Day 4: Algebra Review

Jean Clipperton

Math Camp 2021

Questions?

Concluding CH 1 of Moore & Siegel – moving to Ch 2

Algebra Review

Properties

- **Associative property**: $(a+b)+c = a+(b+c)$ and $(a*b)*c = a*(b*c)$
- **Commutative property** $a+b = b+a$ and $a*b = b*a$
- **Distributive property** $a(b+c) = ab+ac$
- **Identity property** $x+0 = x$ and $x*1 = x$
- **Inverse property** $-x+x = 0$. Multiplicative inverse exists, but not for all numbers $x^{-1}*x = 1$

Factoring

We may need to break down different functions.

1. $x^2 + 3x - 4 =$
2. $m^2 + 3m + 2 =$
3. $x^2 + 5x + 6 =$
4. $25 - x^2 =$

Factoring

We may need to break down different functions.

1. $x^2 + 3x - 4 = (x - 1)(x - 4)$
2. $m^2 + 3m + 2 =$
3. $x^2 + 5x + 6 =$
4. $25 - x^2 =$

Factoring

We may need to break down different functions.

1. $x^2 + 3x - 4 = (x-1)(x-4)$
2. $m^2 + 3m + 2 = (m+1)(m+2)$
3. $x^2 + 5x + 6 =$
4. $25 - x^2 =$

Factoring

We may need to break down different functions.

1. $x^2 + 3x - 4 = (x - 1)(x - 4)$
2. $m^2 + 3m + 2 = (m + 1)(m + 2)$
3. $x^2 + 5x + 6 = (x + 3)(x + 2)$
4. $25 - x^2 =$

Factoring

We may need to break down different functions.

1. $x^2 + 3x - 4 = (x - 1)(x - 4)$
2. $m^2 + 3m + 2 = (m + 1)(m + 2)$
3. $x^2 + 5x + 6 = (x + 3)(x + 2)$
4. $25 - x^2 = (5 - x)(5 + x)$

Factoring

We may need to break down different functions.

1. $x^2 + 3x - 4 = (x - 1)(x - 4)$
2. $m^2 + 3m + 2 = (m + 1)(m + 2)$
3. $x^2 + 5x + 6 = (x + 3)(x + 2)$
4. $25 - x^2 = (5 - x)(5 + x)$

Try:

1. $-b^2 + 9a^4$
2. $2x^2 + 7x + 3$
3. $6y^2 + y - 2$

Factoring

We may need to break down different functions.

1. $x^2 + 3x - 4 = (x - 1)(x - 4)$
2. $m^2 + 3m + 2 = (m + 1)(m + 2)$
3. $x^2 + 5x + 6 = (x + 3)(x + 2)$
4. $25 - x^2 = (5 - x)(5 + x)$

Try:

1. $-b^2 + 9a^4$ $(\text{-}b + 3a^2)(b + 3a^2)$
2. $2x^2 + 7x + 3$
3. $6y^2 + y - 2$

Factoring

We may need to break down different functions.

1. $x^2 + 3x - 4 = (x - 1)(x - 4)$
2. $m^2 + 3m + 2 = (m + 1)(m + 2)$
3. $x^2 + 5x + 6 = (x + 3)(x + 2)$
4. $25 - x^2 = (5 - x)(5 + x)$

Try:

1. $-b^2 + 9a^4$ $(\text{-}b + 3a^2)(b + 3a^2)$
2. $2x^2 + 7x + 3$ $(2x + 1)(x + 3)$
3. $6y^2 + y - 2$

Factoring

We may need to break down different functions.

