

Physics 122 – Class #1 – Outline

- **Announcements**
- Expectations/How to succeed
- Vectors
- Concept Map of Course
- Mastering Physics
- Handout (policies, grading)

Physics 122 – Sections 4, 5, 6
Prof. Richard Sonnenfeld

Recitations: Start this week.

Labs: Start next week.

Online Homework #00
(due Thurs 10:45 am)

Online HW #01 (due Sat 1/17 @23:59)

Prof. Richard Sonnenfeld

(think “Seinfeld”)

Office Hours: After class 12:15-1:00. Or make an appt by e-mail. (or txt me – 575-838-7113)

Texts: Cheap at coursemart.com (electronic only). We will use workbook and Masteringphysics

Clickers: Be prepared to start next Tuesday. 10% of grade.

PLEASE ask questions

- ◆ Ask how I got the next result from the last result
- ◆ Ask how two concepts or equations or units fit together
- ◆ Ask about something unclear in the book
- ◆ Ask about the homework
- ◆ Ask why something is important
- ◆ Tell me I made a mistake
- ◆ Ask something cosmic

**PHYSICS IS
RELEVANT & SELF-CONSISTENT!**

More about Questions

I will not call on you if you do not raise your hand.
(no need to hide)

You will definitely learn more if you ask questions.

There are at least 10 other people that have the same question you have

If you want a reference letter, I will know you if you ask questions.

There is extra credit for questions/corrections.

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Expectations

“Physics was my life”

– It's a 5-unit class ... it can be nearly half your life.

– Expect 10 hours/week of reading/homework **NOT COUNTING**

Lab time

Lecture time

Recitation time

“Getting Organized”

Read course information handout. Bring further questions on Thursday.

Acquire a text.

Log on to Mastering Physics and do the sample problems and the for credit problems.

If you cannot log on, bring a note to class on Thursday explaining what your problem was.

Get a clicker and bring it to class from here on out.

Reading and Active Reading

Reading – Read the book like you would read a novel. Read the words, think about the concepts, vocabulary and flow.

Look at the examples.

Do this before class (Spend 60-90 min.)

Active Reading

Read the words and follow the flow of equations. Write each equation and fill in the missing steps to the next one. Redraw the diagrams.

Work the examples yourself (Follow along with pencil and paper ... don't just read it ... write it ... live it!)
Spend 3-4 hours after class.
THEN do the HW.

If you get behind ...

Do the next reading/HW assignment rather than spending all your time catching up.

Designate some added catchup time for what you missed.

Reading Assignment (next class)

Read “Preface to the Student”

Read Ch 23 through page 670

Actively Read Chapter 3 entirely (You may skip problem 1 that uses the law of cosines. You do not really need the law of cosines).

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Vectors and Scalars

Scalars

Just have magnitude (and sometimes sign)

