

# Vectors in the Plane and in Space

Vector operations, vectors in space, and geometric interpretation.

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

32 main 2-up grid 11 pages visible side quests

## Completion Reward



Shown here as a small pack artifact, not a preview destination.

### 1. What information does a vector represent?

- A. Area and perimeter
- B. Magnitude and direction
- C. Angle only
- D. Slope only

### 1.1. The vector $\langle 4, -2 \rangle$ means move:

- A. right 4, down 2
- B. left 4, down 2
- C. right 2, down 4
- D. up 4, right 2

### 1.2. What is $\langle 2, 5 \rangle + \langle 3, -1 \rangle$ ?

- A.  $\langle 5, 4 \rangle$
- B.  $\langle 1, 6 \rangle$
- C.  $\langle 6, 5 \rangle$
- D.  $\langle 5, -6 \rangle$

### 1.3. What is $3\langle 1, -2 \rangle$ ?

- A.  $\langle 3, -6 \rangle$
- B.  $\langle 4, -2 \rangle$
- C.  $\langle 3, 2 \rangle$
- D.  $\langle 1, -6 \rangle$

### 1.4. To find $u - v$ , you should:

- A. add  $u$  and  $v$  directly
- B. add  $u$  and the opposite of  $v$
- C. multiply  $u$  and  $v$
- D. take the magnitude first

### 1.5. The vector from $(1, 2)$ to $(4, 6)$ is:

- A.  $\langle 3, 4 \rangle$
- B.  $\langle 5, 8 \rangle$
- C.  $\langle -3, -4 \rangle$
- D.  $\langle 4, 6 \rangle$

### 2. What does the vector $(3, -2)$ mean in the plane?

- A. 3 units right and 2 units down
- B. 2 units right and 3 units down
- C. 3 units left and 2 units up
- D. A point on the unit circle

### 2.1. The vector $\langle 4, -2 \rangle$ means move:

- A. right 4, down 2
- B. left 4, down 2
- C. right 2, down 4
- D. up 4, right 2

### 2.2. What is $\langle 2, 5 \rangle + \langle 3, -1 \rangle$ ?

- A.  $\langle 5, 4 \rangle$
- B.  $\langle 1, 6 \rangle$
- C.  $\langle 6, 5 \rangle$
- D.  $\langle 5, -6 \rangle$

### 2.3. What is $3\langle 1, -2 \rangle$ ?

- A.  $\langle 3, -6 \rangle$
- B.  $\langle 4, -2 \rangle$
- C.  $\langle 3, 2 \rangle$
- D.  $\langle 1, -6 \rangle$

### 2.4. To find $u - v$ , you should:

- A. add  $u$  and  $v$  directly
- B. add  $u$  and the opposite of  $v$
- C. multiply  $u$  and  $v$
- D. take the magnitude first

### 2.5. The vector from $(1, 2)$ to $(4, 6)$ is:

- A.  $\langle 3, 4 \rangle$
- B.  $\langle 5, 8 \rangle$
- C.  $\langle -3, -4 \rangle$
- D.  $\langle 4, 6 \rangle$

### 3. How do you add vectors in component form?

- A. Add corresponding components
- B. Multiply corresponding components
- C. Add only the first components
- D. Average the components

### 3.1. The vector $\langle 4, -2 \rangle$ means move:

- A. right 4, down 2
- B. left 4, down 2
- C. right 2, down 4
- D. up 4, right 2

### 3.2. What is $\langle 2, 5 \rangle + \langle 3, -1 \rangle$ ?

- A.  $\langle 5, 4 \rangle$
- B.  $\langle 1, 6 \rangle$
- C.  $\langle 6, 5 \rangle$
- D.  $\langle 5, -6 \rangle$

### 3.3. What is $3\langle 1, -2 \rangle$ ?

- A.  $\langle 3, -6 \rangle$
- B.  $\langle 4, -2 \rangle$
- C.  $\langle 3, 2 \rangle$
- D.  $\langle 1, -6 \rangle$

### 3.4. To find $u - v$ , you should:

- A. add  $u$  and  $v$  directly
- B. add  $u$  and the opposite of  $v$
- C. multiply  $u$  and  $v$
- D. take the magnitude first

### 3.5. The vector from $(1, 2)$ to $(4, 6)$ is:

- A.  $\langle 3, 4 \rangle$
- B.  $\langle 5, 8 \rangle$
- C.  $\langle -3, -4 \rangle$
- D.  $\langle 4, 6 \rangle$

**4. What does multiplying a vector by 3 do?**

- A. Adds 3 to each component
- B. Triples its components
- C. Changes only the direction but not the length
- D. Rotates it by 3 radians

**4.1. The vector  $\langle 4, -2 \rangle$  means move:**

- A. right 4, down 2
- B. left 4, down 2
- C. right 2, down 4
- D. up 4, right 2

**4.2. What is  $\langle 2, 5 \rangle + \langle 3, -1 \rangle$ ?**

- A.  $\langle 5, 4 \rangle$
- B.  $\langle 1, 6 \rangle$
- C.  $\langle 6, 5 \rangle$
- D.  $\langle -5, -6 \rangle$