1. $x^2 + 3x - 4 = (x-1)(x-4)$
2. $m^2 + 3m + 2 = (m+1)(m+2)$
3. $x^2 + 5x + 6 = (x+3)(x+2)$
4. $25 - x^2 = (5-x)(5+x)$

Try:

1. $-b^2 + 9a^4$ $(\text{-}b + 3a^2)(b + 3a^2)$
2. $2x^2 + 7x + 3$ $(2x+1)(x+3)$
3. $6y^2 + y - 2$ $(2y-1)(3y+2)$

Inequalities

Relations: Intervals & Inequalities

Interval notation can be used to express ranges of numbers :

$[a, b]$	a $\leq x \leq b$	Square brackets include end points (closed interval)
(a,b)	$a < x < b$	Parenthesis mean exclude end points (open interval)
{a,b}		Typically used for sets – not inequalities/intervals

Relations

Graph the following:

- $4 < x$
- $y > 12$
- $3 < z < 7$
- $(3, 9)$
- $[-7, 2)$

Solving Inequalities

Solve like regular equations but FLIP inequality when multiplying by negative values.

EX:

- $3x < 4x + 2$

Solving Inequalities

Solve like regular equations but FLIP inequality when multiplying by negative values.

EX:

- $3x < 4x + 2$
- $60x >$-10$(x + 7)$

Solving Inequalities

Solve like regular equations but FLIP inequality when multiplying by negative values.

EX:

- $3x < 4x + 2$
- $60x >$-10$(x + 7)$

Try:

- -6$(x + 8) < 12$

Absolute Value

Solve for TWO possibilities: quantity is positive or negative. EX: $|x-3|>4$

- Quantity is positive: drop bars, solve like usual: $x-3>4, x>7$
- Quantity is negative: then, really have $x-3<$-4 Solve to find $x<$-1

Absolute Value

Solve for TWO possibilities: quantity is positive or negative. EX: $|x-3|>4$

- Quantity is positive: drop bars, solve like usual: $x-3>4, x>7$
- Quantity is negative: then, really have $x-3<$-4 Solve to find $x<$-1

Solution: $x<-1$ OR $x>7$

Absolute Value

Solve for TWO possibilities: quantity is positive or negative. EX: $|x-3|>4$

- Quantity is positive: drop bars, solve like usual: $x-3>4, x>7$
- Quantity is negative: then, really have $x-3<$-4 Solve to find $x<$-1

Solution: $x<-1$ OR $x>7$ Try: $|2x-3|>9$

Factorial

The factorial, !, multiplies a number by each subsequent number down to one.

For example, $4! = 4 * 3 * 2 * 1$

You can also divide and multiply factorials: $\frac{3!}{4!} = \frac{3*2*1}{4*3*2*1} = \frac{1}{4}$

CANNOT ADD THE NUMBERS!! (e.g. $6!3! \neq 9!$**)**

Combinatorics: Combining elements

We can use factorials to help us understand ways of combining elements: e.g. suppose you are forming a committee of 3 people from a group of 5. How many ways can we do that?

Combinatorics: Combining elements

We can use factorials to help us understand ways of combining elements: e.g. suppose you are forming a committee of 3 people from a group of 5. How many ways can we do that?

Say these people are named A, B, C, D, and E.

Then we can have the following committees: ABC, ABD, ABE, ACD, ACE, ADE, BCD, BCE, BDE, CDE, for a total of ten configurations.

Combinatorics: Combining elements

We can use factorials to help us understand ways of combining elements: e.g. suppose you are forming a committee of 3 people from a group of 5. How many ways can we do that?

Say these people are named A, B, C, D, and E.

Then we can have the following committees: ABC, ABD, ABE, ACD, ACE, ADE, BCD, BCE, BDE, CDE, for a total of ten configurations.

We could also calculate them using the binomial function: $\binom{5}{3} = \frac{5!}{3!2!} = \frac{5*4}{2} = 10$

Try $\binom{4}{2}$ with population A,B,C,D. Using the general formula: $\binom{N}{k} = \frac{N!}{k!(N-k)!}$

Combinatorics: Combining elements

We can use factorials to help us understand ways of combining elements: e.g. suppose you are forming a committee of 3 people from a group of 5. How many ways can we do that?

Say these people are named A, B, C, D, and E.

Then we can have the following committees: ABC, ABD, ABE, ACD, ACE, ADE, BCD, BCE, BDE, CDE, for a total of ten configurations.