Vectors

Have magnitude and direction

Vectors and Scalars

Scalars

Just have magnitude

Temperature

Speed

Voltage

Vectors

Have magnitude and direction

Force

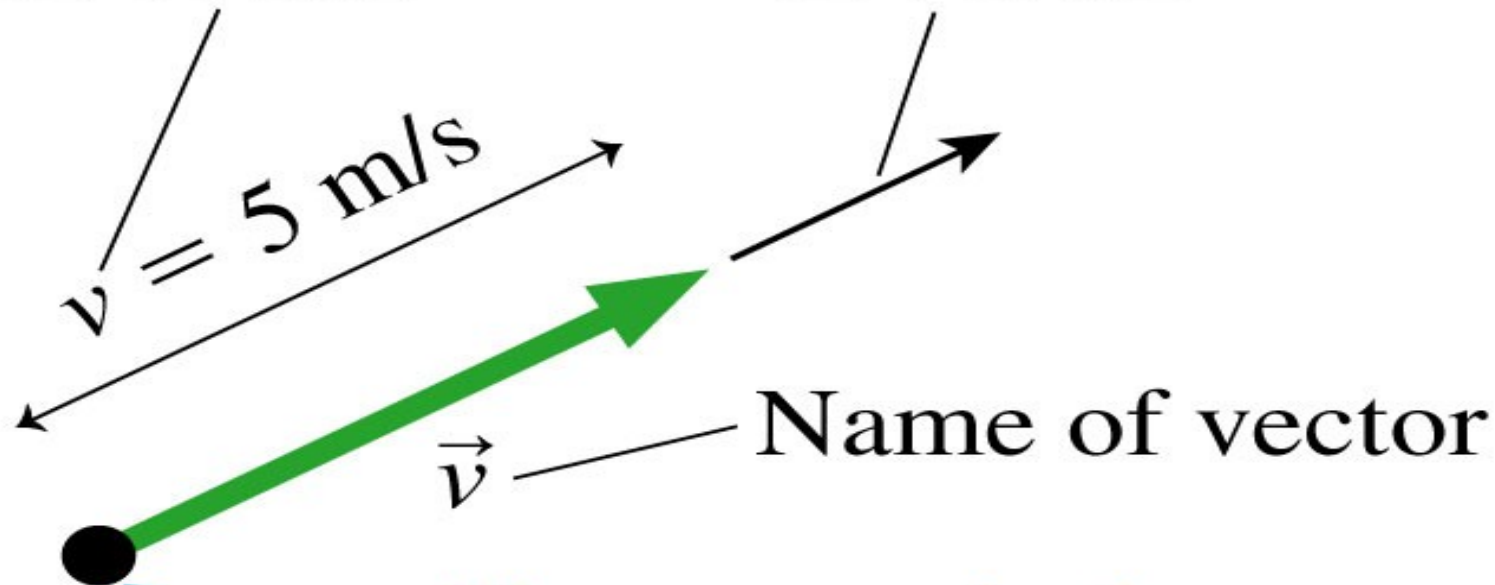
Position

Electric Field

Vectors

Magnitude
of vector

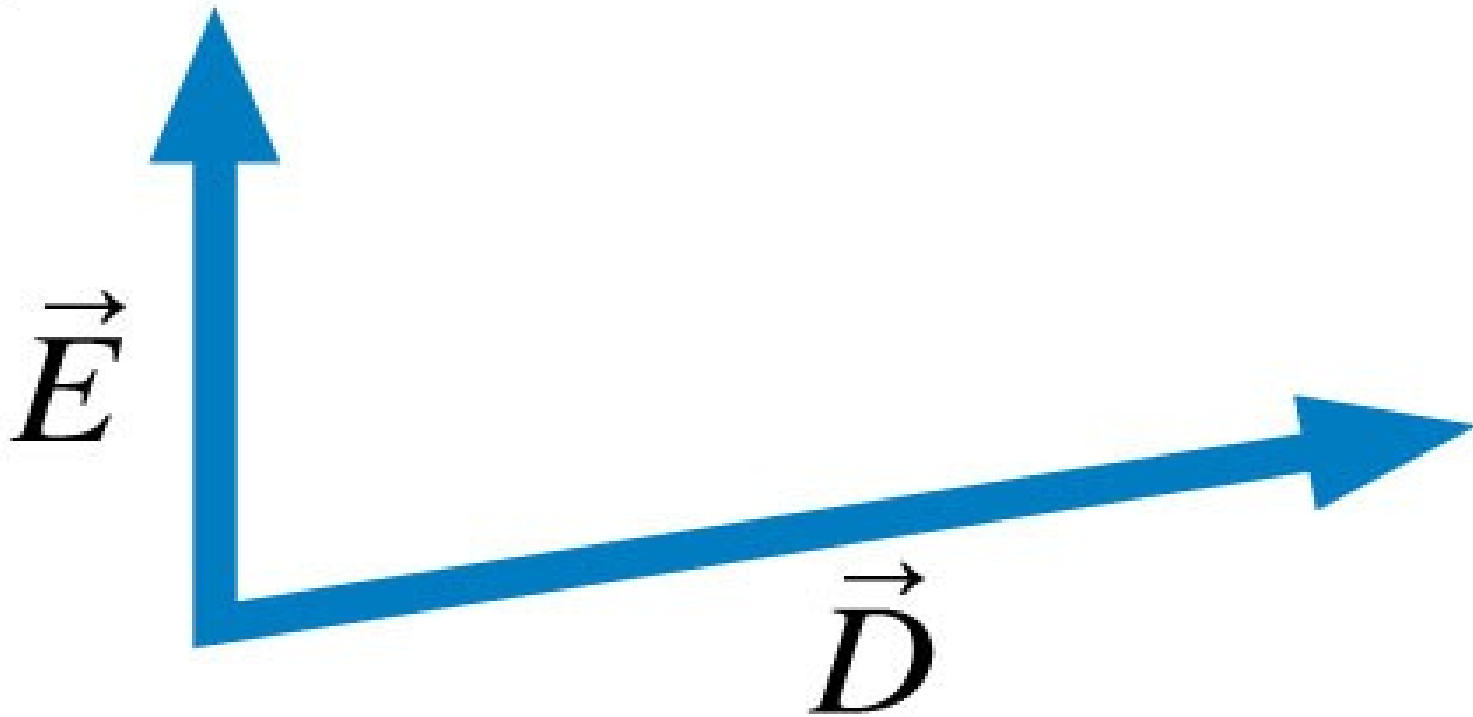
Direction
of vector



The vector is drawn across the page, but it represents the particle's velocity at this one point.

Adding Vectors

(a)



What is $\vec{D} + \vec{E}$?

Parallelogram vs. Tip-to-tail

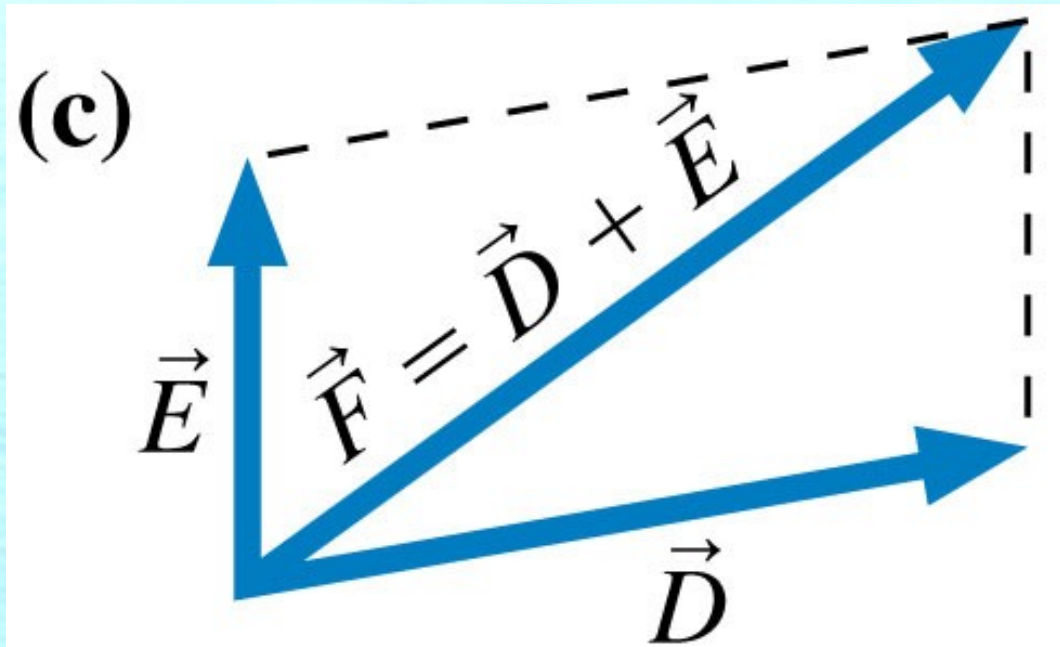
I recommend tip-to-tail

It allows you to add several vectors at once.

