# CONTOUREDUCATION

## VCE Specialist Mathematics ½
## Proofs I [2.1]
## Test

**20 Marks. 1 Minute Reading. 16 Minutes Writing.**

### Results:

| | |
|---|---|
| **Test Questions** | _____ / 20 |

## Section A: Test Questions (20 Marks)

**Question 1** (5 marks)

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

| Statement | True | False |
|---|---|---|
| **a.** Set given by $\{x \mid x^2 \neq 16\}$ can be simplified to $R \backslash \{-4, 4\}$. | | |
| **b.** All integers are natural numbers hence $Z \subseteq N$. | | |
| **c.** 1.91 is a rational number. | | |
| **d.** To simplify $\frac{1}{2+\sqrt{3}}$, you multiply $2 + \sqrt{3}$ on both top and bottom. | | |
| **e.** Opposite of liking maths and science is not liking maths or not liking science. | | |
| **f.** $2k + 1$ is an odd number regardless of what $k$ is. | | |
| **g.** $\frac{m}{n}$ is a rational number only if $m$ and $n$ are integers. | | |
| **h.** If $m$ and $n$ are non-zero integers, then $\frac{m}{n}$ is a rational number. | | |
| **i.** To prove that a number is divisible by 5, we simply show that the number is 5 times by an integer. | | |
| **j.** Product of 5 consecutive numbers is always divisible by 5. | | |

Space for Personal Notes

**Question 2** (2 marks)

Express $\frac{2+\sqrt{5}}{-1-\sqrt{3}}$ in the form $\frac{a}{b}$ where $a \in R$ and $b \in N$.

_____

_____

_____

_____

_____

_____

_____

_____

Space for Personal Notes

**Question 3** (2 marks)

James claims the following.

<p style="text-align:center">All living humans breathe and eat.</p>

Pranit comes along and opposes the idea.

**a.** What did Pranit say? (1 mark)

_____

_____

**b.** Who is correct? (1 mark)

_____

_____

**Space for Personal Notes**

**Question 4** (5 marks)

Prove the following conditional statements.

**a.** If $n$ is an even number, then $n^3 + n^2$ is also an even number. (2 marks)

_____

_____

_____

_____

_____

_____

_____

_____

**b.** If $n$ is a natural number, then $n^3 - n$ is divisible by 3. (3 marks)

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

**Question 5** (6 marks)

Prove the following statements:

**a.** For any integer $n$, if $n$ is divisible by 3, then $n^2$ is divisible by 3. (2 marks)

_____

_____

_____

_____

_____

_____

**b.** For any integer $m$ and $n$, if $m$ is divisible by 2 and $n$ is divisible by 5 then $7m + 4n$ is even. (2 marks)

_____

_____

_____

_____

_____

_____

**c.** For any integer $n, (2n - 1)^2 + (2n + 2)^2$ is odd. (2 marks)

_____

_____

_____

_____

_____

_____

# 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