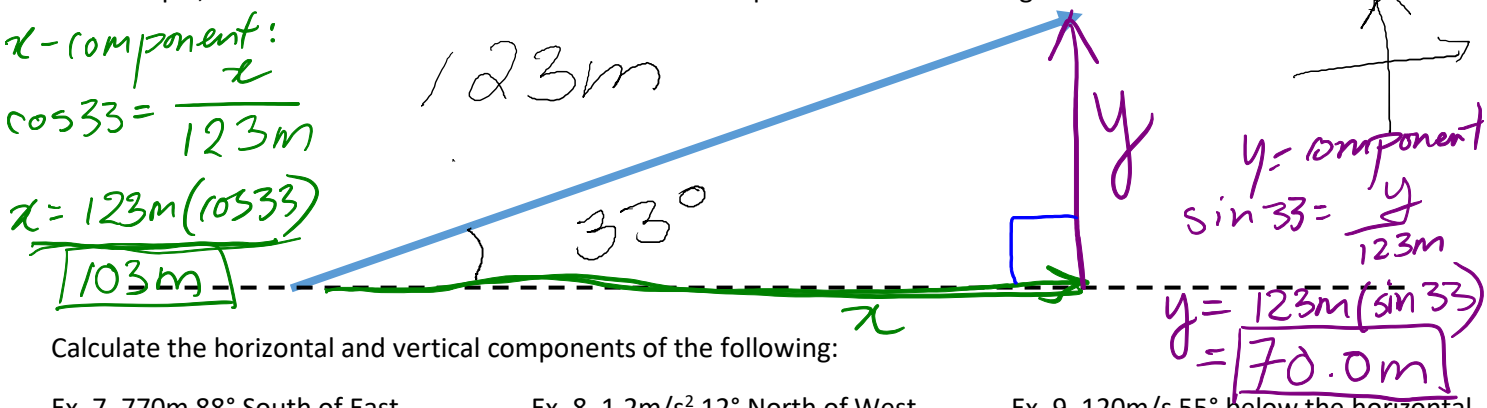
c)



How do we calculate each component quantitatively?

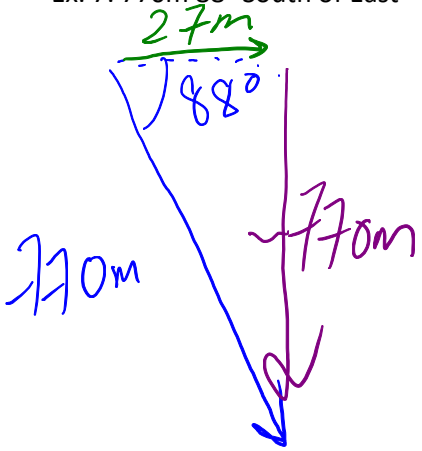
We will use sin and cos to calculate the components.

For example, let's calculate the horizontal and vertical component of the following:

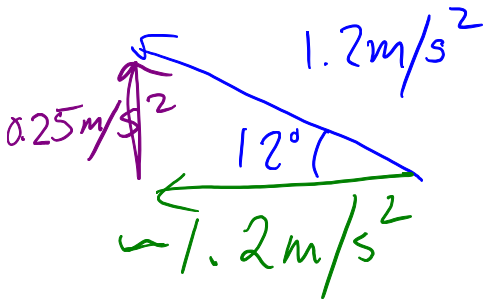


Calculate the horizontal and vertical components of the following:

Ex. 7. 770m 88° South of East



Ex. 8. 1.2m/s^2 12° North of West



Ex. 9. 120m/s 55° below the horizontal