It makes it easier to do subtraction.

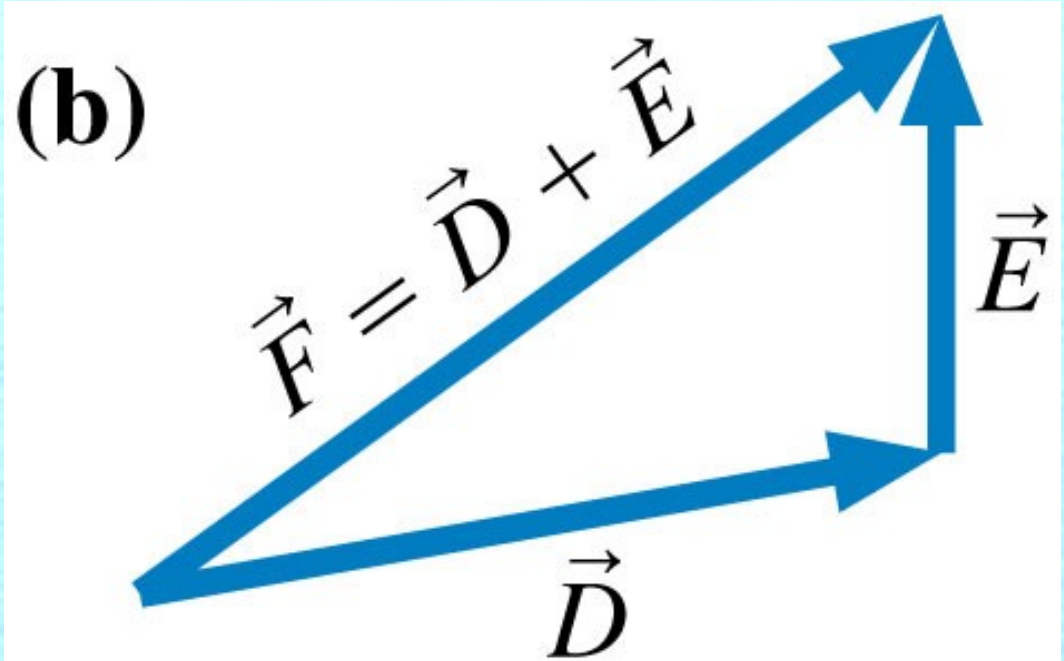
Parallelogram only allows adding two vectors at a time.

Parallelogram



Parallelogram rule:
Find the diagonal of
the parallelogram
formed by \vec{D} and \vec{E} .