We could also calculate them using the binomial function: $\binom{5}{3} = \frac{5!}{3!2!} = \frac{5*4}{2} = 10$

Try $\binom{4}{2}$ with population A,B,C,D. Using the general formula: $\binom{N}{k} = \frac{N!}{k!(N-k)!}$ (Answer: 6)

Combinatorics: Combining elements

WHY DOES THIS MATTER AT ALL????

WHY DOES THIS MATTER AT ALL????

You may have different populations and different treatments – how many different groups would you need to test the possible combinations?

Functions and Relations

Relations allow comparison of variables and expressions – some may be more or less specific in how they assign or specify these relationships between the *range (y)* and *domain (x)*. Suppose we have a domain as follows { apple, kiwi, lime } and a range of { 4, 5}.

Functions and Relations

Suppose we have a domain as follows { apple, kiwi, lime } and a range of { 4, 5}.

Functions

Functions assign *one* element of the range to each element of the domain.

Functions and Relations

Suppose we have a domain as follows { apple, kiwi, lime } and a range of { 4, 5}.

Functions

Functions assign *one* element of the range to each element of the domain. EX: apple $\rightarrow$ 5, kiwi $\rightarrow$ 4, lime $\rightarrow$ 4. (Exactly one y per x, but y can be assigned to multiple x)

Correspondences

Correspondences assign a subset of the range to each element of the domain.

Functions and Relations

Suppose we have a domain as follows { apple, kiwi, lime } and a range of { 4, 5}.

Functions

Functions assign *one* element of the range to each element of the domain. EX: apple $\rightarrow$ 5, kiwi $\rightarrow$ 4, lime $\rightarrow$ 4. (Exactly one y per x, but y can be assigned to multiple x)

Correspondences

Correspondences assign a subset of the range to each element of the domain. EX: apple $\rightarrow$ $\{4, 5\}$. (Can have multiple y assigned to each x)

Functions: different mappings

We can visualize mappings either on a plane, or, even more simply, as connections between two sets:

Functions: different mappings

We can visualize mappings either on a plane, or, even more simply, as connections between two sets:

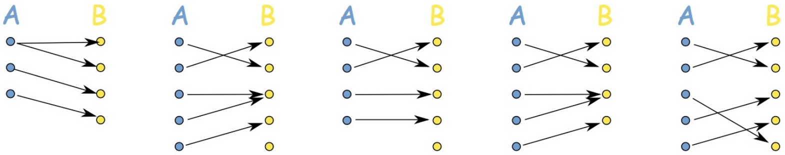

Figure 1:

Functions: the vertical line test

Functions can only assign one x to one y (and not one x to multiple y values) – otherwise it is a relation.

Functions: the vertical line test

Functions can only assign one x to one y (and not one x to multiple y values) – otherwise it is a relation. Can use the vertical line test to check:

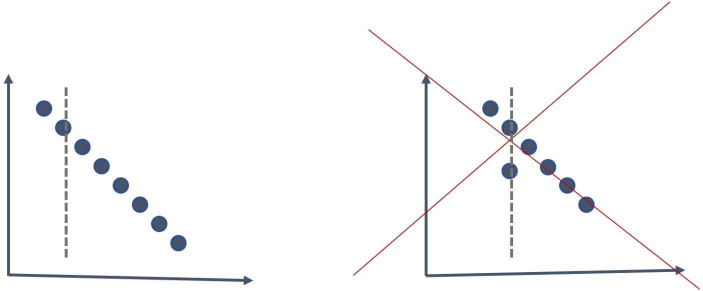

Figure 2: "Vertical line test"

Functions

Functions specify the relationship between x and y, e.g. $y = a + bx$: we often talk about *mapping* something onto something else.

Functions

Functions specify the relationship between x and y, e.g. $y = a + bx$: we often talk about *mapping* something onto something else.

Functions map from the domain to the codomain. Note that there is a distinction between the codomain and the range: codomain are possible values (e.g. natural numbers) and range are only the values reached/obtained. (sometimes called the image).

Functions

Functions specify the relationship between x and y, e.g. $y = a + bx$: we often talk about *mapping* something onto something else.

Functions map from the domain to the codomain. Note that there is a distinction between the codomain and the range: codomain are possible values (e.g. natural numbers) and range are only the values reached/obtained. (sometimes called the image).