**4.3. What is  $3\langle 1, -2 \rangle$ ?**

- A.  $\langle 3, -6 \rangle$
- B.  $\langle 4, -2 \rangle$
- C.  $\langle 3, 2 \rangle$
- D.  $\langle 1, -6 \rangle$

**4.4. To find  $u - v$ , you should:**

- A. add  $u$  and  $v$  directly
- B. add  $u$  and the opposite of  $v$
- C. multiply  $u$  and  $v$
- D. take the magnitude first

**4.5. The vector from  $(1, 2)$  to  $(4, 6)$  is:**

- A.  $\langle 3, 4 \rangle$
- B.  $\langle 5, 8 \rangle$
- C.  $\langle -3, -4 \rangle$
- D.  $\langle 4, 6 \rangle$

**5. What is special about a unit vector?**

- A. Its components are always positive
- B. Its magnitude is 1
- C. It has no direction
- D. Its slope is 1

**5.1. The magnitude of  $\langle 6, 8 \rangle$  is:**

- A. 10
- B. 14
- C. 48
- D. 100

**5.2. A unit vector has magnitude:**

- A. 0
- B. 1
- C. 2
- D. 10

**5.3. In the plane, the vector  $i$  usually means:**

- A.  $\langle 0, 1 \rangle$
- B.  $\langle 1, 0 \rangle$
- C.  $\langle -1, 0 \rangle$
- D.  $\langle 1, 1 \rangle$

**5.4. In the plane, the vector  $j$  usually means:**

- A.  $\langle 0, 1 \rangle$
- B.  $\langle 1, 0 \rangle$
- C.  $\langle -1, 0 \rangle$
- D.  $\langle 1, 1 \rangle$

**5.5. A position vector to point  $(5, -1)$  starts at:**

- A.  $(5, -1)$
- B. the origin
- C.  $(0, -1)$
- D.  $(5, 0)$

**6. Which vector is  $i$  in the plane?**

- A.  $(0, 1)$
- B.  $(-1, 0)$
- C.  $(0, -1)$
- D.  $(1, 0)$

**6.1. The magnitude of  $\langle 6, 8 \rangle$  is:**

- A. 10
- B. 14
- C. 48
- D. 100

**6.2. A unit vector has magnitude:**

- A. 0
- B. 1
- C. 2
- D. 10

**6.3. In the plane, the vector  $i$  usually means:**

- A.  $\langle 0, 1 \rangle$
- B.  $\langle 1, 0 \rangle$
- C.  $\langle -1, 0 \rangle$
- D.  $\langle 1, 1 \rangle$

**6.4. In the plane, the vector  $j$  usually means:**

- A.  $\langle 0, 1 \rangle$
- B.  $\langle 1, 0 \rangle$
- C.  $\langle -1, 0 \rangle$
- D.  $\langle 1, 1 \rangle$

**6.5. A position vector to point  $(5, -1)$  starts at:**

- A.  $(5, -1)$
- B. the origin
- C.  $(0, -1)$
- D.  $(5, 0)$

7. Which vector is  $\mathbf{j}$  in the plane?

- A.  $\langle 1, 0 \rangle$
- B.  $\langle 0, 1 \rangle$
- C.  $\langle 0, -1 \rangle$
- D.  $\langle -1, 0 \rangle$

7.1. The magnitude of  $\langle 6, 8 \rangle$  is:

- A. 10
- B. 14
- C. 48
- D. 100

7.2. A unit vector has magnitude:

- A. 0
- B. 1
- C. 2
- D. 10

7.3. In the plane, the vector  $\mathbf{i}$  usually means:

- A.  $\langle 0, 1 \rangle$
- B.  $\langle -1, 0 \rangle$
- C.  $\langle -1, 0 \rangle$
- D.  $\langle -1, 1 \rangle$

7.4. In the plane, the vector  $\mathbf{j}$  usually means:

- A.  $\langle 0, 1 \rangle$
- B.  $\langle -1, 0 \rangle$
- C.  $\langle -1, 0 \rangle$
- D.  $\langle -1, 1 \rangle$

7.5. A position vector to point  $(5, -1)$  starts at:

- A.  $(5, -1)$
- B. the origin
- C.  $(0, -1)$
- D.  $(5, 0)$

8. What is the position vector of the point  $(4, -3)$ ?

- A.  $\langle 4, -3 \rangle$
- B.  $\langle 1, 1 \rangle$
- C.  $\langle -4, 3 \rangle$
- D.  $\langle 4, 3 \rangle$

8.1. The magnitude of  $\langle 6, 8 \rangle$  is:

- A. 10
- B. 14
- C. 48
- D. 100

8.2. A unit vector has magnitude:

- A. 0
- B. 1
- C. 2
- D. 10

8.3. In the plane, the vector  $\mathbf{i}$  usually means:

- A.  $\langle 0, 1 \rangle$
- B.  $\langle -1, 0 \rangle$
- C.  $\langle -1, 0 \rangle$
- D.  $\langle -1, 1 \rangle$