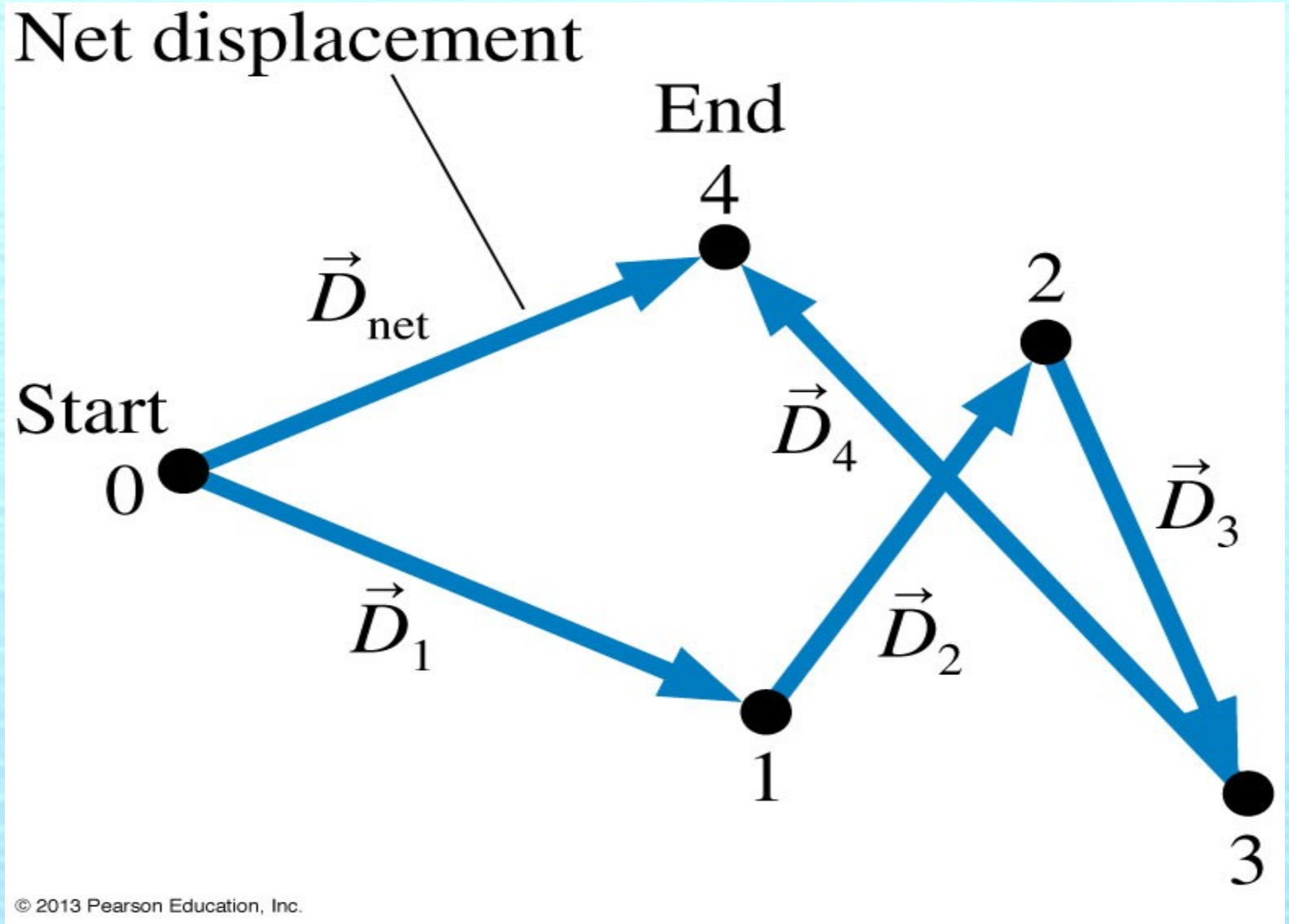
Tip-to-Tail



Tip-to-tail rule:
Slide the tail of \vec{E}
to the tip of \vec{D} .

Tip-to-Tail for Multiple Vectors

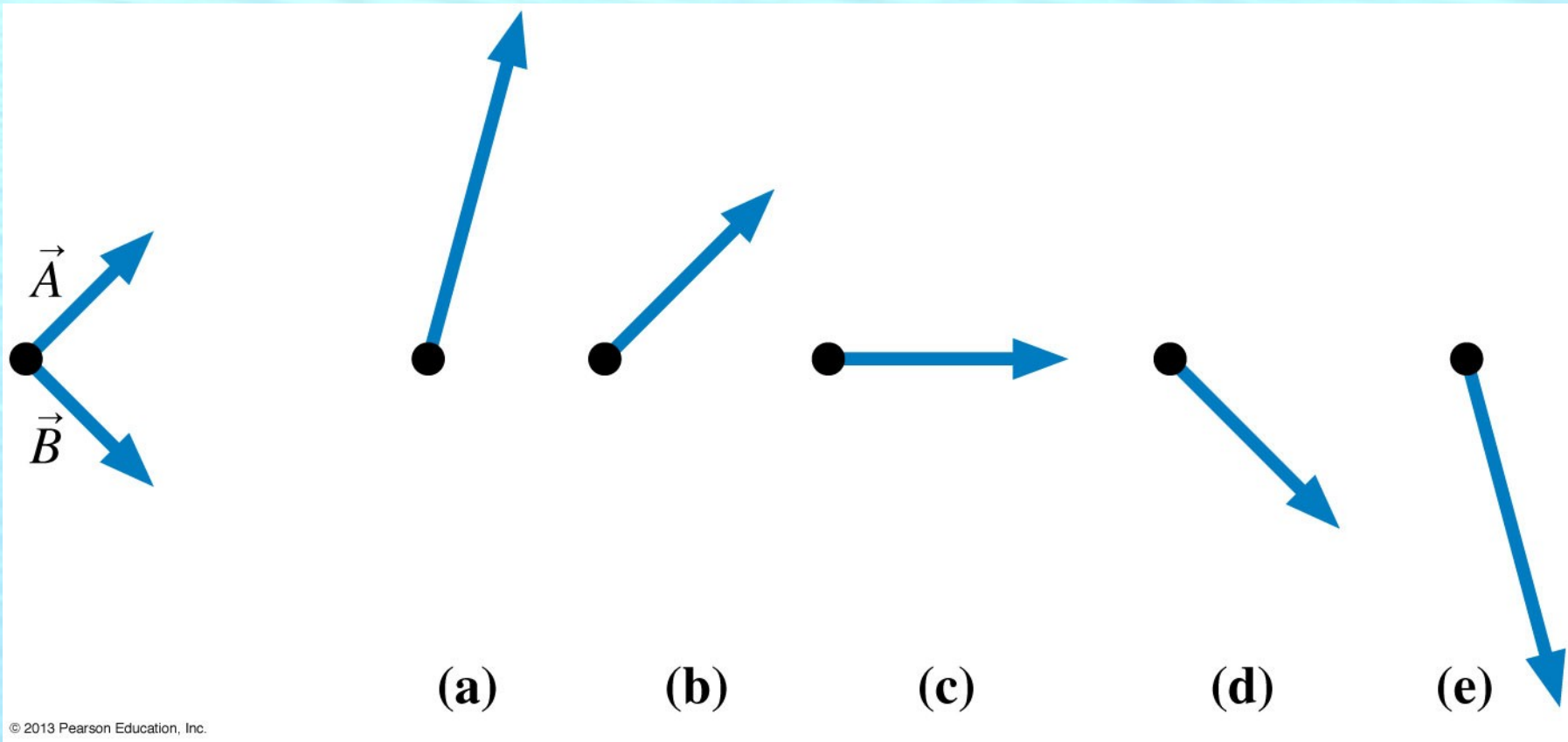
Tip-to-Tail for Multiple Vectors



You do it:

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

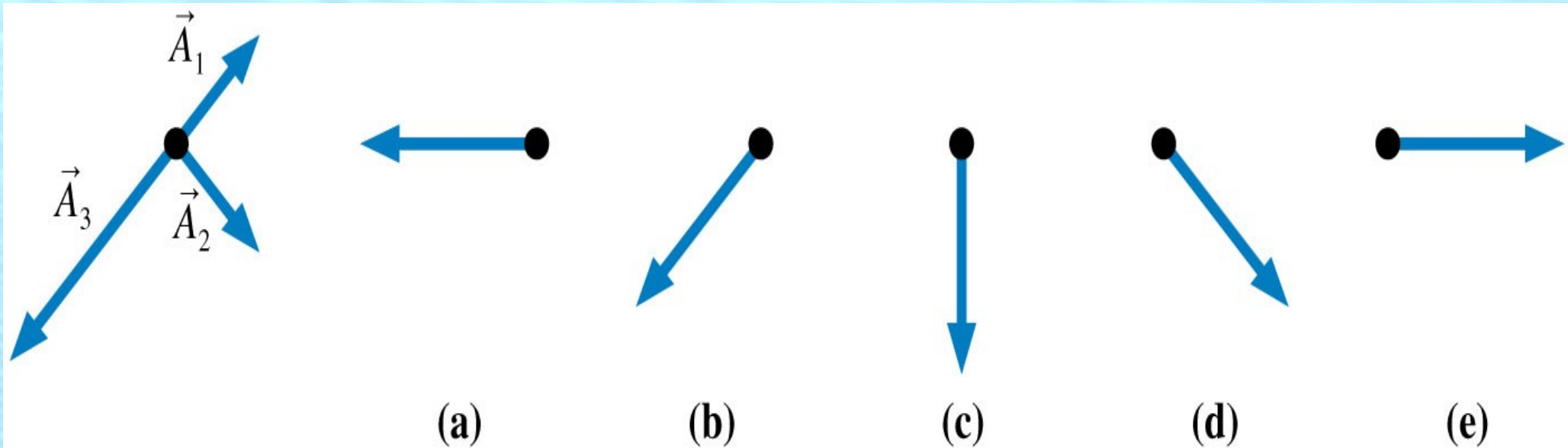
What's \vec{C} ?



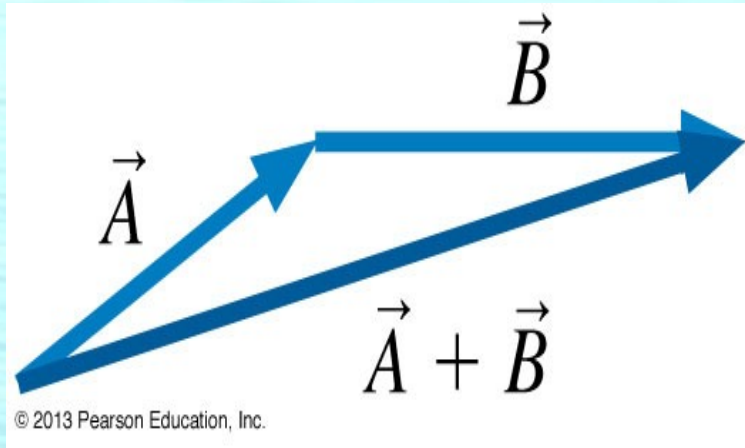
You do it:

$$\vec{R} = \vec{A}_1 + \vec{A}_2 + \vec{A}_3$$

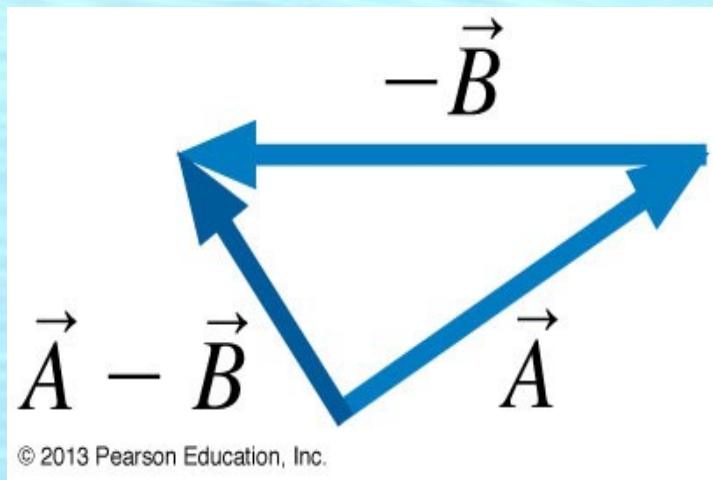
What's \vec{R} ?



