

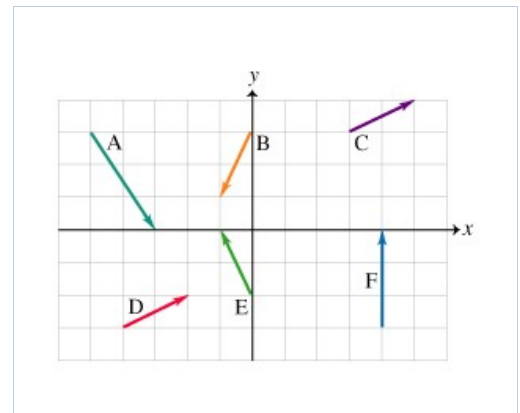
## Vectors pre-class assignment

Due: 11:59pm on Sunday, April 24, 2022

You will receive no credit for items you complete after the assignment is due. [Grading Policy](#)

### Adding and Subtracting Vectors Conceptual Question

Six vectors (A to F) have the magnitudes and directions indicated in the figure.



#### Part A

Which two vectors, when added, will have the largest (positive) x component?

##### Hint 1. Largest x component

The two vectors with the largest x components will, when combined, give the resultant with the largest x component. Keep in mind that positive x components are larger than negative x components.

ANSWER:

- ☐ C and E
- ☐ E and F
- ☐ A and F
- ☒ C and D
- ☐ B and D

Correct

#### Part B

Which two vectors, when added, will have the largest (positive) y component?

##### Hint 1. Largest y component

The two vectors with the largest y components will, when combined, give the resultant with the largest y component. Keep in mind that positive y components are larger than negative y components.

ANSWER:

- ☐ C and D
- ☐ A and F
- ☒ E and F
- ☐ A and B
- ☐ E and D

Correct

### Part C

Which two vectors, when *subtracted* (i.e., when one vector is subtracted from the other), will have the largest magnitude?

#### Hint 1. Subtracting vectors

To subtract two vectors, add a vector with the same magnitude but opposite direction of one of the vectors to the other vector.

ANSWER:

- ☒ A and F
- ☐ A and E
- ☐ D and B
- ☐ C and D
- ☐ E and F

Correct

## Adding Scalar Multiples of Vectors Graphically

Draw the vectors indicated. You may use any extra (unlabeled) vectors that are helpful; but, keep in mind that the unlabeled vectors should be deleted before submitting your answer.

### Part A

Draw the vector  $\vec{C} = \vec{A} + 2\vec{B}$ .

The length and orientation of the vector will be graded. The location of the vector is not important.

#### Hint 1. How to approach the problem

You can add the vectors graphically or using components, but a graphical approach will be the simplest. It may help to draw the vector  $2\vec{B}$  first.

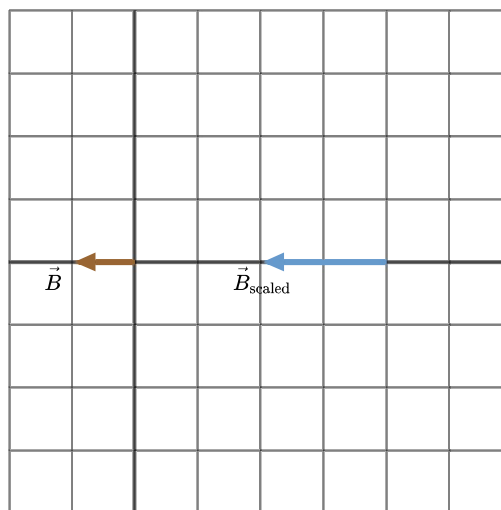
#### Hint 2. Draw $2\vec{B}$

Draw the vector  $\vec{B}_{\text{scaled}} = 2\vec{B}$ .

The length and orientation of the vector will be graded. The location of the vector is not important.

