Problem 1 - SOEN 6011

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1 Function 8: Power Function

1.1 Introduction

A power function or exponentiation is of the form:

$$f(x, y) = x^y$$

where x and y are real numbers.

1.2 Domain and Codomain

1. When y is a non-negative integer, the domain is all real numbers: $(-\infty, \infty)$

2. When y is a negative integer, the domain is all real numbers excluding zero ($(-\infty, 0) \cup (0, \infty)$)

3. When y is an irrational number and $y > 0$, the domain is all non-negative real numbers and when y is an irrational number and $y < 0$, the domain is all positive real numbers

4. The codomain of the function is $[-\infty, \infty]$ and can be indeterminate

1.3 Characteristics of Power Function.

1. The behaviour of the power function depends on whether the value of y is a positive or a negative and an odd or an even number

2. Also, the power function outputs differently for negative and positive fractional powers

References

[1] *"Exponentiation"* https://en.wikipedia.org/wiki/Exponentiation#Power_functions

[2] *"Fractional Exponents"* https://www.mathsisfun.com/algebra/exponent-fractional.html