You can also combine functions, e.g. $f(x) = x$ and $g(x) = x^3$ can be combined to produce $f \circ g(x) = f(g(x))$.

Function Terms

Table 3.1 from book (pg 49)

Term	Meaning
Identity function	Elements in domain are mapped to identical elements in codomain
Inverse function	Function that when composed with original function returns identity function
Surjective (onto)	Every value in codomain produced by value in domain
Injective (one-to-one)	Each value in range comes from only one value in domain
Bijective (invertible)	Both surjective and injective; function has an inverse

Function Terms

Table 3.1 from book (pg 49)

Term	Meaning
Identity function	Elements in domain are mapped to identical elements in codomain
Inverse function	Function that when composed with original function returns identity function
Surjective (onto)	Every value in codomain produced by value in domain
Injective (one-to-one)	Each value in range comes from only one value in domain
Bijective (invertible)	Both surjective and injective; function has an inverse

Why do we care?

Function Terms

We care about whether a function is surjective, injective, or bijective because we will know if we can trace back what produced what we have.

https://www.mathsisfun.com/sets/injective-surjective-bijective.html

Function Terms

- We can see that both functions are surjective – each ‘covers’ the codomains
- In the case of g(x), we can see that it is injective, while f(x) is not
- Thus, f(x) is not bijective but g(x) is (both surjective and injective) – thus, it is invertible (to be defined)

Composite Functions

Inner/Outer Functions: We begin at these two functions $f(x) = x^5$ and $g(x) = x^2 + 5x + 1$.. You essentially substitute the second function as 'x'.

Composite Functions

Inner/Outer Functions: We begin at these two functions $f(x) = x^5$ and $g(x) = x^2 + 5x + 1$.. You essentially substitute the second function as 'x'.

- Consider $f(x) = x^5$ and $g(x) = x^2 + 5x + 1$. Combine them to create $f \circ g(x) = f(g(x)) = (x^2 + 5x + 1)^5$

Composite Functions

Inner/Outer Functions: We begin at these two functions $f(x) = x^5$ and $g(x) = x^2 + 5x + 1$.. You essentially substitute the second function as 'x'.

- Consider $f(x) = x^5$ and $g(x) = x^2 + 5x + 1$. Combine them to create $f \circ g(x) = f(g(x)) = (x^2 + 5x + 1)^5$
- Similarly, $f(x) = x^{0.5}$ and $g(x) = x(5x - 1)$ produce $f \circ g(x) = f(g(x)) = \sqrt{5x^2 - x}$

Composite functions, $f \circ g(x) = f(g(x))$ and $g \circ f(x) = g(f(x))$

Try: $f(x) = x^2 + 1$, $g(x) = 2x$

Composite Functions

Inner/Outer Functions: We begin at these two functions $f(x) = x^5$ and $g(x) = x^2 + 5x + 1$.. You essentially substitute the second function as 'x'.

- Consider $f(x) = x^5$ and $g(x) = x^2 + 5x + 1$. Combine them to create $f \circ g(x) = f(g(x)) = (x^2 + 5x + 1)^5$
- Similarly, $f(x) = x^{0.5}$ and $g(x) = x(5x - 1)$ produce $f \circ g(x) = f(g(x)) = \sqrt{5x^2 - x}$

Composite functions, $f \circ g(x) = f(g(x))$ and $g \circ f(x) = g(f(x))$

Try: $f(x) = x^2 + 1$, $g(x) = 2x$

- $f \circ g(x) = 4x^2 + 1$
- $g \circ f(x) = 2x^2 + 2$

Function Terms: Invertible functions

When you compose a function with its inverse, you get the identity function.

Function Terms: Invertible functions

When you compose a function with its inverse, you get the identity function.

Example: suppose f(x)=3x and g(x)=x/3. Find $f \circ g(x) = f(g(x))$

Function Terms: Invertible functions

When you compose a function with its inverse, you get the identity function.

Example: suppose f(x)=3x and g(x)=x/3. Find $f \circ g(x) = f(g(x))$

In this case, we get $f(g(x)) = 3 * (x/3) = x$, where x is the identity function.