8.4. In the plane, the vector  $\mathbf{j}$  usually means:

- A.  $\langle 0, 1 \rangle$
- B.  $\langle -1, 0 \rangle$
- C.  $\langle -1, 0 \rangle$
- D.  $\langle -1, 1 \rangle$

8.5. A position vector to point  $(5, -1)$  starts at:

- A.  $(5, -1)$
- B. the origin
- C.  $(0, -1)$
- D.  $(5, 0)$

9. To find the magnitude of  $(3, 4)$ , what is the best first step?

- A. Compute  $3 + 4$
- B. Use  $\sqrt{3^2 + 4^2}$
- C. Compute  $3^2 + 4^2$  and stop there
- D. Average the two components

9.1. The magnitude of  $\langle 6, 8 \rangle$  is:

- A. 10
- B. 14
- C. 48
- D. 100

9.2. A unit vector has magnitude:

- A. 0
- B. 1
- C. 2
- D. 10

9.3. In the plane, the vector  $\mathbf{i}$  usually means:

- A.  $\langle 0, 1 \rangle$
- B.  $\langle -1, 0 \rangle$
- C.  $\langle -1, 0 \rangle$
- D.  $\langle -1, 1 \rangle$

9.4. In the plane, the vector  $\mathbf{j}$  usually means:

- A.  $\langle 0, 1 \rangle$
- B.  $\langle -1, 0 \rangle$
- C.  $\langle -1, 0 \rangle$
- D.  $\langle -1, 1 \rangle$

9.5. A position vector to point  $(5, -1)$  starts at:

- A.  $(5, -1)$
- B. the origin
- C.  $(0, -1)$
- D.  $(5, 0)$

10. To find the vector from  $A(2, 1)$  to  $B(7, 5)$ , what is the best first step?

- A. Subtract A from B coordinate by coordinate
- B. Add the coordinates
- C. Find the midpoint
- D. Convert to polar form first

10.1. The magnitude of  $\langle 6, 8 \rangle$  is:

- A. 10
- B. 14
- C. 48
- D. 100

10.2. A unit vector has magnitude:

- A. 0
- B. 1
- C. 2
- D. 10

10.3. In the plane, the vector  $i$  usually means:

- A.  $\langle 0, 1 \rangle$
- B.  $\langle 1, 0 \rangle$
- C.  $\langle -1, 0 \rangle$
- D.  $\langle -1, 1 \rangle$

10.4. In the plane, the vector  $j$  usually means:

- A.  $\langle 0, 1 \rangle$
- B.  $\langle 1, 0 \rangle$
- C.  $\langle -1, 0 \rangle$
- D.  $\langle -1, 1 \rangle$

10.5. A position vector to point  $(5, -1)$  starts at:

- A.  $(5, -1)$
- B. the origin
- C.  $(0, -1)$
- D.  $(5, 0)$

11. A student says  $(2, 3) + (4, -1) = (6, -3)$ . What is wrong?

- A. They should multiply instead of add
- B. They added the second components incorrectly
- C. The first component should be 8
- D. Nothing is wrong

11.1. The vector  $\langle 4, -2 \rangle$  means move:

- A. right 4, down 2
- B. left 4, down 2
- C. right 2, down 4
- D. up 4, right 2

11.2. What is  $\langle 2, 5 \rangle + \langle 3, -1 \rangle$ ?

- A.  $\langle 5, 4 \rangle$
- B.  $\langle 1, 6 \rangle$
- C.  $\langle 6, 5 \rangle$
- D.  $\langle 5, -6 \rangle$

11.3. What is  $3\langle 1, -2 \rangle$ ?

- A.  $\langle 3, -6 \rangle$
- B.  $\langle 4, -2 \rangle$
- C.  $\langle 3, 2 \rangle$
- D.  $\langle -1, -6 \rangle$

11.4. To find  $u - v$ , you should:

- A. add  $u$  and  $v$  directly
- B. add  $u$  and the opposite of  $v$
- C. multiply  $u$  and  $v$
- D. take the magnitude first

11.5. The vector from  $(1, 2)$  to  $(4, 6)$  is:

- A.  $\langle 3, 4 \rangle$
- B.  $\langle 5, 8 \rangle$
- C.  $\langle -3, -4 \rangle$
- D.  $\langle 4, 6 \rangle$

12. A student says  $2(3, -4) = (5, -2)$ . What is wrong?

- A. Only the first component should change
- B. The vector should be unchanged
- C. The sign should always become positive
- D. Each component should be multiplied by 2

12.1. The vector  $\langle 4, -2 \rangle$  means move:

- A. right 4, down 2
- B. left 4, down 2
- C. right 2, down 4
- D. up 4, right 2

12.2. What is  $\langle 2, 5 \rangle + \langle 3, -1 \rangle$ ?

- A.  $\langle 5, 4 \rangle$
- B.  $\langle 1, 6 \rangle$
- C.  $\langle 6, 5 \rangle$
- D.  $\langle -5, -6 \rangle$

