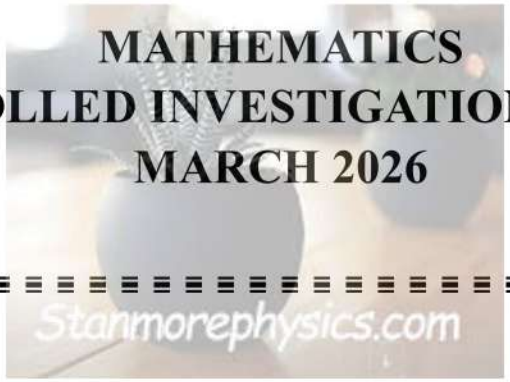
GET

GRADE 09

MATHEMATICS
CONTROLLED INVESTIGATION – TERM 1
MARCH 2026



MARKS: 50

TIME: 1 hour

This Question Paper consists of 5 pages.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This investigation is about discovering patterns. You must show your working, explain what you notice, and write short notes where asked. Marks are awarded for both correct answers and clear explanations.
2. This investigation shall be done during two **lessons.**
3. This investigation consists of **7 Questions**.
4. Answer **ALL** the questions.
5. Number the answers correctly according to the numbering system used in this question paper.
6. Clearly show ALL calculations, diagrams (which may not necessarily be drawn to scale), graphs, etc, that you have used in determining your answers
7. Answers only will NOT necessarily be awarded full marks.
8. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
9. If necessary, round off answers correct to TWO decimal places, unless stated otherwise
10. Write neatly and legibly.

Section A: Linear Number Patterns (15 marks)

Question 1 (8 marks)

Consider the sequence: 3, 7, 11, 15, …

a) Write down the next two terms. (2)

b) What is the common difference? (1)

c) Investigate: Write a formula for the n^{th}term. (3)

d) Use your formula to find the 20th term. (2)

Question 2 (7 marks)

Investigate the sequence: 12, 9, 6, 3, …

a) Write down the next two terms. (2)

b) What is the common difference? (1)

c) Write a formula for the n^{th}term. (2)

d) Which term of the sequence is equal to -9? (2)

Section B: Square and Cube Patterns (10 marks)

Question 3 (5 marks)

Investigate perfect squares: 2, 5, 10, 17, … (Think Perfect Squares)

a) Write down the next two terms. (2)

b) What do you notice about the differences between consecutive terms? (2)

c) Explain why these differences increase. (1)

Question 4 (5 marks)

Investigate cubes: 0, 7, 26, 63, …

a) Write down the next two terms. (2)

b) What do you notice about the growth compared to squares? (2)

c) Explain why cubes grow faster. (1)

Section C: Fibonacci Sequence (10 marks)

Question 5 (10 marks)

Investigate the sequence: 2, 2, 4, 6, 10, 16, …

a) Write down the next three terms. (3)

b) Explain the rule in words. (2)

c) What do you notice about the ratio of consecutive terms as the sequence grows? (2)

d) Why is this sequence important in nature? Give one example. (2)

e) What is the golden ratio and how is it related to the Fibonacci Sequence? (1)

Section D: Pascal's Triangle (8 marks)

Question 6 (8 marks)

Investigate Pascal's Triangle:

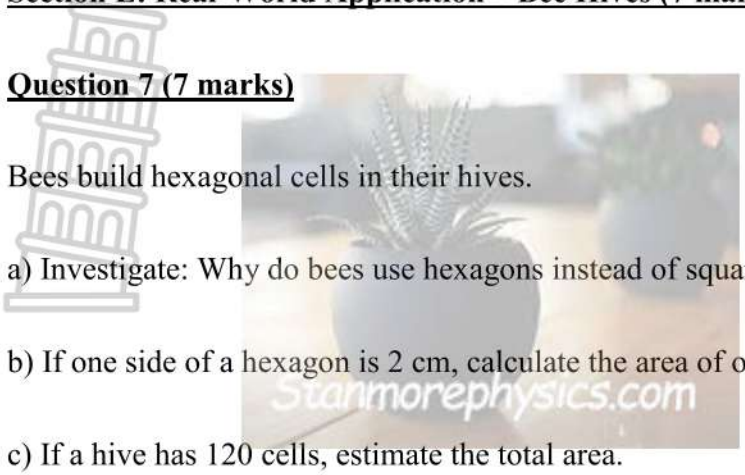
a) Write down the first five rows. (3)

b) What do you notice about the diagonals? (2)

c) How does Pascal's Triangle connect to Fibonacci Sequence? (3)

Section E: Real-World Application – Bee Hives (7 marks)

Question 7 (7 marks)



Bees build hexagonal cells in their hives.

a) Investigate: Why do bees use hexagons instead of squares or triangles? (2)

b) If one side of a hexagon is 2 cm, calculate the area of one cell. (3)

c) If a hive has 120 cells, estimate the total area. (2)