Function Terms: Invertible functions

When you compose a function with its inverse, you get the identity function.

Example: suppose f(x)=3x and g(x)=x/3. Find $f \circ g(x) = f(g(x))$

In this case, we get $f(g(x)) = 3 * (x/3) = x$, where x is the identity function.

We can see that we only get one y value for each x and that, depending on the domain/codomain, the function is surjective as well, making this function bijective and have a legitimate inverse.

Monotonic Function Terms

Term	Meaning
Increasing	Function increases on subset of domain
Decreasing	Function decreases on subset of domain
Strictly increasing	Function always increases on subset of domain
Strictly decreasing	Function always decreases on subset of domain
Weakly increasing	Function does not decrease on subset of domain
Weakly decreasing	Function does not increase on subset of domain
(Strict) monotonicity	Order preservation; function (strictly) increasing or decreasing over domain

Table 3.2 from book (pg 51)

Monotonic Function Terms

Term	Meaning
Increasing	Function increases on subset of domain
Decreasing	Function decreases on subset of domain
Strictly increasing	Function always increases on subset of domain
Strictly decreasing	Function always decreases on subset of domain
Weakly increasing	Function does not decrease on subset of domain
Weakly decreasing	Function does not increase on subset of domain
(Strict) monotonicity	Order preservation; function (strictly) increasing or decreasing over domain

Table 3.2 from book (pg 51)

This is useful for math land but also for theory building: how are x and y related? Does more x ALWAYS mean more y (function is monotonically increasing, etc)?

Linear Equation vs Linear Function

Your beloved friend: $y = a + bx$ (AKA $y = mx + b$ AKA affine function).

Linear Equation vs Linear Function

Your beloved friend: $y = a + bx$ (AKA $y = mx + b$ AKA affine function).

We have the **intercept** (where the line crosses the y axis) and the **slope** (unit increase in iv related to dv). This is the 'plain vanilla' version.

The **linear function** is much more expansive: includes multiple variables, exponents, and logs (logarithms).

Exponents

- Multiplying a number by itself: $x * x * x * x = x^4$

Exponents

- Multiplying a number by itself: $x * x * x * x = x^4$
- Add or subtract exponents when multiplying same variable: $x^4 * x^{-3} = x$

Exponents

- Multiplying a number by itself: $x * x * x * x = x^4$
- Add or subtract exponents when multiplying same variable: $x^4 * x^{-3} = x$
- Simplify bases when same exponent: $x^4 * y^4 = (xy)^4$ and $m^{-2}n^2 = (m^{-1}n)^2$

Exponents

- Multiplying a number by itself: $x * x * x * x = x^4$
- Add or subtract exponents when multiplying same variable: $x^4 * x^{-3} = x$
- Simplify bases when same exponent: $x^4 * y^4 = (xy)^4$ and $m^{-2}n^2 = (m^{-1}n)^2$
- Power of power: multiply, $(x^3)^3 = x^{3*3} = x^9$

Exponents

- Multiplying a number by itself: $x * x * x * x = x^4$
- Add or subtract exponents when multiplying same variable: $x^4 * x^{-3} = x$
- Simplify bases when same exponent: $x^4 * y^4 = (xy)^4$ and $m^{-2}n^2 = (m^{-1}n)^2$
- Power of power: multiply, $(x^3)^3 = x^{3*3} = x^9$

Try: $xz^2(x^3z^{-2})^3$

Exponents

- Multiplying a number by itself: $x * x * x * x = x^4$
- Add or subtract exponents when multiplying same variable: $x^4 * x^{-3} = x$
- Simplify bases when same exponent: $x^4 * y^4 = (xy)^4$ and $m^{-2}n^2 = (m^{-1}n)^2$
- Power of power: multiply, $(x^3)^3 = x^{3*3} = x^9$

Try: $xz^2(x^3z^{-2})^3$ **=(**$xz^2(x^9z^{-6})$))