12.3. What is  $3\langle 1, -2 \rangle$ ?

- A.  $\langle 3, -6 \rangle$
- B.  $\langle 4, -2 \rangle$
- C.  $\langle 3, 2 \rangle$
- D.  $\langle -1, -6 \rangle$

12.4. To find  $u - v$ , you should:

- A. add  $u$  and  $v$  directly
- B. add  $u$  and the opposite of  $v$
- C. multiply  $u$  and  $v$
- D. take the magnitude first

12.5. The vector from  $(1, 2)$  to  $(4, 6)$  is:

- A.  $\langle 3, 4 \rangle$
- B.  $\langle 5, 8 \rangle$
- C.  $\langle -3, -4 \rangle$
- D.  $\langle 4, 6 \rangle$

13. Find the sum of  $(3, -2)$  and  $(4, 5)$ . What is the first component of the result? Answer with a number.

13.3. What is  $3\langle 1, -2 \rangle$ ?

- A.  $\langle 3, -6 \rangle$
- B.  $\langle 4, -2 \rangle$
- C.  $\langle 3, 2 \rangle$
- D.  $\langle 1, -6 \rangle$

14. Find the sum of  $(3, -2)$  and  $(4, 5)$ . What is the second component of the result? Answer with a number.

14.3. What is  $3\langle 1, -2 \rangle$ ?

- A.  $\langle 3, -6 \rangle$
- B.  $\langle 4, -2 \rangle$
- C.  $\langle 3, 2 \rangle$
- D.  $\langle 1, -6 \rangle$

15. Find the magnitude of  $(3, 4)$ . Answer with a number.

15.3. In the plane, the vector  $i$  usually means:

- A.  $\langle 0, 1 \rangle$
- B.  $\langle 1, 0 \rangle$
- C.  $\langle -1, 0 \rangle$
- D.  $\langle 1, 1 \rangle$

13.1. The vector  $\langle 4, -2 \rangle$  means move:

- A. right 4, down 2
- B. left 4, down 2
- C. right 2, down 4
- D. up 4, right 2

13.4. To find  $u - v$ , you should:

- A. add  $u$  and  $v$  directly
- B. add  $u$  and the opposite of  $v$
- C. multiply  $u$  and  $v$
- D. take the magnitude first

14.1. The vector  $\langle 4, -2 \rangle$  means move:

- A. right 4, down 2
- B. left 4, down 2
- C. right 2, down 4
- D. up 4, right 2

14.4. To find  $u - v$ , you should:

- A. add  $u$  and  $v$  directly
- B. add  $u$  and the opposite of  $v$
- C. multiply  $u$  and  $v$
- D. take the magnitude first

15.1. The magnitude of  $\langle 6, 8 \rangle$  is:

- A. 10
- B. 14
- C. 48
- D. 100

15.4. In the plane, the vector  $j$  usually means:

- A.  $\langle 0, 1 \rangle$
- B.  $\langle 1, 0 \rangle$
- C.  $\langle -1, 0 \rangle$
- D.  $\langle 1, 1 \rangle$

13.2. What is  $\langle 2, 5 \rangle + \langle 3, -1 \rangle$ ?

- A.  $\langle 5, 4 \rangle$
- B.  $\langle 1, 6 \rangle$
- C.  $\langle 6, 5 \rangle$
- D.  $\langle -5, -6 \rangle$

13.5. The vector from  $(1, 2)$  to  $(4, 6)$  is:

- A.  $\langle 3, 4 \rangle$
- B.  $\langle 5, 8 \rangle$
- C.  $\langle -3, -4 \rangle$
- D.  $\langle 4, 6 \rangle$

14.2. What is  $\langle 2, 5 \rangle + \langle 3, -1 \rangle$ ?

- A.  $\langle 5, 4 \rangle$
- B.  $\langle 1, 6 \rangle$
- C.  $\langle 6, 5 \rangle$
- D.  $\langle -5, -6 \rangle$

14.5. The vector from  $(1, 2)$  to  $(4, 6)$  is:

- A.  $\langle 3, 4 \rangle$
- B.  $\langle 5, 8 \rangle$
- C.  $\langle -3, -4 \rangle$
- D.  $\langle 4, 6 \rangle$

15.2. A unit vector has magnitude:

- A. 0
- B. 1
- C. 2
- D. 10

15.5. A position vector to point  $(5, -1)$  starts at:

- A.  $(5, -1)$
- B. the origin
- C.  $(0, -1)$
- D.  $(5, 0)$

16. Find the magnitude of  $(5, 12)$ . Answer with a number.

16.1. The magnitude of  $\langle 6, 8 \rangle$  is:

- A. 10
- B. 14
- C. 48
- D. 100

16.2. A unit vector has magnitude:

- A. 0
- B. 1
- C. 2
- D. 10

16.3. In the plane, the vector  $i$  usually means:

- A.  $\langle 0, 1 \rangle$
- B.  $\langle 1, 0 \rangle$
- C.  $\langle -1, 0 \rangle$
- D.  $\langle 1, 1 \rangle$

