SOEN 6011 - Software Engineering Processes

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Scientific Calculator- ETERNITY: FUNCTIONS

Project Report

Deliverable 1

Presented to

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Contents

Chapter 1

Introduction

1.1 Function Definition[2]

Exponentiation[2] is a mathematical operation, written as x^y, involving two numbers, the base x and the exponent or power y. When y is a positive integer, exponentiation corresponds to repeated multiplication of the base: that is, x^y is the product of multiplying y bases:

$$f(x, y) = x^y \tag{1.1}$$

1.1 is known as the Exponentiation function

$$x^y = x * ... * y \text{ (y times)} \tag{1.2}$$

1.2 is depicts the evaluation of exponentiation function

1.2 Domain[3]

All real numbers

$$\{(x, y) \in \mathbb{R}^2 : (x \geq 0 \land y \neq 0) \lor x > 0\} \tag{1.3}$$

1.3 presents the domain of exponentiation function

1.3 Co-domain[1]

All positive real numbers (never zero)

$$\{(x, y) \in \mathbb{R} : x \geq 0\} \tag{1.4}$$

1.4 presents the co-domain of exponentiation function

1.4 Characteristics[1]

- In an exponential graph, the "rate of change" increases (or decreases) across the graph.
- The exponential graph crosses the y-axis at (0,1).
- The exponential graph increases, when $x > 1$.
- The exponential graph decreases, when $0 < x < 1$.
- The exponential graph is asymptotic to the x-axis - gets very, very close to the x-axis but, in this case, does not touch it or cross it.

Bibliography

[1] MathBits' Teacher. *Exponential Functions*. 2019. URL: https://mathbitsnotebook.com/Algebra2/Exponential/EXExpFunctions.html (visited on 07/06/2019).

[2] Wikipedia. *Exponentiation*. 2019. URL: https://en.wikipedia.org/wiki/Exponentiation (visited on 07/06/2019).

[3] WolframAlpha. *Domain of exponentiation function*. 2019. URL: https://www.wolframalpha.com/input/?i=x%5C%5Ey (visited on 07/06/2019).