Exponents

- Multiplying a number by itself: $x * x * x * x = x^4$
- Add or subtract exponents when multiplying same variable: $x^4 * x^{-3} = x$
- Simplify bases when same exponent: $x^4 * y^4 = (xy)^4$ and $m^{-2}n^2 = (m^{-1}n)^2$
- Power of power: multiply, $(x^3)^3 = x^{3*3} = x^9$

Try: $xz^2(x^3z^{-2})^3$ $\mathbf{=(}xz^2(x^9z^{-6}))\mathbf{=}x^{10}z^{-4}$

Exponents, Exponentials, Exponential functions

Exponents

Exponents are where you take a variable to some power – e.g. x^a where x is a variable and a is a constant. Typically, we focus on the numerical portion of the exponent–calling it 'the exponent'.

Exponential

An exponential is the reverse of the exponent – here it is a number to the power of a variable, e.g. a^x. To get the x 'down', we need to use logarithms (aka logs).

Exponential Function

The exponential function has a particular base, e, (where e is Euler's e and is approx 2.72.)

Functions: Quadratic Functions and Polynomials

Quadratic functions : highest order (largest exponent) is equal to 2.

Functions: Quadratic Functions and Polynomials

Quadratic functions : highest order (largest exponent) is equal to 2.
$y = \alpha + \beta_1 x + \beta_2 x^2$.

Functions: Quadratic Functions and Polynomials

Quadratic functions : highest order (largest exponent) is equal to 2.
$y = \alpha + \beta_1 x + \beta_2 x^2$.

Higher order polynomials: more of the same, but now the highest order can be anything.

Functions: Quadratic Functions and Polynomials

Quadratic functions : highest order (largest exponent) is equal to 2.
$y = \alpha + \beta_1 x + \beta_2 x^2$.

Higher order polynomials: more of the same, but now the highest order can be anything. Some examples include:
$y = \alpha + \beta_1 x + \beta_2 x^3$. and $y = \alpha + \beta_1 x + \beta_2 x^2 + \beta_3 x^3$.

Functions: Quadratic Functions and Polynomials

Quadratic functions : highest order (largest exponent) is equal to 2.
$y = \alpha + \beta_1 x + \beta_2 x^2$.

Higher order polynomials: more of the same, but now the highest order can be anything. Some examples include:
$y = \alpha + \beta_1 x + \beta_2 x^3$. and $y = \alpha + \beta_1 x + \beta_2 x^2 + \beta_3 x^3$.

We care because we might see these as utility functions or use higher order values as a way to represent the relationship between two variables in a linear regression Know what these concepts are–will be relevant later.

Logs and other functions

Logs are the inverses of exponents: the power to which you raise the base, e.g. 10, to produce a given value, e.g.z

Logs and other functions

Logs are the inverses of exponents: the power to which you raise the base, e.g. 10, to produce a given value, e.g.z

You will see logs!

Logs and other functions

Logs are the inverses of exponents: the power to which you raise the base, e.g. 10, to produce a given value, e.g.z

You will see logs!

Logarithms (typically base 10 ($log(x)$) or base e ($ln(e)$), but any base is possible, e.g. $log_{8675309}x$ (Bases aside from e and 10 will be specified).

- $y = log(z) \leftrightarrow 10^y = z$
- $y = ln(z) \leftrightarrow e^y = z$
- $log(1) = 0$

Logs and other functions

Logs are the inverses of exponents: the power to which you raise the base, e.g. 10, to produce a given value, e.g.z

You will see logs!

Logarithms (typically base 10 ($log(x)$) or base e ($ln(e)$), but any base is possible, e.g. $log_{8675309}x$ (Bases aside from e and 10 will be specified).

