FAR BEYOND

MAT122

Polynomial Function
Quadratic Function
Exponential Function

Stony Brook University

Polynomials/Intro to Power Function

Power Function: ax^n

Polynomial:

Format: $p(x) = a_n x^n + a_{n-1} x^{n-1} + a_{n-2} x^{n-2} + \ldots + a_2 x^2 + a_1 x + a_0$

example: $p(x) = -3x^4 + 18x^2 + 29$

Quadratics - Intro

The quadratic function graphs as a parabola.

$$f(x) = ax^2 + bx + c$$

where $a \neq 0$

Exponential Functions

Compare the two functions: Power Function $f(x) = x^2$ versus Exponential Function $f(x) = 2^x$

Exponential Function: $f(x) = a_0 b^x$ where b is a positive constant and not equal to zero and not equal to one

Examples of Exponential Functions:

Not Exponential Functions:

General Shapes of Exponential Graph

As time increases, so does resulting amount.

Exponential
Growth

As time increases, resulting amount decreases.

Exponential
Decay

Exponential Sketch:

Exponent Laws

$$b^x b^y = b^{x+y}$$

$$\frac{b^x}{b^y} = b^{x-y}$$

$$\left(b^x\right)^y = b^{xy}$$

$$(abc)^x = a^x b^x c^x$$

$$\left(\frac{a}{b}\right)^x = \frac{a^x}{b^x}$$

$$\sqrt[n]{\frac{a}{b}} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}}$$

$$\sqrt[n]{b} = b^{1/n}$$

Express exponent as a positive number:

$$b^{-x} = \frac{1}{b^x} \qquad \frac{1}{b^{-x}} = b^x$$