



## Ninth Grade - Vector and Matrix Quantities

1) Classify whether the quantity 10 kg is

- Vector
- Scalar
- Co initial vectors
- Unit

2) Classify whether 10 meters north is

- Vector
- Scalar
- Co initial vectors
- Unit

3) Classify whether 10 Newton is

- Scalar
- Unit
- Vector
- Co initial vectors

4) Classify whether  $10^{23}$  coulomb is

- Vector
- Co initial vectors
- Scalar
- Unit

5) Let a and b are given vectors such that



*If  $\vec{a}$  and  $\vec{b}$  are collinear and are in the same direction then*

- $ab$
- $1$
- $0$
- $-ab$

6) Let  $a$  and  $b$  are given vectors such that

*If  $\vec{a}$  and  $\vec{b}$  are in the opposite direction then*

- $-ab$
- $1$
- $0$
- $ab$

7) Let  $a$  and  $b$  are given vectors such that

*If  $\vec{a}$  and  $\vec{b}$  are two non zero vectors then*

$$a) \vec{a} \cdot \vec{b} = 0 \quad b) \vec{a} \cdot \vec{b} \neq 0 \quad c) \vec{a} \propto \vec{b} \quad d) \vec{a} \equiv \vec{b}$$

- $a$
- $b$
- $d$
- $c$

8) Find angle between two vectors.

*If  $\vec{a}$  and  $\vec{b}$  are two vectors such that*

$$|\vec{a}| = 4 \quad |\vec{b}| = 3 \quad \text{and} \quad \vec{a} \cdot \vec{b} = 6$$

- $1/8$



- $\frac{1}{2}$
- $\frac{1}{3}$
- $\frac{1}{4}$

9) Find the projection of the vector.

$$(\vec{r} \cdot \vec{j}) \vec{i} + (\vec{r} \cdot \vec{i}) \vec{j} + (\vec{r} \cdot \vec{k}) \vec{k}$$

(a)  $\vec{i}$    (b)  $\vec{j}$    (c)  $\vec{r}$    (d)  $\vec{k}$

- b
- c
- d
- a

10) Identify the law vectors.

If  $\vec{a}$  and  $\vec{b}$  represented in magnitude and direction by the two adjacent sides of a parallelogram then their sum  $\vec{c}$  is represented by the parallelogram and it is known as

- Trapezoidal law of vectors
- Parallelogram law of vectors
- Quadrilateral law of vectors
- Law of vectors

11) If the following vectors represented by the side of the triangle taken in order by then



If  $\vec{a}, \vec{b}, \vec{c}$  be the vectors represented by the sides of a triangle taken in order then

a)  $\vec{a} + \vec{b} + \vec{c} = 1$       b)  $\vec{a} + \vec{b} + \vec{c} = 0$

c)  $\vec{a} + \vec{b} + \vec{c} = 2$       d)  $\vec{a} + \vec{b} + \vec{c} = 3$

- c
- a
- b
- d

12) Simplify the following vectors.

If  $\left| -m(\vec{a}) \right| = ?$

a)  $-m|\vec{a}|$     b)  $m|\vec{a}|$     c)  $m\vec{a}$     d)  $-m\vec{a}$

- d
- b
- c
- a

13) If the diagonals of a parallelogram are equal then it is?

- Trapezium
- Parallelogram
- Rhombus
- Rectangle

14) If the vectors are parallel to the same plane then it is



- Collinear
- Non collinear
- Coplanar
- Non coplanar

15) Which of the following is external section formula?

- b
- d
- a
- c

16) Consider the given vectors a and b.

Find the angle between two vectors  $\vec{a}$  and  $\vec{b}$

having the same length  $\sqrt{2}$  and their scalar product is -1

- $\frac{\pi}{2}$
- $\frac{2\pi}{3}$
- $\frac{\pi}{3}$
- $\frac{6\pi}{7}$

17) Consider the given vectors a and b.