Vector Subtraction



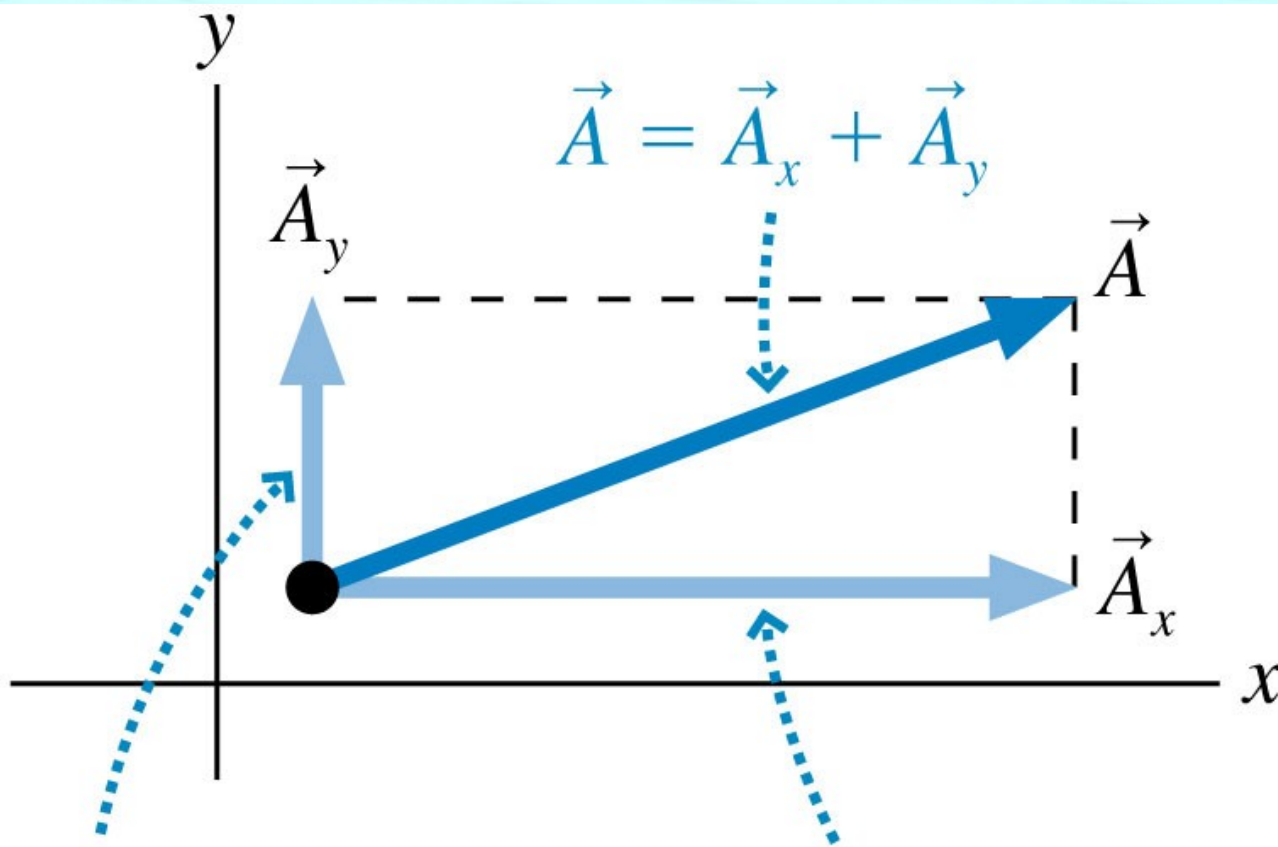
Same as addition, but you reverse the direction of the subtracted vector.



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

What's \vec{C} ?

Vector Components vs. Magnitude and Angle

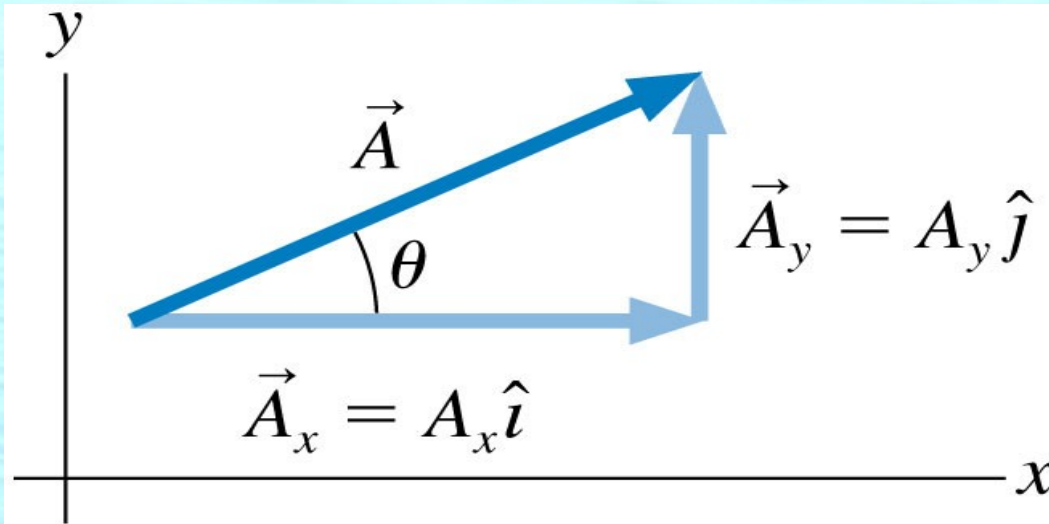


The y-component vector is parallel to the y-axis.

The x-component vector is parallel to the x-axis.

Important to know magnitude and angle, but much easier to calculate with components.

Getting components from Angle and Magnitude



Magnitude is always a positive number.