16.4. In the plane, the vector  $j$  usually means:

- A.  $\langle 0, 1 \rangle$
- B.  $\langle 1, 0 \rangle$
- C.  $\langle -1, 0 \rangle$
- D.  $\langle 1, 1 \rangle$

16.5. A position vector to point  $(5, -1)$  starts at:

- A.  $(5, -1)$
- B. the origin
- C.  $(0, -1)$
- D.  $(5, 0)$

17. Find the vector from  $(2, 1)$  to  $(7, 5)$ . What is the first component? Answer with a number.

17.1. The magnitude of  $\langle 6, 8 \rangle$  is:

- A. 10
- B. 14
- C. 48
- D. 100

17.2. A unit vector has magnitude:

- A. 0
- B. 1
- C. 2
- D. 10

17.3. In the plane, the vector  $i$  usually means:

- A.  $\langle 0, 1 \rangle$
- B.  $\langle 1, 0 \rangle$
- C.  $\langle -1, 0 \rangle$
- D.  $\langle 1, 1 \rangle$

17.4. In the plane, the vector  $j$  usually means:

- A.  $\langle 0, 1 \rangle$
- B.  $\langle 1, 0 \rangle$
- C.  $\langle -1, 0 \rangle$
- D.  $\langle 1, 1 \rangle$

17.5. A position vector to point  $(5, -1)$  starts at:

- A.  $(5, -1)$
- B. the origin
- C.  $(0, -1)$
- D.  $(5, 0)$

18. Find the vector from  $(2, 1)$  to  $(7, 5)$ . What is the second component? Answer with a number.

18.1. The magnitude of  $\langle 6, 8 \rangle$  is:

- A. 10
- B. 14
- C. 48
- D. 100

18.2. A unit vector has magnitude:

- A. 0
- B. 1
- C. 2
- D. 10

18.3. In the plane, the vector  $i$  usually means:

- A.  $\langle 0, 1 \rangle$
- B.  $\langle 1, 0 \rangle$
- C.  $\langle -1, 0 \rangle$
- D.  $\langle 1, 1 \rangle$

18.4. In the plane, the vector  $j$  usually means:

- A.  $\langle 0, 1 \rangle$
- B.  $\langle 1, 0 \rangle$
- C.  $\langle -1, 0 \rangle$
- D.  $\langle 1, 1 \rangle$

18.5. A position vector to point  $(5, -1)$  starts at:

- A.  $(5, -1)$
- B. the origin
- C.  $(0, -1)$
- D.  $(5, 0)$

19. For  $3\langle 2, -5 \rangle$ , what is the second component?  
Answer with a number.

19.1. The vector  $\langle 4, -2 \rangle$  means move:

- A. right 4, down 2
- B. left 4, down 2
- C. right 2, down 4
- D. up 4, right 2

19.2. What is  $\langle 2, 5 \rangle + \langle 3, -1 \rangle$ ?

- A.  $\langle 5, 4 \rangle$
- B.  $\langle 1, 6 \rangle$
- C.  $\langle 6, 5 \rangle$
- D.  $\langle 5, -6 \rangle$

19.3. What is  $3\langle 1, -2 \rangle$ ?

- A.  $\langle 3, -6 \rangle$
- B.  $\langle 4, -2 \rangle$
- C.  $\langle 3, 2 \rangle$
- D.  $\langle 1, -6 \rangle$

19.4. To find  $u - v$ , you should:

- A. add  $u$  and  $v$  directly
- B. add  $u$  and the opposite of  $v$
- C. multiply  $u$  and  $v$
- D. take the magnitude first

19.5. The vector from  $(1, 2)$  to  $(4, 6)$  is:

- A.  $\langle 3, 4 \rangle$
- B.  $\langle 5, 8 \rangle$
- C.  $\langle -3, -4 \rangle$
- D.  $\langle 4, 6 \rangle$

20. Find the magnitude of  $(2, 3, 6)$ . Answer with a number.

20.1. The magnitude of  $\langle 6, 8 \rangle$  is:

- A. 10
- B. 14
- C. 48
- D. 100

20.2. A unit vector has magnitude:

- A. 0
- B. 1
- C. 2
- D. 10

20.3. In the plane, the vector  $i$  usually means:

- A.  $\langle 0, 1 \rangle$
- B.  $\langle 1, 0 \rangle$
- C.  $\langle -1, 0 \rangle$
- D.  $\langle 1, 1 \rangle$

20.4. In the plane, the vector  $j$  usually means:

- A.  $\langle 0, 1 \rangle$
- B.  $\langle 1, 0 \rangle$
- C.  $\langle -1, 0 \rangle$
- D.  $\langle 1, 1 \rangle$

