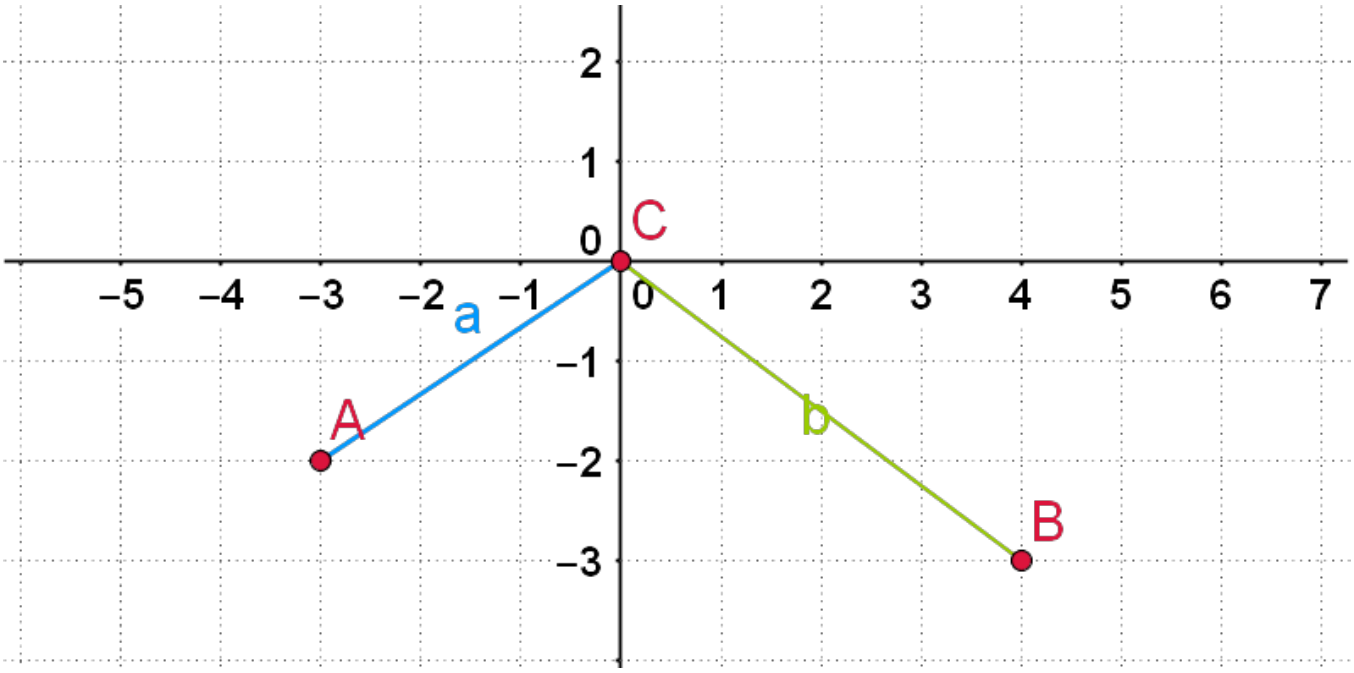
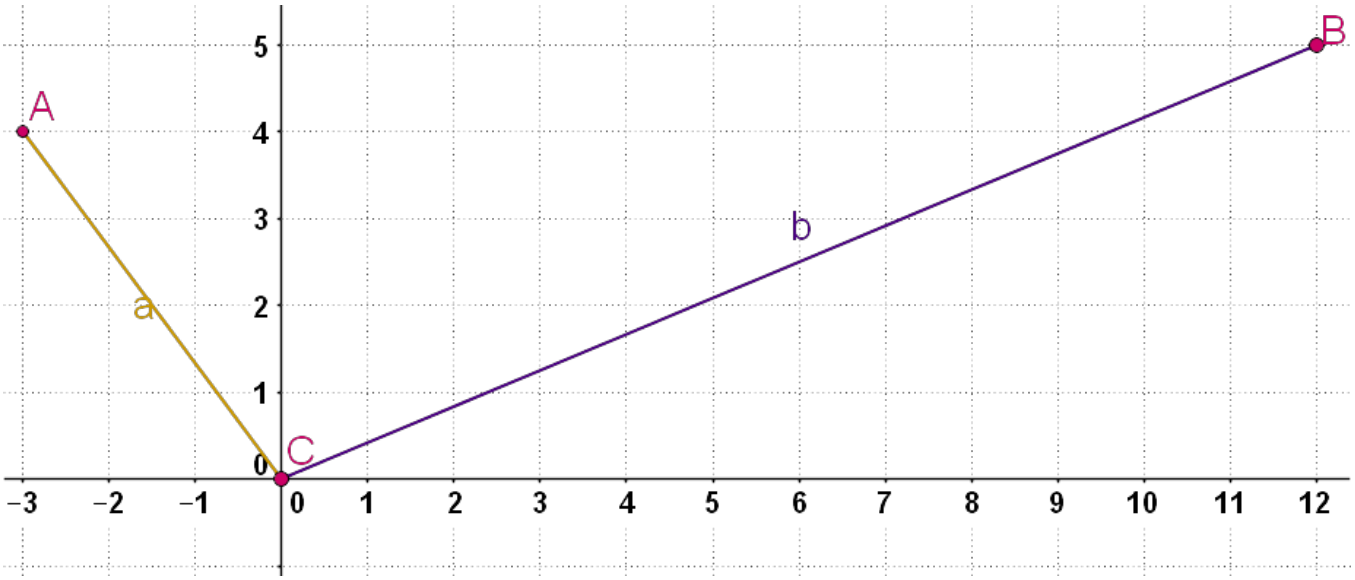
Twelfth Grade - Vector Algebra

1) What is the value of a × b?



