CONTOUREDUCATION

VCE Specialist Mathematics ½
Combinatorics II [5.2]
Test

26.5 Marks. 1 Minute Reading. 27 Minutes Writing.

Results:

Test Questions	_____ / 26.5

Section A: Test Questions (26.5 Marks)

Question 1 (2.5 marks)

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

Statement	True	False
a. Combination is used when the order matters.		
b. There are 10^2 ways to select any number of people from the pool of 10 people.		
c. The pigeonhole principle is used to show that some pairs or groups of objects have the same property.		
d. The inclusion-exclusion principle allows us to count the number of elements in a union of sets.		
e. The inclusion-exclusion principle formula for three sets is given by $|A \cup B \cup C| = |A| + |B| + |C| - |A \cap B| - |B \cap C| - |A \cap C| - |A \cap B \cap C|$.		

Space for Personal Notes

Question 2 (8 marks) **Tech-Active.**

Consider the word 'TRIANGLE'.

a. How many ways can the letters of the word TRIANGLE be arranged? (2 marks)

_____

_____

_____

_____

b. How many ways can the letters of the word TRIANGLE be arranged if the first three letters must be RAN (in that exact order)? (2 marks)

_____

_____

_____

_____

c. How many ways can the letters of the word TRIANGLE be arranged if the first three letters must be RAN (in any order)? (2 marks)

_____

_____

_____

_____

d. How many ways can the letters of the word TRIANGLE be arranged if the first three letters must be RAN (in any order) and the last letter must be a vowel? (2 marks)

_____

_____

_____

_____

Space for Personal Notes

Question 3 (2 marks)

Find the minimum number of students in a class such that three of them are born in the same month.

_____

_____

_____

_____

_____

_____

_____

Space for Personal Notes

Question 4 (3 marks)

Show that in a group of 20 people and friendship is mutual, show that there exist two people who have the same number of friends.

_____

_____

_____

_____

_____

_____

Space for Personal Notes

Question 5 (8 marks) **Tech-Active.**

How many seven-letter arrangements of the word CONTOUR,

a. Begin with a vowel? (2 marks)

_____

_____

_____

_____

b. End with a vowel? (2 marks)

_____

_____

_____

_____

c. Begin and end with a vowel? (2 marks)

_____

_____

_____

_____

d. Begin or end with a vowel? (2 marks)

_____

_____

_____

_____

Question 6 (3 marks)

There are 350 farmers in a large region. 260 farm beetroot, 100 farm yams, 70 farm radish, 40 farm beetroot and radish, 40 farm yams and radish and 30 farm beetroot and yams.

Let B, Y, and R denote the set of farms that farm beetroot, yams and radish respectively.

Determine the number of farmers that farm beetroot, yams, and radish.

_____

_____

_____

_____

_____

_____

_____

Space for Personal Notes

CONTOUREDUCATION

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