20.5. A position vector to point  $(5, -1)$  starts at:

- A.  $(5, -1)$
- B. the origin
- C.  $(0, -1)$
- D.  $(5, 0)$

21. Find the magnitude of  $(1, 2, 2)$ . Answer with a number.

21.1. The magnitude of  $\langle 6, 8 \rangle$  is:

- A. 10
- B. 14
- C. 48
- D. 100

21.2. A unit vector has magnitude:

- A. 0
- B. 1
- C. 2
- D. 10

21.3. In the plane, the vector  $i$  usually means:

- A.  $\langle 0, 1 \rangle$
- B.  $\langle 1, 0 \rangle$
- C.  $\langle -1, 0 \rangle$
- D.  $\langle 1, 1 \rangle$

21.4. In the plane, the vector  $j$  usually means:

- A.  $\langle 0, 1 \rangle$
- B.  $\langle 1, 0 \rangle$
- C.  $\langle -1, 0 \rangle$
- D.  $\langle 1, 1 \rangle$

21.5. A position vector to point  $(5, -1)$  starts at:

- A.  $(5, -1)$
- B. the origin
- C.  $(0, -1)$
- D.  $(5, 0)$

22. Find  $(6, 1) - (2, 5)$ . What is the first component? Answer with a number.

22.1. The vector  $\langle 4, -2 \rangle$  means move:

- A. right 4, down 2
- B. left 4, down 2
- C. right 2, down 4
- D. up 4, right 2

22.2. What is  $\langle 2, 5 \rangle + \langle 3, -1 \rangle$ ?

- A.  $\langle 5, 4 \rangle$
- B.  $\langle 1, 6 \rangle$
- C.  $\langle 6, 5 \rangle$
- D.  $\langle 5, -6 \rangle$

22.3. What is  $3\langle 1, -2 \rangle$ ?

- A.  $\langle 3, -6 \rangle$
- B.  $\langle 4, -2 \rangle$
- C.  $\langle 3, 2 \rangle$
- D.  $\langle 1, -6 \rangle$

22.4. To find  $u - v$ , you should:

- A. add  $u$  and  $v$  directly
- B. add  $u$  and the opposite of  $v$
- C. multiply  $u$  and  $v$
- D. take the magnitude first

22.5. The vector from  $(1, 2)$  to  $(4, 6)$  is:

- A.  $\langle 3, 4 \rangle$
- B.  $\langle 5, 8 \rangle$
- C.  $\langle -3, -4 \rangle$
- D.  $\langle 4, 6 \rangle$

23. Find  $(6, 1) - (2, 5)$ . What is the second component? Answer with a number.

23.1. The vector  $\langle 4, -2 \rangle$  means move:

- A. right 4, down 2
- B. left 4, down 2
- C. right 2, down 4
- D. up 4, right 2

23.2. What is  $\langle 2, 5 \rangle + \langle 3, -1 \rangle$ ?

- A.  $\langle 5, 4 \rangle$
- B.  $\langle 1, 6 \rangle$
- C.  $\langle 6, 5 \rangle$
- D.  $\langle 5, -6 \rangle$

23.3. What is  $3\langle 1, -2 \rangle$ ?

- A.  $\langle 3, -6 \rangle$
- B.  $\langle 4, -2 \rangle$
- C.  $\langle 3, 2 \rangle$
- D.  $\langle 1, -6 \rangle$

23.4. To find  $u - v$ , you should:

- A. add  $u$  and  $v$  directly
- B. add  $u$  and the opposite of  $v$
- C. multiply  $u$  and  $v$
- D. take the magnitude first

23.5. The vector from  $(1, 2)$  to  $(4, 6)$  is:

- A.  $\langle 3, 4 \rangle$
- B.  $\langle 5, 8 \rangle$
- C.  $\langle -3, -4 \rangle$
- D.  $\langle 4, 6 \rangle$

24. Find the  $x$ -coordinate of the midpoint of  $(2, 1)$  and  $(8, 5)$ . Answer with a number.

24.1. The magnitude of  $\langle 6, 8 \rangle$  is:

- A. 10
- B. 14
- C. 48
- D. 100

24.2. A unit vector has magnitude:

- A. 0
- B. 1
- C. 2
- D. 10

24.3. In the plane, the vector  $i$  usually means:

- A.  $\langle 0, 1 \rangle$
- B.  $\langle 1, 0 \rangle$
- C.  $\langle -1, 0 \rangle$
- D.  $\langle 1, 1 \rangle$

24.4. In the plane, the vector  $j$  usually means:

- A.  $\langle 0, 1 \rangle$
- B.  $\langle 1, 0 \rangle$
- C.  $\langle -1, 0 \rangle$
- D.  $\langle 1, 1 \rangle$