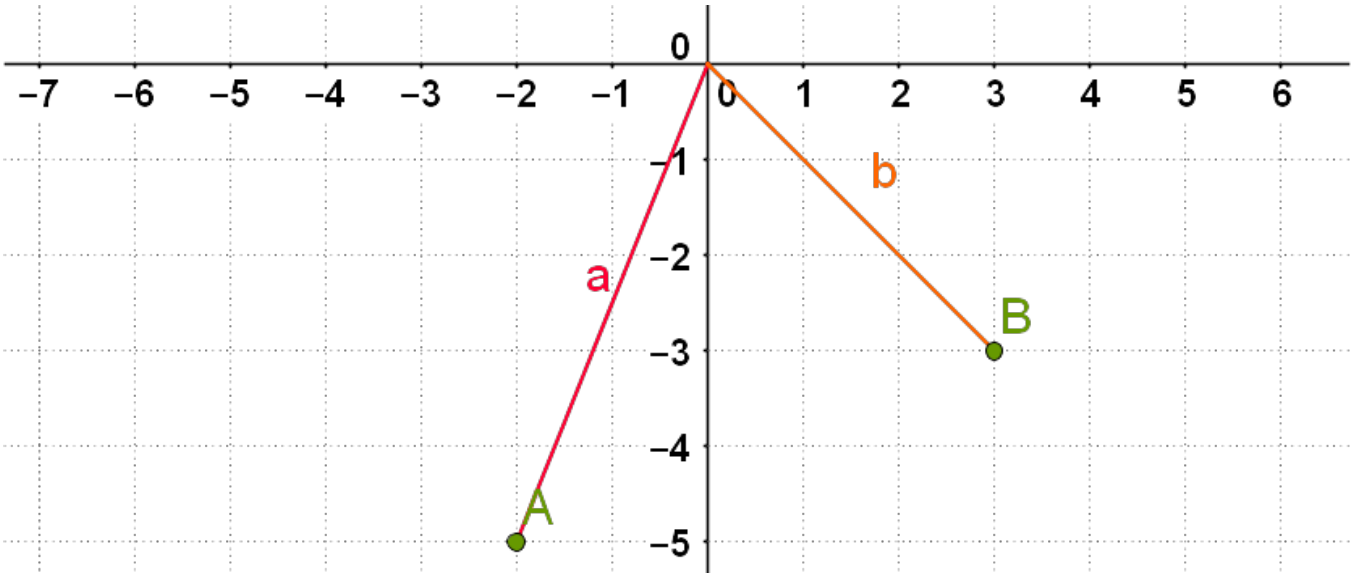
- -3
- 6
- -6
- -9

2) What is the value of a. b and hence find the value of ??



- 100.3°
- 104.3°
- 101.1°
- 102.4°

3) Use the dot product to find the size of angle ??



- 106.8°
- 66.8°
- 59.8°
- 16.4°

4) If k is any positive number, what is the size of the angle between the vectors a = (k, k) and b = (-3, 4)?

- 81.9°
- 56.5°
- 101.1°
- 91.9°

5) Which one of the following is not a unit vector?
a. (0,1,0) b. (0,0,1) c. (1/?3,1/?3,1/?3) d. (1,1,1)

- b
- c
- d
- a

6) What is the size of the angle between the vectors a = (2, 5, -1) and b = (-3, 2, 6)?

- 96.0
- 98.0
- 93.0
- 99.0

7) Vector a has magnitude 3, vector b has magnitude 4, the angle between a and b is 30° and n is the unit vector at right angles to both a and b. What is a × b?

- 2n
- 4n
- 5n
- 6n

8) Vector a has magnitude 3?2, vector b has magnitude 5. The angle between a and b is 135° and n is the unit vector at right angles to both a and b. What is the value of a × b?

- 16n
- 12n
- 13n
- 15n

9) Vector a has magnitude 1/?3, vector b has magnitude 4, the angle between a and b is 60° and n is the unit vector at right angles to both a and b. What is the value of a × b?

- 4n
- 2n
- 3n
- 6n

10) What is the cross product of a = (1, 2, 3) and b = (4, 5, 6)?

- (-3, 6, -3)
- (8, 6, 7)
- (-3, -6, 3)
- (3, 9, 3)

11) What is the cross product of a = (-2, 3, 5) and b = (-4, 1, -6)?