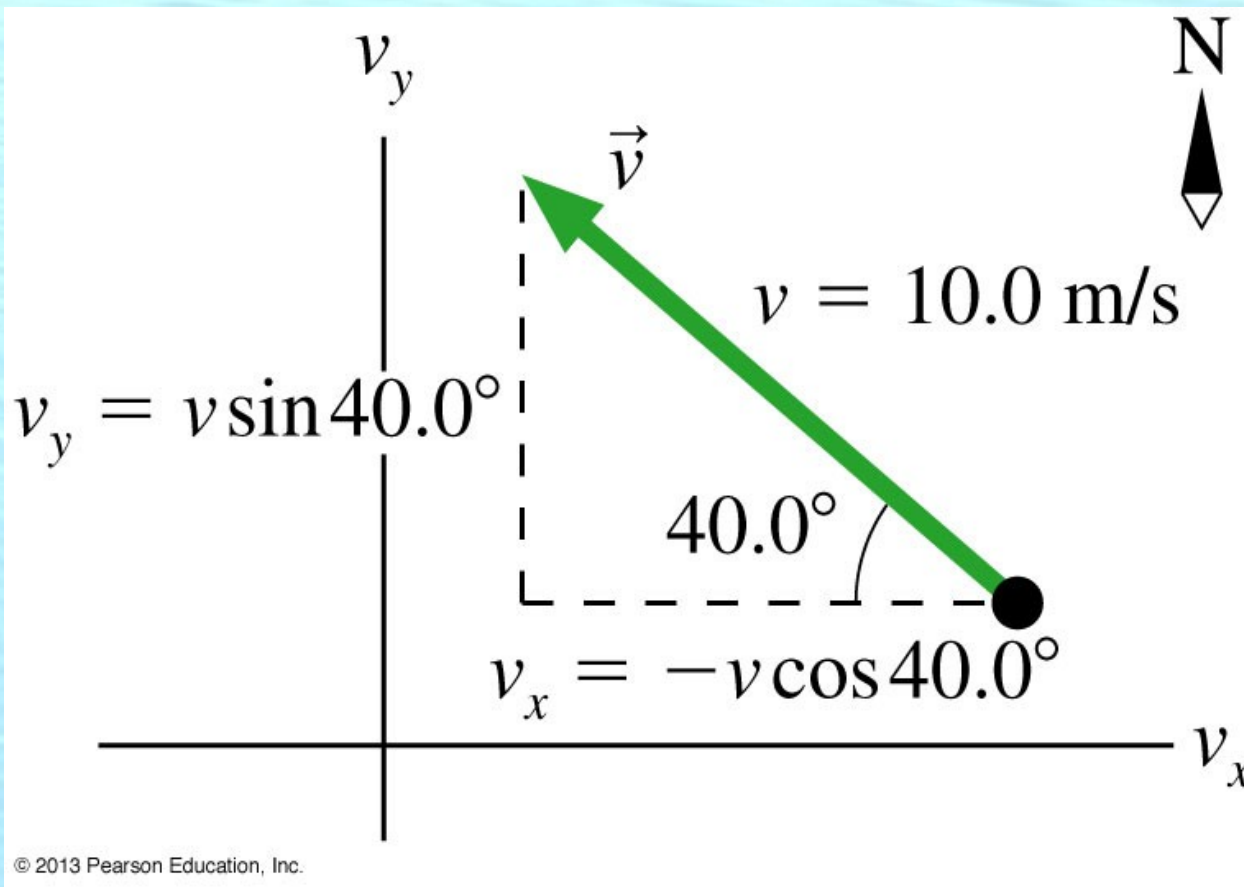
Positive angle is CCW from +x axis.

$A_x < 0$	$A_x > 0$
$A_y > 0$	$A_y > 0$
$A_x < 0$	$A_x > 0$
$A_y < 0$	$A_y < 0$

Getting components from Angle and Magnitude

Magnitude is always a positive number.

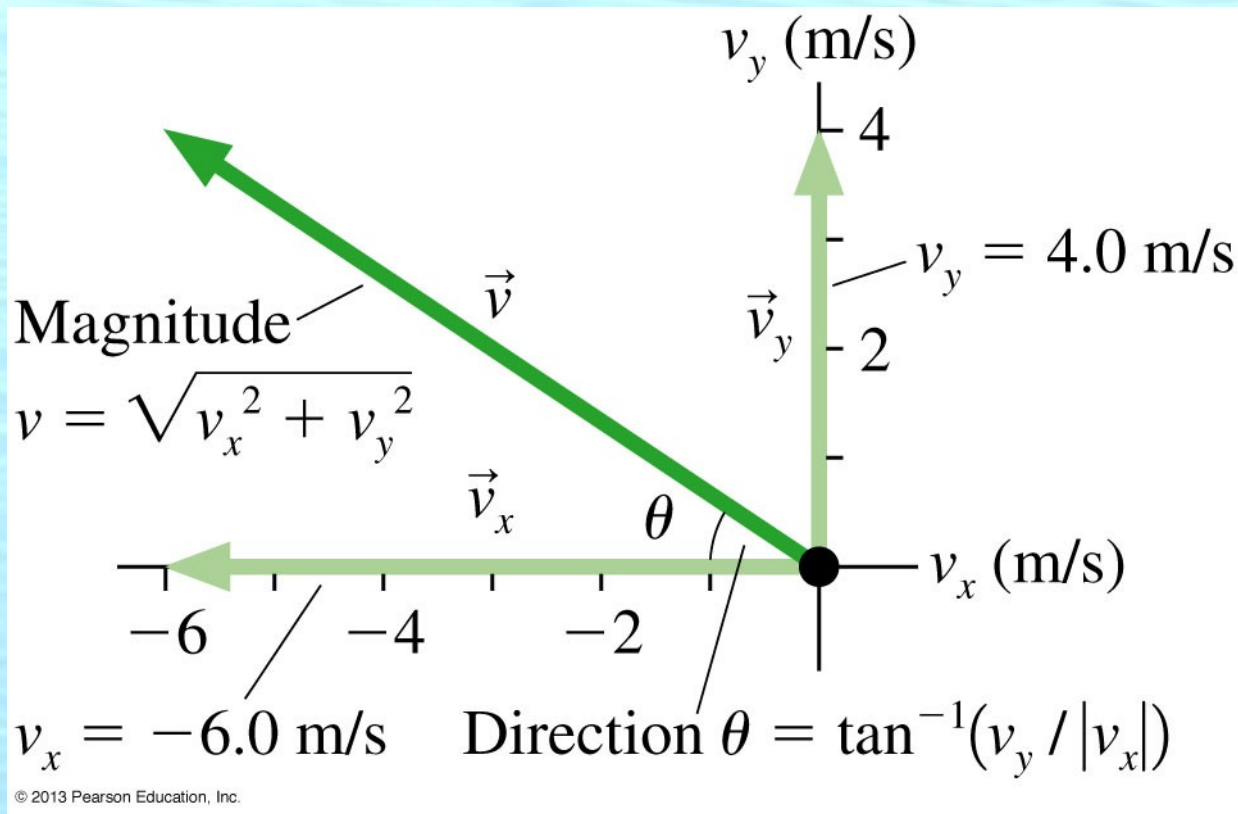
Positive angle is CCW from +x axis.



