

# ADVANCED LEVEL MATHEMATICS

Instructor, G. David • BöŞZik Inc.™

R2S Exodus 2020 - 2021



Subject : **PURE MATHEMATICS**

Proficiency : **CAPE, UNIT 1**

Classifier : **Assignment**

Assessment: **WS03 - Binary Operations**

Date Given : **Oct. 29, 2020**

Date Due : **Nov. 05, 2020**

## General Instructions

- Please attempt ALL questions. All working must be shown clearly and neatly. All drawings and labelings should be done using a pencil. Pay close attention to accuracy and significant figures, as appropriate.
- All solutions should be numbered within the left-hand side margin ONLY. Do not write solutions in the header, footer or within all margins of your folder leaves. And, if it is economical, start a new solution on the next page.
- On all your reports scanned as a single file (**pdf only**), use the *Formatted Header*:

**Name** : Jane Doe

**Institution** : Hampton School

**Subject** : Pure Math, Unit 1

**Assessment** : [Insert name (see above)]

**Due Date** : Mm, dd, yyyy

- Report Submissions ~ All reports should be submitted via our *FTP site* or *R2S iDoceo Connect*. (Upload Codes will be provided per assignment.)

This document consists of 2 typeset pages and 0 blank pages.

**Please Turn Over**

**PURE MATHEMATICS**  
**WORKSHEET**

1. (a) What are *Unary and Binary Operators*? Give an example of each. [2]
- (b) If,  $a \otimes b = e$  where  $\otimes$  is binary operator and  $e$  is an *identity value*, then what is the relationship between the quantities  $a$  and  $b$ ? [1]
- (c) Binary operations on  $x, y \in \mathbb{R}$  is defined as  $x \odot y = 4x + 5y$ . Determine whether or not the binary operator,  $\odot$  is
- (i) closed on  $\mathbb{R}$ , [3]
- (ii) associative on  $\mathbb{R}$  [4]
- (iii) distributive on  $\mathbb{R}$  [5]

**[15 marks]**

2. Binary operations on  $x, y \in \mathbb{R}$  is defined as  $x \otimes y = 2x^2 + 2y^2 - 3$ . Determine whether or not the binary operator,  $\otimes$  is
- (a) Closed [5]
- (b) Commutative [4]
- (c) Associative [5]
- (d) Distributive [6]

**[20 marks]**

3. Binary operations on  $\mathbb{R}$  is defined as  $x \otimes y = 3x + y^2 - 10$ .
- (a) Find the values of  $2 \otimes (-3)$  and  $(-3) \otimes 2$ . Comment on your answer. [4]
- (b) Develop the equation  $x \otimes x = 0$  and solve for all possible values of  $x$ . [6]

**[10 marks]**

**TOTAL 35 marks**