- (-33, -32, 40)
- (-23, -32, 10)
- (-29, -72, 30)
- (-53, -72, 10)

12) What is the cross product of a = (2, -5, 1) and b = (3, -2, -4)?

- (25, 13, 14)
- (25, 16, 11)
- (22, 11, 11)
- (28, 12, 11)

13) If a = (-2, 1, 1), b = (2, 1, 1) and c = a × b, what is the magnitude of c?

- 4?2
- 9?2
- 7?2
- 5?3

14) If a = (2, 0, 1), b = (0, 1, 1/2) and c = a × b, what is the magnitude of c?

- ?5
- ?3
- ?6
- ?8

15) If a = (2, -4, 4), b = (4, 0, 3) and c = a × b, what is the magnitude of c?

- 9?5
- 12?5
- 18?5
- 10?5

16) a, b and c are three vectors such that c is perpendicular to both a and b. What is the value of a × b × c?

- (0, 1, 0)
- (1, 0, 0)
- (0, 0, 1)
- (0, 0, 0)

17) What should be added in vector to get its resultant a unit vector i, if a = 3i + 4j - 2k

- -2i – 4j + 5k
- -2i – 4j + 2k
- -2i + 4j + 2k
- -i – j + k

18) The magnitudes of mutually perpendicular forces a, b and c are 2, 10 and 11 respectively. Then the magnitude of its resultant is

- 12
- 15
- 13
- 10

19) The position vectors of two points A and B are i + j - k and 2i - j + k respectively. Then |AB| = ?

- 8
- 0
- 4
- 6

20) If a and b are two non-zero and non-collinear vectors, then a + b and a - b are?

- None of these
- Linearly spanning
- Linearly independent
- Linearly dependent

21) Find the angle between two vectors a and b having the same length ?2, and their scalar product is -1

- 2?
- ?
- ?/3
- 2?/3

22) Let a and b be two vectors of the same magnitude, such that the angle between them is 60° a × b = 8. Find

$$|\vec{a}| \quad \text{and} \quad |\vec{b}|$$

- 5
- 2
- 4
- 1

23) If vector a = 5i - j - 3k and vector b = i + 3j - 5k, then the vectors (a + b) × (a - b) is

- Perpendicular
- Collinear
- Parallel
- Non parallel

24) Find

$$\vec{a} \times \vec{b}, \text{ if } \vec{a} = 2\vec{i} + \vec{k} \text{ and } \vec{b} = \vec{i} + \vec{j} + \vec{k}$$

- i + j + 2k
- -i - j + 2k
- -i - j - 2k
- -2i - 3j - 2k

25) Find the magnitude of

$$|\vec{a}| \text{ if } \vec{a} = (\vec{i} + 3\vec{j} - 2\vec{k}) \times (-\vec{i} + 3\vec{k})$$

- ?91
- 91

- 19
- ?19

26) If a and b are two vectors such that

$$\left|\vec{a}\right| = 3 \quad \left|\vec{b}\right| = 2 \quad \vec{a} \cdot \vec{b} = 6, Find \quad \left|\vec{a} + \vec{b}\right|$$

- 5
- 4
- 3
- 7

27) Find the values of x for which vectors a = $2x^2$i + 4xj + k and 7i - 2j + xk is obtuse.

- 0
- 0
- 0 > x > 1/2
- 0

28) Find the projection of vector 7i + j - 4k on vector 2i +6j + 3k

- 7/8
- 8/7
- 9/7
- 16/7

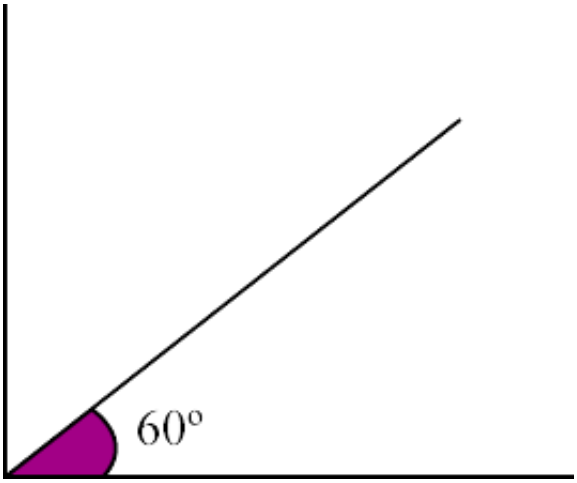
29) Here which of the following represents the linear combination of vectors?

1. $\vec{r} = x\vec{a} + y\vec{b} + z\vec{c}$ 2. $\vec{r} = x\vec{a} - y\vec{b}$ 3. $\vec{r} = x\vec{a}$ 4. None of these

- Only 1
- None of these
- Both 1 and 2

- Both 1 and 3

30) The magnitude of a vector F is 10 units and the direction of the vector is 60° with the horizontal. Find the components of the vector?



- (5, 5?3)
- (9, 9?2)
- (6, 6?3)
- (4, 4?2)