

keep scrolling to get  
a sneak peek!

Help your PreCalculus students practice **adding and subtracting vectors**. Students will be eager to get the self-checking benefits from this circuit activity!

# VECTOR ADDITION & SUBTRACTION

## Differentiated Circuit Worksheet

Date: \_\_\_\_\_

### VECTOR ADDITION & SUBTRACTION CIRCUIT

Directions: A circuit is a route that starts and ends at the same place. Start in the first box and solve the problem. Search through the remaining boxes for the answer you got for that question. Continue until you have completed the questions and you return to the original question. Record your path below.

1 → \_\_\_\_\_ → \_\_\_\_\_ → \_\_\_\_\_ → \_\_\_\_\_ → \_\_\_\_\_ → \_\_\_\_\_

Answer: $\langle 6, 14 \rangle$	# <u>1</u>	Previous Answer: $\langle 6, 3 \rangle$
1. Let $u = \langle 1, 2 \rangle$ and $v = \langle 3, 1 \rangle$ . Find $2u + v$ .		2. Let $u = \langle 5, 2 \rangle$ and $v = \langle 1, 1 \rangle$ . $-u = -1\langle 5, 2 \rangle = \langle -5, -2 \rangle$ $4v = 4\langle 1, 1 \rangle = \langle 4, 4 \rangle$ $-u + 4v = \langle -5 + 4, -2 + 4 \rangle = \langle -1, 2 \rangle$
3. Let $u = \langle 2, 4 \rangle$ $2 + 3, 4 + 1$	# <u>9</u>	Previous Answer: $\langle 0, -5 \rangle$
Find $v - 2u$ .		4. Let $u = \langle 2, -1 \rangle$ and $v = \langle 4, 3 \rangle$ . Find $u - v$ .

Previous Answer:  $\langle 4, -1 \rangle$

1. Let $u = \langle 2, 3 \rangle$ and $v = \langle 1, -1 \rangle$ . Find $u + v$ .	# _____	Previous Answer: $\langle 5, -6 \rangle$
2. Let $u = \langle 3, 5 \rangle$ and $v = \langle 2, 1 \rangle$ . Find $u - v$ .		3. Let $u = \langle 8, 3 \rangle$ and $v = \langle 5, 2 \rangle$ . Find $u - v$ .
4. Let $u = \langle -1, 4 \rangle$ and $v = \langle 3, 1 \rangle$ . Find $u + v$ .		5. Let $u = \langle 4, 1 \rangle$ and $v = \langle 2, 3 \rangle$ . Find $u - v$ .



2 versions + Answer key included

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Why do you need this?



It's self-checking! Your students will know if they are correct or not.



2 differentiated versions for all students practice this essential math skill.

# Vector Addition & Subtraction Circuit

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## VECTOR ADDITION & SUBTRACTION CIRCUIT

**Directions:** A circuit is a route that starts and ends at the same place. Start in the first box labeled 1 and solve the problem. Search through the remaining boxes for the answer you got for question 1. Now complete that question. Continue until you have completed the questions and you are back to the original question. Record your path below.

1 → \_\_\_\_\_ → \_\_\_\_\_ → \_\_\_\_\_ → \_\_\_\_\_ → \_\_\_\_\_

Previous Answer: <6, 14>	# _____	Previous
1. Let $u = \langle 1, 2 \rangle$ and $v = \langle 3, 1 \rangle$ . Find $2u + v$ .		2. Let $u = \langle 3, 2 \rangle$
Previous Answer: <11, 9>	# _____	Previous
3. Let $u = \langle 2, 1 \rangle$ and $v = \langle 5, 2 \rangle$ . Find $v - 2u$ .		4. Let $u = \langle 5, 2 \rangle$ and $v = \langle 3, 1 \rangle$ . Find $u - v$ .
Previous Answer: <4, -5>	# _____	Previous
5. Let $u = \langle 1, 6 \rangle$ and $v = \langle 3, 2 \rangle$ . Find $u + 2v$ .		6. Let $u = \langle 4, 0 \rangle$ and $v = \langle 1, 3 \rangle$ . Find $u - v$ .
Previous Answer: <3, 2>	# _____	Previous
7. Let $u = \langle 5, 2 \rangle$ and $v = \langle 3, 1 \rangle$ . Find $u - v$ .		8. Let $u = \langle 4, 0 \rangle$ and $v = \langle 1, 3 \rangle$ . Find $u - v$ .
Previous Answer: <-5, 5>	# _____	Previous
9. Let $u = \langle 7, 1 \rangle$ and $v = \langle 2, 5 \rangle$ . Find $u - v$ .		10. Let $u = \langle 6, -2 \rangle$ and $v = \langle 1, 0 \rangle$ . Find $u - v$ .

