Website: contoureducation.com.au | **Phone:** 1800 888 300
Email: hello@contoureducation.com.au

VCE Specialist Mathematics ½

Vectors I [6.1]

Test

20.5 Marks. 1 Minute Reading. 16 Minutes Writing.

Results:

Test Questions	_____ / 20.5

Section A: Test Questions (20.5 Marks)

Question 1 (3.5 marks)

Tick whether the following statements are **true** or **false**.

Statement	True	False
a. Scalar quantity has a direction component whereas a vector quantity does not.		
b. If $\overrightarrow{OA} = \boldsymbol{a}, \overrightarrow{OB} = \boldsymbol{b}, \overrightarrow{CA} = \boldsymbol{u}$ and $\overrightarrow{CB} = \boldsymbol{v}$, then $\boldsymbol{b} - \boldsymbol{a} = \boldsymbol{v} - \boldsymbol{u}$.		
c. The resultant vector is a sum of any number of vectors added together.		
d. Subtraction of a vector can be thought of adding a negative vector.		
e. Scalar multiplication does not change the direction of the vector.		
f. If the point A has coordinates $(1, 4)$ and the point B has coordinates $(3, 5)$ then the position vector of A is $2\boldsymbol{i} + \boldsymbol{j}$.		
g. The angle between two vectors is measured by joining one's head with another vector's tail.		

Space for Personal Notes

Question 2 (4 marks)

The point A has coordinates $(2,1,-3)$ and point B is such that $\overrightarrow{AB} = 3\boldsymbol{i} - \boldsymbol{j} + 5\boldsymbol{k}$.

a. Find the position vector of B. (2 marks)

b. Hence, find the distance of B from O. (2 marks)

Space for Personal Notes

Question 3 (3 marks)

Consider the points A: $(1, 2)$ and B: $(2, -1)$.

It is known that $\overrightarrow{OA} + k\boldsymbol{j}$ and $\overrightarrow{AB}$ are parallel to each other.

Find the value of k.

Space for Personal Notes

Question 4 (4 marks)

The following information is given for two points which lie on the same plane.

$$\overrightarrow{OA} = \boldsymbol{i} + 4\boldsymbol{j} \text{ and } \overrightarrow{OB} = 5\boldsymbol{i} + 5\boldsymbol{j}$$

a. Find the vector $\overrightarrow{AB}$ and hence, state its length. (2 marks)

b. Find $\cos(\theta)$, where θ is the angle AOB. (2 marks)

Space for Personal Notes

Question 5 (6 marks)

Given the vectors:

$$\boldsymbol{a} = \boldsymbol{i} - \boldsymbol{j} + 3\boldsymbol{k}$$

$$\boldsymbol{b} = 2\boldsymbol{i} - \boldsymbol{j} + \boldsymbol{k}$$

a. Evaluate $\boldsymbol{a} - \boldsymbol{b}$. (1 mark)

b. Calculate the dot product of $\boldsymbol{a}$ and $\boldsymbol{b}$. (1 mark)

c. Find a unit vector in the direction of $-\boldsymbol{a}$. (1 mark)

d. Find $\sin(\theta)$, where θ is the angle between $\boldsymbol{a}$ and the z-axis. (3 marks)

Space for Personal Notes

CONTOUREDUCATION

Website: contoureducation.com.au | **Phone:** 1800 888 300 | **Email:** hello@contoureducation.com.au

VCE Specialist Mathematics ½

Free 1-on-1 Consults

What Are 1-on-1 Consults?

- **Who Runs Them?** Experienced Contour tutors (45 + raw scores and 99 + ATARs).
- **Who Can Join?** Fully enrolled Contour students.
- **When Are They?** 30-minute 1-on-1 help sessions, after-school weekdays, and all-day weekends.
- **What To Do?** Join on time, ask questions, re-learn concepts, or extend yourself!
- **Price?** Completely free!
- **One Active Booking Per Subject:** Must attend your current consultation before scheduling the next :)

SAVE THE LINK, AND MAKE THE MOST OF THIS (FREE) SERVICE!

Booking Link

bit.ly/contour-specialist-consult-2025