24.5. A position vector to point  $(5, -1)$  starts at:

- A.  $(5, -1)$
- B. the origin
- C.  $(0, -1)$
- D.  $(5, 0)$

25. Write  $(2, 3) + (4, -1)$ . Answer as an equation.

25.1. The vector  $\langle 4, -2 \rangle$  means move:

- A. right 4, down 2
- B. left 4, down 2
- C. right 2, down 4
- D. up 4, right 2

25.2. What is  $\langle 2, 5 \rangle + \langle 3, -1 \rangle$ ?

- A.  $\langle 5, 4 \rangle$
- B.  $\langle 1, 6 \rangle$
- C.  $\langle 6, 5 \rangle$
- D.  $\langle 5, -6 \rangle$

25.3. What is  $3\langle 1, -2 \rangle$ ?

- A.  $\langle 3, -6 \rangle$
- B.  $\langle 4, -2 \rangle$
- C.  $\langle 3, 2 \rangle$
- D.  $\langle 1, -6 \rangle$

25.4. To find  $u - v$ , you should:

- A. add  $u$  and  $v$  directly
- B. add  $u$  and the opposite of  $v$
- C. multiply  $u$  and  $v$
- D. take the magnitude first

25.5. The vector from  $(1, 2)$  to  $(4, 6)$  is:

- A.  $\langle 3, 4 \rangle$
- B.  $\langle 5, 8 \rangle$
- C.  $\langle -3, -4 \rangle$
- D.  $\langle 4, 6 \rangle$

26. Write  $(5, 1) - (2, 4)$ . Answer as an equation.

26.1. The vector  $\langle 4, -2 \rangle$  means move:

- A. right 4, down 2
- B. left 4, down 2
- C. right 2, down 4
- D. up 4, right 2

26.2. What is  $\langle 2, 5 \rangle + \langle 3, -1 \rangle$ ?

- A.  $\langle 5, 4 \rangle$
- B.  $\langle 1, 6 \rangle$
- C.  $\langle 6, 5 \rangle$
- D.  $\langle 5, -6 \rangle$

26.3. What is  $3\langle 1, -2 \rangle$ ?

- A.  $\langle 3, -6 \rangle$
- B.  $\langle 4, -2 \rangle$
- C.  $\langle 3, 2 \rangle$
- D.  $\langle 1, -6 \rangle$

26.4. To find  $u - v$ , you should:

- A. add  $u$  and  $v$  directly
- B. add  $u$  and the opposite of  $v$
- C. multiply  $u$  and  $v$
- D. take the magnitude first

26.5. The vector from  $(1, 2)$  to  $(4, 6)$  is:

- A.  $\langle 3, 4 \rangle$
- B.  $\langle 5, 8 \rangle$
- C.  $\langle -3, -4 \rangle$
- D.  $\langle 4, 6 \rangle$

27. Write  $-2(3, -4)$ . Answer as an equation.

27.1. The vector  $\langle 4, -2 \rangle$  means move:

- A. right 4, down 2
- B. left 4, down 2
- C. right 2, down 4
- D. up 4, right 2

27.2. What is  $\langle 2, 5 \rangle + \langle 3, -1 \rangle$ ?

- A.  $\langle 5, 4 \rangle$
- B.  $\langle 1, 6 \rangle$
- C.  $\langle 6, 5 \rangle$
- D.  $\langle 5, -6 \rangle$

27.3. What is  $3\langle 1, -2 \rangle$ ?

- A.  $\langle 3, -6 \rangle$
- B.  $\langle 4, -2 \rangle$
- C.  $\langle 3, 2 \rangle$
- D.  $\langle 1, -6 \rangle$

27.4. To find  $u - v$ , you should:

- A. add  $u$  and  $v$  directly
- B. add  $u$  and the opposite of  $v$
- C. multiply  $u$  and  $v$
- D. take the magnitude first

27.5. The vector from  $(1, 2)$  to  $(4, 6)$  is:

- A.  $\langle 3, 4 \rangle$
- B.  $\langle 5, 8 \rangle$
- C.  $\langle -3, -4 \rangle$
- D.  $\langle 4, 6 \rangle$

28. Write the vector from (1, 2) to (6, 7). Answer as an equation.

28.1. The magnitude of  $\langle 6, 8 \rangle$  is:

- A. 10
- B. 14
- C. 48
- D. 100

28.2. A unit vector has magnitude:

- A. 0
- B. 1
- C. 2
- D. 10

28.3. In the plane, the vector  $i$  usually means:

- A.  $\langle 0, 1 \rangle$
- B.  $\langle 1, 0 \rangle$
- C.  $\langle -1, 0 \rangle$
- D.  $\langle 1, 1 \rangle$

28.4. In the plane, the vector  $j$  usually means:

- A.  $\langle 0, 1 \rangle$
- B.  $\langle 1, 0 \rangle$
- C.  $\langle -1, 0 \rangle$
- D.  $\langle 1, 1 \rangle$

28.5. A position vector to point (5, -1) starts at:

- A. (5, -1)
- B. the origin
- C. (0, -1)
- D. (5, 0)

