

Exponents (negative, positive, fractional, variables)

Negative Exponents -> Positive Exponent

1. Take the reciprocal of the base
 2. Raise it to the positive power
 3. Evaluate/ Simplify
- Negative exponents in denominator will move to the numerator with a positive exponent
 - Fractional exponents - $\sqrt[n]{x^m} = x \text{ to the } \frac{m}{n} \text{ power}$

Exponential equations

Solving Exponential Equations

1. Rewrite the equation with a common base
2. Set the equation equal by comparison
3. Solve

Relations vs functions

Relation: A pairing of input values with output values (x,y)

Function: Every element of the domain corresponds to one and only one element in the range.

Types of functions

Function Relation: Every element of the domain corresponds to one and only one element in the range

Vertical Line- Test: If any vertical line passes through more than one point on the graph of a relation, the relation is not a function

One to One Function: A function is 1-1 if every element of the range of the function corresponds to exactly one element of the domain

Horizontal Line-Test: If any horizontal line passes through more than one point on the graph of a function, the function is not a one to one function.

Onto Function: For every element in the range of the function there is an element in the domain of the function

Function Notations: An equation that can be used to describe infinite sets of ordered pairs

Domain and Range (on a graph and in an algebraic function) (find the vertex as well)

Domain: Set of all first elements of ordered pairs (x,y)

Range: Set of all second elements of ordered pairs (x,y)

Type of Function	Parent Function	Domain	Range	Comment
Constant	$f(x) = c$	Anything	Constant	
Linear	$f(x) = x$	Anything	Anything	onto function
Quadratic	$f(x) = x^2$	Anything	$x \geq 0$	
Cubic	$f(x) = x^3$	Anything	Anything	onto function
Absolute Value	$f(x) = x $	Anything	$x \geq 0$	
Radical	$f(x) = \sqrt{x}$	$x \geq 0$	$x \geq 0$	
Rational	$f(x) = \frac{1}{x}$	All Real Numbers except 0		

Transformations

1. $f(x) \rightarrow f(x) + h$: Translation h units up
2. $f(x) \rightarrow f(x) - h$: Translation h units down
3. $f(x) \rightarrow f(x+h)$ Translation h units left
4. $f(x) \rightarrow f(x-h)$ Translation h units right
5. $f(x) \rightarrow -f(x)$ Reflection of x -axis
6. $f(x) \rightarrow f(-x)$ Reflection of y -axis
7. $f(x) \rightarrow af(x)$ Vertically stretched by a factor of a (compression) ($a > 1$)
8. $f(x) \rightarrow f(ax)$ Horizontally stretched ($0 < a < 1$) of $1/a$ (Horizontally compression, $a > 1$)

Vertex Form: $f(x) = a(x-h)^2 + k$

Vertex (h,k)

Axis of Symmetry: $x=h$