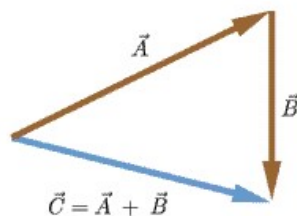
ANSWER:

No elements selected



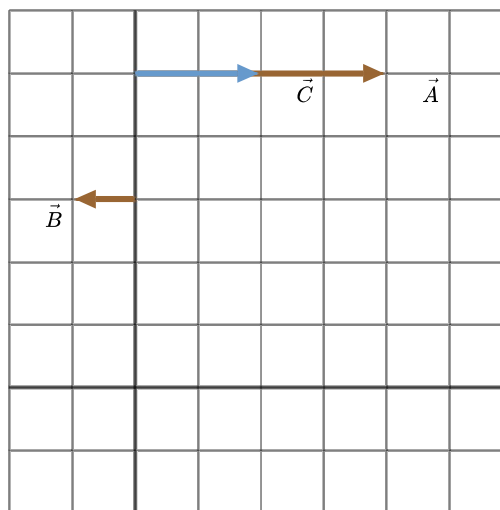
### Hint 3. Adding vectors graphically

To add two vectors, slide one vector (without rotating it) until its tip coincides with the tail of the second vector. The sum of the two vectors is the vector that goes from the tail of the first vector to the tip of the second:



ANSWER:

No elements selected



**Correct**

Now use the same technique to answer the next two parts.

### Part B

Draw the vector  $\vec{C} = 1.5\vec{A} - 3\vec{B}$ .

The length and orientation of the vector will be graded. The location of the vector is not important.

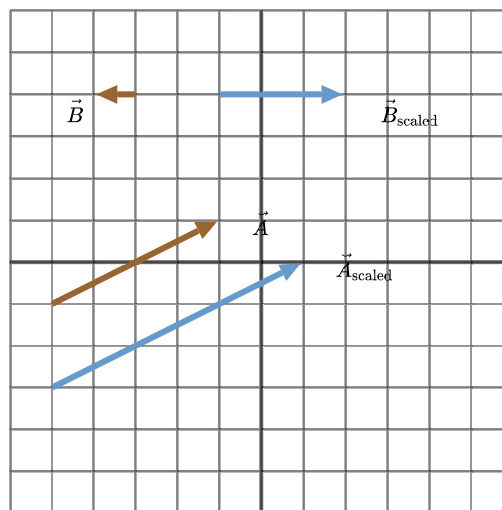
**Hint 1.** Find  $1.5\vec{A}$  and  $-3\vec{B}$

Draw the vectors  $\vec{A}_{\text{scaled}} = 1.5\vec{A}$  and  $\vec{B}_{\text{scaled}} = -3\vec{B}$ . Recall that multiplying a vector by a negative number reverses its direction.

The length and orientation of the vectors will be graded. The locations of the vectors are not important.

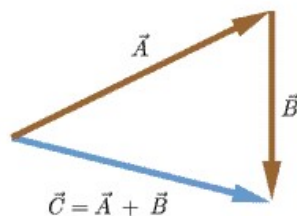
ANSWER:

No elements selected



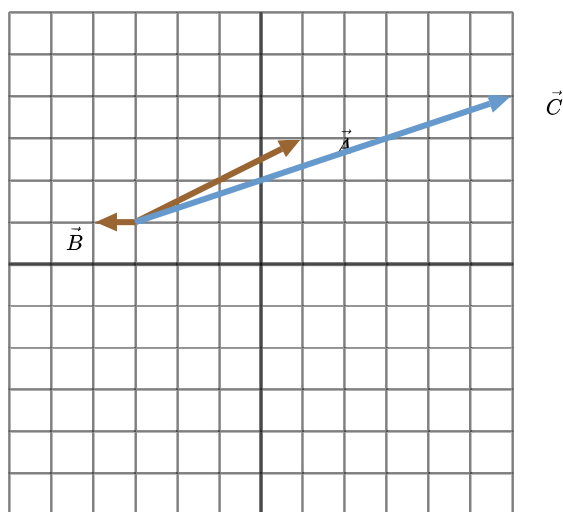
### Hint 2. Adding vectors graphically

To add two vectors, slide one vector (without rotating it) until its tip coincides with the tail of the second vector. The sum of the two vectors is the vector that goes from the tail of the first vector to the tip of the second:



ANSWER:

No elements selected



Correct

### Part C

Draw the vector  $\vec{C} = 0.5\vec{A} + 2\vec{B}$ .

