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VCE Specialist Mathematics ½

Logic & Algorithms I [2.4]

Test

24.5 Marks. 1 Minute Reading. 20 Minutes Writing.

Results:

Test Questions	_____ / 24.5

Section A: Test Questions (24.5 Marks)

Question 1 (2.5 marks)

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

Statement	True	False
a. Selections allow us to selectively perform an operation.		
b. For loops can be used when we don't know how many loops it will exactly take to finish.		
c. Infinite loop can be created if the variable controlling the loop is updated within the operation of the loop.		
d. Function can be defined to hold an algorithm and can be called within another algorithm.		
e. List can be used to hold multiple values at once.		

Space for Personal Notes

Question 2 (2 marks)

Turn the following hybrid function into an algorithm:

$$f(n) = \begin{cases} 2n+1, & \text{if } n \text{ is odd} \\ 4, & \text{if } n = 4 \\ 3n-2, & \text{otherwise} \end{cases}$$

Space for Personal Notes

Question 3 (2 marks)

Write an algorithm to find the first six terms of the arithmetic sequence with the first term 19 and common difference 3.

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Question 4 (2 marks)

James decides to invest $50000 at an interest rate of 3% compounded annually. Construct an algorithm that outputs the number of years needed for James' initial investment to double.

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Question 5 (6 marks)

Consider the sequence $3,5,7,9,\ldots,2n+1$.

Using pseudocode, write an algorithm to calculate:

a. The sum of the terms in this sequence. (2 marks)

b. The product of the terms in this sequence. (2 marks)

c. Provide a table of values to demonstrate each algorithm when $n = 3$. (2 marks)

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Question 6 (3 marks)

Using pseudocodes, construct an algorithm for the following:

An algorithm that outputs the remainder of a division with a given input of number and divisor.

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Question 7 (4 marks)

Using pseudocodes, construct an algorithm for the following:

An algorithm that reads 3 numbers (a, b, c) and writes them in ascending order.

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Question 8 (3 marks)

Using pseudocode, write an algorithm to find the positive integer solutions of the equation.

$$43x + 17y + 7z = 200$$

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