

Name: \_\_\_\_\_

Mark: \_\_\_\_\_ / 30

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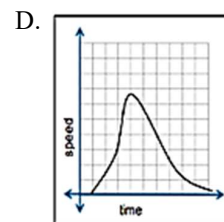
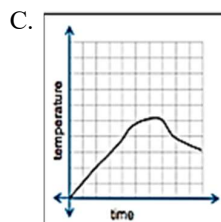
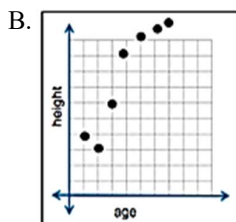
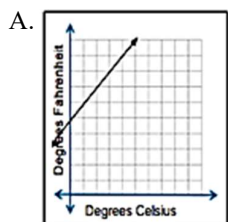
## Section I

## Part A: Knowledge - Fill in Blanks (6 marks, 1 mark per each)

- Write out the first six rows of Pascal's triangle below. (2 marks)
- The term  $t_{3,2} =$  \_\_\_\_\_.
- The sum of  $t_{5,4} + t_{5,5} =$  \_\_\_\_\_.
- The sum of all terms in the row 7 = \_\_\_\_\_.
- Express  $t_{25,17} + t_{25,18}$  as a single term in the form  $t_{n,r}$ : \_\_\_\_\_.

## Part B: Knowledge - Multiple Choices (3 marks, 1 mark per each)

- Which of the following sequence is an arithmetic sequence for all values of  $x$ ?
  - $x^8, x^4, x^2, x$
  - $x, 2x, 3x, 4x$
  - $x, x^2, x^3, x^4$
  - $x, 2x, 4x, 8x$
- Which of the following is the correct expansion of  $(2x + y)^3$ 
  - $2x^3 + y^3$
  - $8x^3 + y^3$
  - $8x^3 + 4x^2y + 2xy^2 + y^3$
  - $8x^3 + 12x^2y + 6xy^2 + y^3$
- Which of the following graph represents a discrete function?



## Part C: Short Answers - Application (9 marks)

- Apply what you have learned in this unit to solve the following problems.
  - The question requires mathematical calculations, so please show all of your work.
- Find the first four terms based on the given formulas (4 marks):
    - $t_n = 2^n$
    - $f(n) = f(n-1) - 7, f(1) = 30$
  - Apply your knowledge of Pascal's triangle to expand the following binomial powers. Please show your work.
    - $(x - 3y)^3$  (2.5 marks)
    - $(2m + n)^5$  (2.5 marks)

## Part D: Short Answers - Thinking (6 marks)

- The question requires mathematical calculations, so please show all of your work.
- 1) Analyze and find an explicit formula for the  $n$ th term of the sequence 20, 23, 26, 29, 32, ... (1 mark)
  - 2) Find the 25<sup>th</sup> term of the sequence -2, -8, -14, -20, ... (2 marks)

## Section II

12. 1) Analyze and find a recursion formula for the nth term of the sequence 10, 20, 40, 80, ... (1 mark)
- 2) Determine the number of terms in the geometric sequence 16, -8, 4, ...,  $-\frac{1}{2048}$ . (2 marks)

### Part E: Communication (6 marks)

13. Mary plans to buy some apples. Given that each apple is \$0.4,
- 1) Use the function notation “f( )” and domain restriction to represent the relationship between the number of apples and the total price. (2 marks)
  - 2) Sketch a graph to represent the relationship between the number of apples and the total price. (2 marks)
  - 3) Is this function a discrete function or continuous function? Give your reasoning. (2 marks)