Helpful Hints: Use these hints to help you solve the problems.

Vector Addition:  $\langle a, b \rangle + \langle c, d \rangle = \langle a + c, b + d \rangle$   
Vector Subtraction:  $\langle a, b \rangle - \langle c, d \rangle = \langle a - c, b - d \rangle$   
Remember to use the distributive property with negatives!!

# Adding & Subtracting Vectors *includes:*

Challenge: Let  $u = \langle 3, -2 \rangle$  and  $v = \langle -1, 4 \rangle$ . Find  $3(u + v) - 2(u - v)$ .

How are you feeling about this topic? Circle one:

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Helpful Hints: Use these hints to help you solve the problems.

Vector Addition:  $\langle a, b \rangle + \langle c, d \rangle = \langle a + c, b + d \rangle$

Vector Subtraction:  $\langle a, b \rangle - \langle c, d \rangle = \langle a - c, b - d \rangle$

Be careful of subtracting negatives!!  
 $a - (-b) = a + b$

How are you feeling about this topic? Circle one:

- ✓ 10 self-checking problems
- ✓ a detailed answer key
- ✓ a standard version with an extension question
- ✓ a basic version with helpful hints section
- ✓ student self assessment

# Adding & Subtracting Vectors

standards covered:

**CCSS:** HSN-VM.B.4, HSN-VM.B.5

**TEKs:** P.4.J

**VA SOLs:** AG.MA.7

**VECTOR ADDITION & SUBTRACTION CIRCUIT**

Previous Answer: $\langle 5, 5 \rangle$	# <b>1</b>	Previous Answer: $\langle -1, 2 \rangle$
7. Let $u = \langle 4, 1 \rangle$ and $v = \langle 2, 3 \rangle$ . Find $u - 2v$ .		8. Let $u = \langle 3, 0 \rangle$ and $v = \langle 2, 5 \rangle$ . Find $2u - v$ .
$2v = 2\langle 2, 3 \rangle = \langle 4, 6 \rangle$		$2u = 2\langle 3, 0 \rangle = \langle 6, 0 \rangle$
$u - 2v = \langle 4 - 4, 1 - 6 \rangle$		$2u - v = \langle 6 - 2, 0 - 5 \rangle$
$= \langle 0, -5 \rangle$		$= \langle 4, -5 \rangle$
Previous Answer: $\langle 7, 10 \rangle$	# <b>5</b>	Previous Answer: $\langle 5, -7 \rangle$
9. Let $u = \langle 4, 4 \rangle$ and $v = \langle 1, 3 \rangle$ . Find $3u - v$ .		10. Let $u = \langle 0, 3 \rangle$ and $v = \langle 2, -1 \rangle$ . Find $2u + 3v$ .
$3u = 3\langle 4, 4 \rangle = \langle 12, 12 \rangle$		$2u = 2\langle 0, 3 \rangle = \langle 0, 6 \rangle$
$3u - v = \langle 12 - 1, 12 - 3 \rangle$		$3v = 3\langle 2, -1 \rangle = \langle 6, -3 \rangle$
$= \langle 11, 9 \rangle$		$2u + 3v = \langle 0 + 6, 6 + -3 \rangle$
		$= \langle 6, 3 \rangle$
Challenge: Let $u = \langle 3, -2 \rangle$ and $v = \langle -1, 4 \rangle$ . Find $3(u + v) - 2(u - v)$ .		
$u + v = \langle 3 + (-1), -2 + 4 \rangle = \langle 2, 2 \rangle$		$3(u + v) - 2(u - v) = \langle 6 - 8, 6 - 12 \rangle$
$3(u + v) = 3\langle 2, 2 \rangle = \langle 6, 6 \rangle$		
$u - v = \langle 3 - (-1), -2 - 4 \rangle = \langle 4, -6 \rangle$		
$2(u - v) = 2\langle 4, -6 \rangle = \langle 8, -12 \rangle$		

# how this circuit resource works

Then search for their answer on the worksheet. Once the answer is found, students complete the problem below it.

Students can track their path at the top.



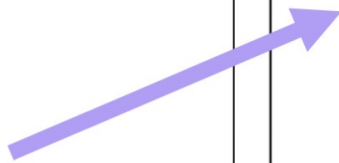
Name: \_\_\_\_\_ Date: \_\_\_\_\_

### VECTOR ADDITION & SUBTRACTION CIRCUIT

**Directions:** A circuit is a route that starts and ends at the same place. Start in the first box labeled 1 and solve the problem. Search through the remaining boxes for the answer you got for question 1. Now complete that question. Continue until you have completed the questions and you are back to the original question. Record your path below.