Let  $\vec{a}$  and  $\vec{b}$  be two vectors of the same magnitude

such that the angle between them is  $60^\circ$   $\vec{a} \cdot \vec{b} = 8$ . Find  $|\vec{a}|$  and  $|\vec{b}|$

- 4
- 3
- 5
- 8



18) Consider the given vectors a and b.

$$\text{If } \vec{a} = 5\vec{i} - \vec{j} - 3\vec{k} \quad \vec{b} = \vec{i} + 3\vec{j} - 5\vec{k}$$

then the vectors  $(\vec{a} + \vec{b}) \cdot (\vec{a} - \vec{b})$  is

- Non parallel
- Parallel
- Collinear
- Perpendicular

19) Consider the given vectors a and b.

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

$$(a) -\vec{i} - \vec{j} + 2\vec{k} \quad (b) -\vec{j} - \vec{j} + 6\vec{k} \quad (c) -\vec{i} - \vec{i} - 8\vec{k} \quad (d) \vec{k} + \vec{j} - 2\vec{k}$$

- a
- b
- c
- d

20) Let ab given vectors then

$$\text{Find the magnitude } \vec{a} \cdot \vec{a} = (\vec{i} + \vec{j} + \vec{k}) \times (-\vec{i} + 3\vec{k})$$

- ?95
- ?99
- ?93
- ?91

21) From the product of given two vectors.

$$\text{Find } \lambda \text{ and } \mu \text{ if } (2\vec{i} + 6\vec{j} + 27\vec{k}) * (\vec{i} + \lambda\vec{j} + \mu\vec{k})$$



- 3, 97/7
- 3, 27/2
- 5, 57/2
- 7, 17/2

22) Given magnitude and product of two vectors then

If two vectors  $\vec{a}$  and  $\vec{b}$  are such that

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

- 6
- 9
- 2
- 5

23) Let a and b are two vectors.

Find the values of x for which  $\vec{a} = 2x^2\vec{i} + 4x\vec{j} + \vec{k}$

and  $\vec{b} = 7\vec{i} - 2\vec{j} + x\vec{k}$  is obtuse

- $0 > x > 1/3$
- $0 < x < 7/2$
- 0
- 0

24) For the given vectors.

Find the projection  $7\vec{i} + \vec{j} - 4\vec{k}$  on  $2\vec{i} + 6\vec{j} + 3\vec{k}$

- 4/7
- 5/9
- 5/7
- 8/7



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

a)  $\vec{r} = x\vec{a} + y\vec{b} + z\vec{c}$     b)  $\vec{r} = x\vec{a} - y\vec{b}$     c)  $\vec{r} = x\vec{a}$     d) *None*

- Both 2 and 4
- Both 1 and 2
- Both 2 and 3
- Both 1 and 2

26) Find the unit vector parallel to the vector?

$$-3\vec{i} + 4\vec{j}$$

a)  $(3/5)\vec{i} + (4/5)\vec{j}$     b)  $(3/5)\vec{i} - (4/5)\vec{j}$     c)  $-(3/5)\vec{i} + (4/5)\vec{j}$     d)  $(3/5)\vec{i} + (4/5)\vec{j}$

- a
- b
- c
- d

27) Find the magnitude of vector?

$$2\vec{i} - \vec{j}$$

- 9
- 5
- 6
- 7

28) Find the value of x, y, z

$$\vec{a} = x\vec{i} + y\vec{j} + z\vec{k} \quad \vec{b} = 2\vec{i} + y\vec{j} + \vec{k} \text{ are equal}$$

- (2, 2, 1)





- (5 , 7 , 1)
- (-2 , - 2 , -1)
- (-2 , -2 , 1)

29) Find the magnitude of

$$\vec{a} = 3\vec{i} - 6\vec{j} + 2\vec{k}$$

- 5
- 7
- 9
- 3

30) How can we define.

$$\vec{a} \times \vec{b}$$

$$a) \quad \vec{a} \times \vec{b} = |\vec{a}| \quad |\vec{b}| \cos \theta \quad b) \quad \vec{a} \times \vec{b} = \cos \theta$$

$$c) \quad \vec{a} \times \vec{b} = |\vec{a}| \quad |\vec{b}| \sin \theta \quad d) \quad \vec{a} \times \vec{b} = |\vec{a}| \quad |\vec{b}|$$

- d
- c
- a
- b