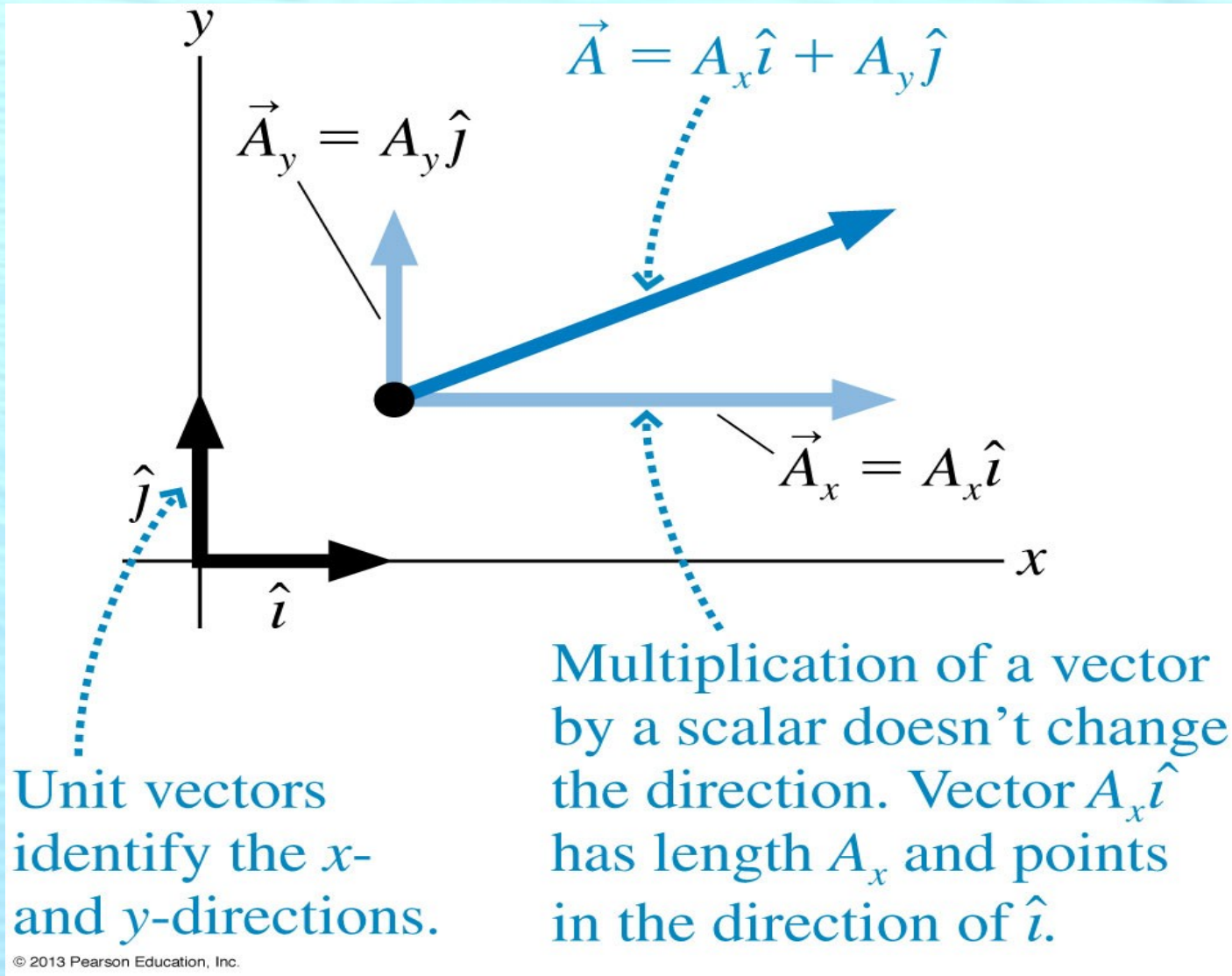
Getting angle and magnitude from components

Magnitude is always a positive number.

Positive angle is CCW from +x axis.



Unit Vectors



Adding Vectors by components

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Concept Map of Course

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Questions about Handout?

Website (www.nmt.edu/~rsonnenf click on Classes/Phys122)

Next Time

Light Rays

Snells Law

Reflecting and Refraction

Reminders

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Read Handout, Get clicker

Get book, Read Preface, Ch 3, Ch 23