29. Write  $(1, 2, 3) + (4, -1, 5)$ . Answer as an equation.

29.1. The vector  $\langle 4, -2 \rangle$  means move:

- A. right 4, down 2
- B. left 4, down 2
- C. right 2, down 4
- D. up 4, right 2

29.2. What is  $\langle 2, 5 \rangle + \langle 3, -1 \rangle$ ?

- A.  $\langle 5, 4 \rangle$
- B.  $\langle 1, 6 \rangle$
- C.  $\langle 6, 5 \rangle$
- D.  $\langle 5, -6 \rangle$

29.3. What is  $3\langle 1, -2 \rangle$ ?

- A.  $\langle 3, -6 \rangle$
- B.  $\langle 4, -2 \rangle$
- C.  $\langle 3, 2 \rangle$
- D.  $\langle 1, -6 \rangle$

29.4. To find  $u - v$ , you should:

- A. add  $u$  and  $v$  directly
- B. add  $u$  and the opposite of  $v$
- C. multiply  $u$  and  $v$
- D. take the magnitude first

29.5. The vector from (1, 2) to (4, 6) is:

- A.  $\langle 3, 4 \rangle$
- B.  $\langle 5, 8 \rangle$
- C.  $\langle -3, -4 \rangle$
- D.  $\langle 4, 6 \rangle$

30. Write  $3i - 2j$  in component form. Answer as an equation.

30.1. The vector  $\langle 4, -2 \rangle$  means move:

- A. right 4, down 2
- B. left 4, down 2
- C. right 2, down 4
- D. up 4, right 2

30.2. What is  $\langle 2, 5 \rangle + \langle 3, -1 \rangle$ ?

- A.  $\langle 5, 4 \rangle$
- B.  $\langle 1, 6 \rangle$
- C.  $\langle 6, 5 \rangle$
- D.  $\langle 5, -6 \rangle$

30.3. What is  $3\langle 1, -2 \rangle$ ?

- A.  $\langle 3, -6 \rangle$
- B.  $\langle 4, -2 \rangle$
- C.  $\langle 3, 2 \rangle$
- D.  $\langle 1, -6 \rangle$

30.4. To find  $u - v$ , you should:

- A. add  $u$  and  $v$  directly
- B. add  $u$  and the opposite of  $v$
- C. multiply  $u$  and  $v$
- D. take the magnitude first

30.5. The vector from (1, 2) to (4, 6) is:

- A.  $\langle 3, 4 \rangle$
- B.  $\langle 5, 8 \rangle$
- C.  $\langle -3, -4 \rangle$
- D.  $\langle 4, 6 \rangle$

31. Which vector goes from (1, 2) to (5, -1)?

- A. (4, -3)
- B. (6, 1)
- C. (-4, 3)
- D. (5, -1)

31.1. The magnitude of  $\langle 6, 8 \rangle$  is:

- A. 10
- B. 14
- C. 48
- D. 100

31.2. A unit vector has magnitude:

- A. 0
- B. 1
- C. 2
- D. 10

31.3. In the plane, the vector  $i$  usually means:

- A.  $\langle 0, 1 \rangle$
- B.  $\langle 1, 0 \rangle$
- C.  $\langle -1, 0 \rangle$
- D.  $\langle 1, 1 \rangle$

31.4. In the plane, the vector  $j$  usually means:

- A.  $\langle 0, 1 \rangle$
- B.  $\langle 1, 0 \rangle$
- C.  $\langle -1, 0 \rangle$
- D.  $\langle 1, 1 \rangle$

31.5. A position vector to point (5, -1) starts at:

- A. (5, -1)
- B. the origin
- C. (0, -1)
- D. (5, 0)

32. Which vector equals  $-2\langle 3, -1 \rangle$ ?

- A. (6, -2)
- B. (-6, 2)
- C. (-1, 3)
- D. (1, -3)

32.1. The vector  $\langle 4, -2 \rangle$  means move:

- A. right 4, down 2
- B. left 4, down 2
- C. right 2, down 4
- D. up 4, right 2

32.2. What is  $\langle 2, 5 \rangle + \langle 3, -1 \rangle$ ?

- A.  $\langle 5, 4 \rangle$
- B.  $\langle 1, 6 \rangle$
- C.  $\langle 6, 5 \rangle$
- D.  $\langle 5, -6 \rangle$

32.3. What is  $3\langle 1, -2 \rangle$ ?

- A.  $\langle 3, -6 \rangle$
- B.  $\langle 4, -2 \rangle$
- C.  $\langle 3, 2 \rangle$
- D.  $\langle 1, -6 \rangle$

32.4. To find  $u - v$ , you should:

- A. add  $u$  and  $v$  directly
- B. add  $u$  and the opposite of  $v$
- C. multiply  $u$  and  $v$
- D. take the magnitude first

32.5. The vector from (1, 2) to (4, 6) is:

- A.  $\langle 3, 4 \rangle$
- B.  $\langle 5, 8 \rangle$
- C.  $\langle -3, -4 \rangle$
- D.  $\langle 4, 6 \rangle$