The length and orientation of the vector will be graded. The location of the vector is not important.

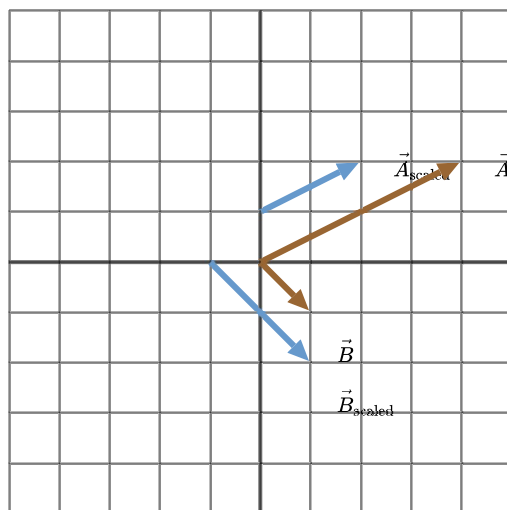
**Hint 1.** Find  $0.5\vec{A}$  and  $2\vec{B}$

Draw the vectors  $\vec{A}_{\text{scaled}} = 0.5\vec{A}$  and  $\vec{B}_{\text{scaled}} = 2\vec{B}$ .

The length and orientation of the vectors will be graded. The locations of the vectors are not important.

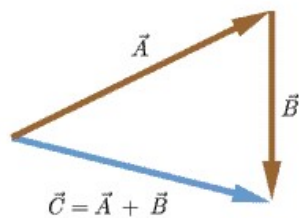
ANSWER:

No elements selected



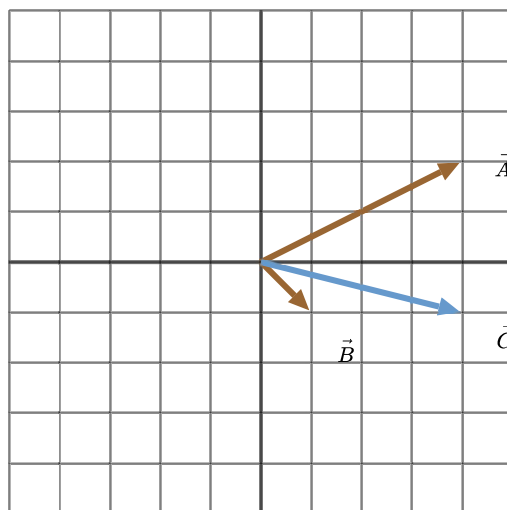
### Hint 2. Adding vectors graphically

To add two vectors, slide one vector (without rotating it) until its tip coincides with the tail of the second vector. The sum of the two vectors is the vector that goes from the tail of the first vector to the tip of the second:



ANSWER:

No elements selected



Correct

## Chapter 1, Conceptual Question 3

The "arrow of time" has a very specific direction, which is from the past to the future.

### Part A

What kind of physical quantity is time?

**Hint 1. Defining a quantity mathematically:**

One must be careful to obtain a complete description of a physical quantity before determining whether the quantity is a scalar or vector quantity.

ANSWER:

- ☐ vector
- ☐ operator
- ☒ scalar

Correct

The answer is correct: The "time" is a scalar quantity because it can be specified completely by a single number.



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**Exercise 1.25**

A postal employee drives a delivery truck along the route shown in the figure .



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**Part A**

Determine the magnitude of the resultant displacement by drawing a scale diagram.

**Express your answer using two significant figures.**

ANSWER:

**Correct**

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**Part B**

Determine the direction of the resultant displacement.

**Express your answer using two significant figures.**

ANSWER:

**Correct**

**Score Summary:**

Your score on this assignment is 95.3%.

You received 95.32 out of a possible total of 100 points.