1 → \_\_\_ → \_\_\_ → \_\_\_ → \_\_\_ → \_\_\_ → \_\_\_ → \_\_\_ → \_\_\_ → \_\_\_ → 1

Previous Answer: $\langle 4, -1 \rangle$ # _____	Previous Answer: $\langle 5, -6 \rangle$ # _____
1. Let $u = \langle 2, 3 \rangle$ and $v = \langle 1, -1 \rangle$ . Find $u + v$ .	2. Let $u = \langle 3, 5 \rangle$ and $v = \langle -2, 1 \rangle$ . Find $u + v$ .
Previous Answer: $\langle 5, -4 \rangle$ # _____	Previous Answer: $\langle 2, 1 \rangle$ # _____
3. Let $u = \langle 8, 3 \rangle$ and $v = \langle 5, 2 \rangle$ . Find $u - v$ .	4. Let $u = \langle -1, 4 \rangle$ and $v = \langle 2, 3 \rangle$ . Find $u + v$ .



Students start with the first question.

The last question they answer should lead back to problem #1 to "close" the circuit.

# how to use this resource

Name: **Answer Key** \_\_\_\_\_ Date: \_\_\_\_\_

## VECTOR ADDITION & SUBTRACTION CIRCUIT

**Directions:** A circuit is a route that starts and ends at the same place. Start in the first box labeled 1 and solve the problem. Search through the remaining boxes for the answer you got for question 1. Now complete that question. Continue until you have completed the questions and you are back to the original question. Record your path below.

1 → **7** → **4** → **10** → **2** → **8** → **5** → **9** → **3** → **6** → 1

Previous Answer: $\langle 4, -1 \rangle$ # <b>1</b>	Previous Answer: $\langle 5, -6 \rangle$ # <b>10</b>
1. Let $u = \langle 2, 3 \rangle$ and $v = \langle 1, -1 \rangle$ . Find $u + v$ .	2. Let $u = \langle 3, 5 \rangle$ and $v = \langle -2, 1 \rangle$ . Find $u + v$ .

$\langle 2 + 1, 3 + (-1) \rangle$   
 $= \langle 3, 2 \rangle$

Previous Answer:  $\langle 5, -4 \rangle$

3. Let  $u = \langle 8, 3 \rangle$  and  $v = \langle 5, -2 \rangle$ .

$\langle 8 - 5, 3 - 2 \rangle$   
 $= \langle 3, 1 \rangle$

Previous Answer:  $\langle 3, -3 \rangle$

5. Let  $u = \langle -2, 6 \rangle$  and  $v = \langle 3, -1 \rangle$ .

$\langle -2 - 3, 6 - (-1) \rangle$   
 $= \langle -5, 5 \rangle$

## VECTOR ADDITION & SUBTRACTION CIRCUIT

Previous Answer: $\langle 5, 5 \rangle$ # <b>1</b>	Previous Answer: $\langle -1, 2 \rangle$ # <b>2</b>
7. Let $u = \langle 4, 1 \rangle$ and $v = \langle 2, 3 \rangle$ . Find $u - 2v$ .	8. Let $u = \langle 3, 0 \rangle$ and $v = \langle 2, 5 \rangle$ . Find $2u - v$ .
$2v = 2\langle 2, 3 \rangle = \langle 4, 6 \rangle$ $u - 2v = \langle 4 - 4, 1 - 6 \rangle$ $= \langle 0, -5 \rangle$	$2u = 2\langle 3, 0 \rangle = \langle 6, 0 \rangle$ $2u - v = \langle 6 - 2, 0 - 5 \rangle$ $= \langle 4, -5 \rangle$
Previous Answer: $\langle 7, 10 \rangle$ # <b>5</b>	Previous Answer: $\langle 5, -7 \rangle$ # <b>4</b>
9. Let $u = \langle 4, 4 \rangle$ and $v = \langle 1, 3 \rangle$ . Find $3u - v$ .	10. Let $u = \langle 0, 3 \rangle$ and $v = \langle 2, -1 \rangle$ . Find $2u + 3v$ .
$3u = 3\langle 4, 4 \rangle = \langle 12, 12 \rangle$ $3u - v = \langle 12 - 1, 12 - 3 \rangle$ $= \langle 11, 9 \rangle$	$2u = 2\langle 0, 3 \rangle = \langle 0, 6 \rangle$ $3v = 3\langle 2, -1 \rangle = \langle 6, -3 \rangle$ $2u + 3v = \langle 0 + 6, 6 + (-3) \rangle$ $= \langle 6, 3 \rangle$

This is a great activity to use when reviewing how perform vector operations.

It can be used right after teaching the concept or as homework.

This is also a **substitute-friendly** assignment!



hey there!

My name is Malia and I'm passionate about making learning and practicing math fun. I love creating engaging math resources for my students and I hope your students enjoy this activity too!

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