

# Problem 1

Course - SOEN 6011, Professor - Pankaj Kamthan

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## 1 Function 9 : Power Function

### 1.1 Description

A power function is of the form:

$$f(x) = x^y \tag{1}$$

where  $y$  is a real number.

### 1.2 Domain

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

### 1.3 Characteristics of Power Function.

1. The behaviour of power function depends on whether the  $y$  is a positive or a negative number.
2. The behaviour of power function depends on whether the  $y$  is even or odd.
3. Also, the power function behaves differently for fractional powers and specifically for negative or positive fractional powers.

## References

- [1] "*Power Functions Algebraic Representation*" <http://wmueller.com/precalculus/families/1\textunderscore41.html>
- [2] "*Power Functions*" <http://www.biology.arizona.edu/biomath/tutorials/Power/Powerbasics.html>