- $y = log(z) \leftrightarrow 10^y = z$
- $y = ln(z) \leftrightarrow e^y = z$
- $log(1) = 0$

Exponents in log are different from what you might expect:

- $log(x^2) = 2(log(x))$
- $log(x/y) = log(x) - log(y)$ provided $(x, y > 0)$

Logs help weigh smaller values more heavily; adding units not linear–less meaningful for larger values
($log(100) = 2$, $log(1000) = 3$)

Logs Practice

Simplify the following

- $log(x^4)$
- $log(xy)$
- $ln(e^3)$
- $ln(1)$
- $log(3) + log(7)$

Logs Practice

Simplify the following

- $log(x^4) = 4log(x)$
- $log(xy)$
- $ln(e^3)$
- $ln(1)$
- $log(3) + log(7)$

Logs Practice

Simplify the following

- $log(x^4) = 4log(x)$
- $log(xy) = log(x) + log(y)$
- $ln(e^3)$
- $ln(1)$
- $log(3) + log(7)$

Logs Practice

Simplify the following

- $log(x^4) = 4log(x)$
- $log(xy) = log(x) + log(y)$
- $ln(e^3) = 3$
- $ln(1)$
- $log(3) + log(7)$

Logs Practice

Simplify the following

- $log(x^4) = 4log(x)$
- $log(xy) = log(x) + log(y)$
- $ln(e^3) = 3$
- $ln(1) = 0$
- $log(3) + log(7)$

Logs Practice

Simplify the following

- $log(x^4) = 4log(x)$
- $log(xy) = log(x) + log(y)$
- $ln(e^3) = 3$
- $ln(1) = 0$
- $log(3) + log(7) = log(21)$

More Practice

- $2e^{6x} = 18$
- $e^{x^2} = 1$
- $2^x = e^5$
- $2^{x-2} = 5$
- $ln(x^2) = 5$
- $ln(x^3) - ln(x) = ln(16)$

When would I ever actually *see* a log function??

When would I ever actually *see* a log function??

https://thesocietypages.org/graphicsociology/2010/12/07/1247/

Tying it all together

Consider the example in Moore and Siegel (pg 72): predicting voting probability of an individual in a national education. Variables: education, partisan id, income, age, closeness. *How can we categorize these variables?*

Tying it all together

Consider the example in Moore and Siegel (pg 72): predicting voting probability of an individual in a national education. Variables: education (discrete (count)), partisan id (categorical (0,1)), income (continuous), age (discrete (count)), closeness (interval-ratio, 0-1). *(categorization in parentheses)*

Tying it all together

Consider the example in Moore and Siegel (pg 72): predicting voting probability of an individual in a national education. Variables: education (discrete (count)), partisan id (categorical (0,1)), income (continuous), age (discrete (count)), closeness (interval-ratio, 0-1). *(categorization in parentheses)*

The probability is given by this function: how can we interpret the following? $p_v = f(ed, p, i, a, c)$

Tying it all together

Consider the example in Moore and Siegel (pg 72): predicting voting probability of an individual in a national education. Variables: education (discrete (count)), partisan id (categorical (0,1)), income (continuous), age (discrete (count)), closeness (interval-ratio, 0-1). *(categorization in parentheses)*

The probability is given by this function: how can we interpret the following? $p_v = f(ed, p, i, a, c)$ *The probability is a function of the variables given above.*

Tying it all together

Consider the example in Moore and Siegel (pg 72): predicting voting probability of an individual in a national education. Variables: education (discrete (count)), partisan id (categorical (0,1)), income (continuous), age (discrete (count)), closeness (interval-ratio, 0-1). *(categorization in parentheses)*

The probability is given by this function: how can we interpret the following? $p_v = f(ed, p, i, a, c)$ *The probability is a function of the variables given above.* Can further specify as a direct linear function: $p_v = \alpha + \beta_1 ed + \beta_2 p + \beta_3 i + \beta_4 a + \beta_5 c$

Tying it all together

Consider the example in Moore and Siegel (pg 72): predicting voting probability of an individual in a national education. Variables: education (discrete (count)), partisan id (categorical (0,1)), income (continuous), age (discrete (count)), closeness (interval-ratio, 0-1). *(categorization in parentheses)*

The probability is given by this function: how can we interpret the following? $p_v = f(ed, p, i, a, c)$ *The probability is a function of the variables given above.* Can further specify as a direct linear function: $p_v = \alpha + \beta_1 ed + \beta_2 p + \beta_3 i + \beta_4 a + \beta_5 c$ But this is one of many options (how would we apply the quadratic or linear functions?)