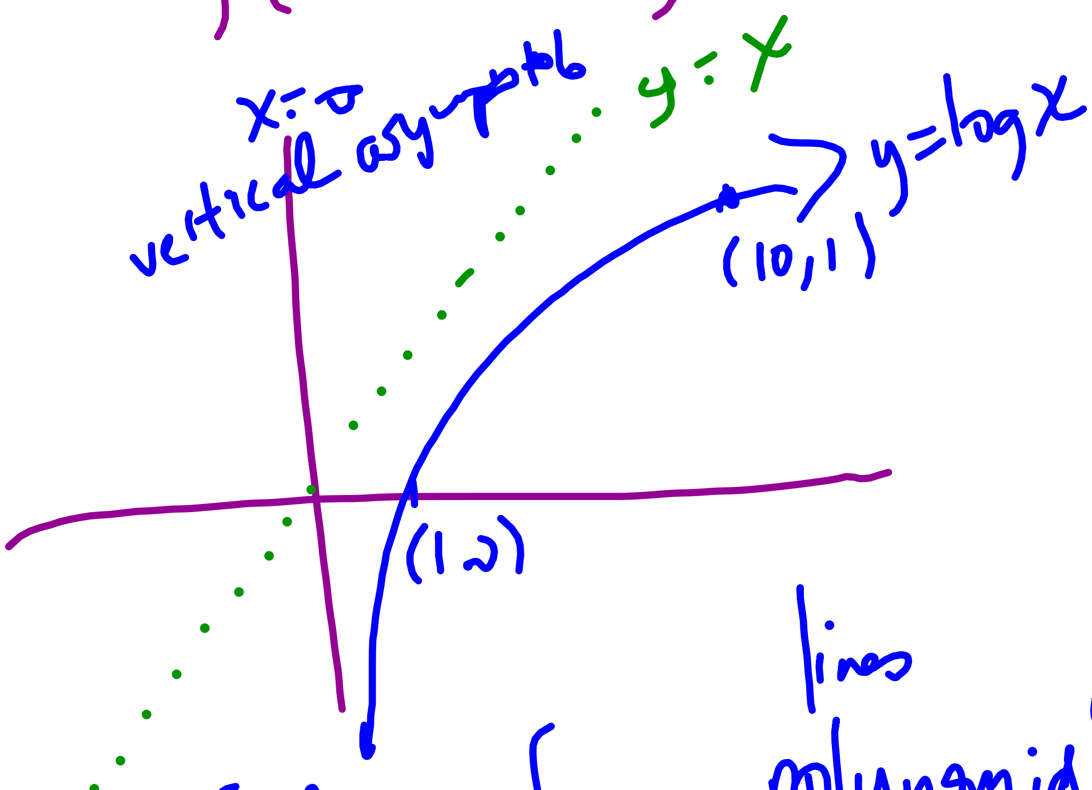
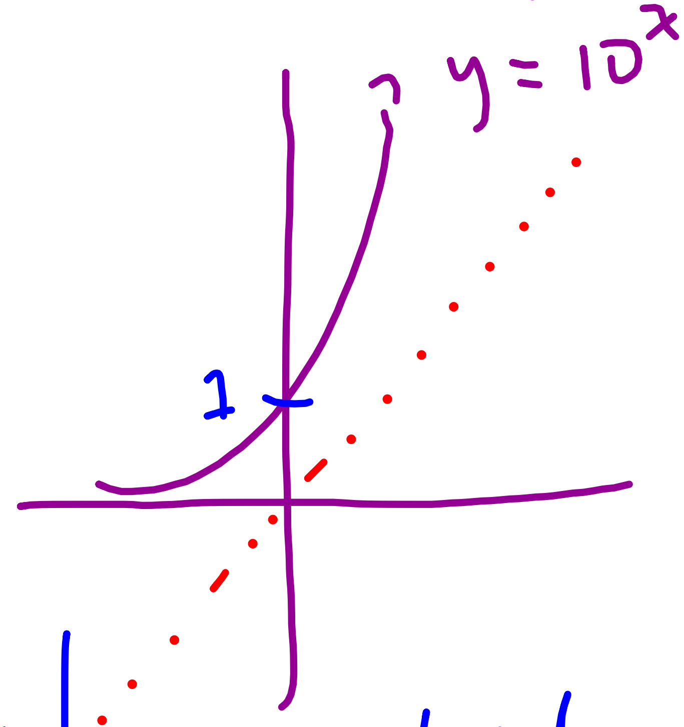
1 Graph of Logarithms

2 measures of diversity

Graphing logs

$f(x) = \log x$ inverse the exponential





logs grow slow | lines polynomials | exponentials grow fast

$$\lim_{x \to \infty} \log x = +\infty$$

$y = \ln x$

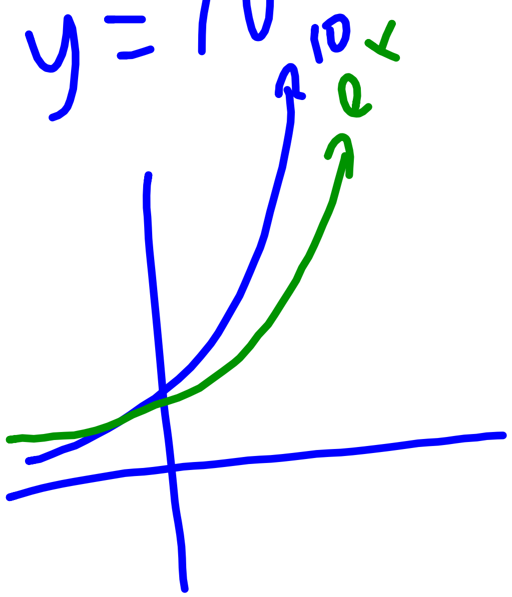
graph this

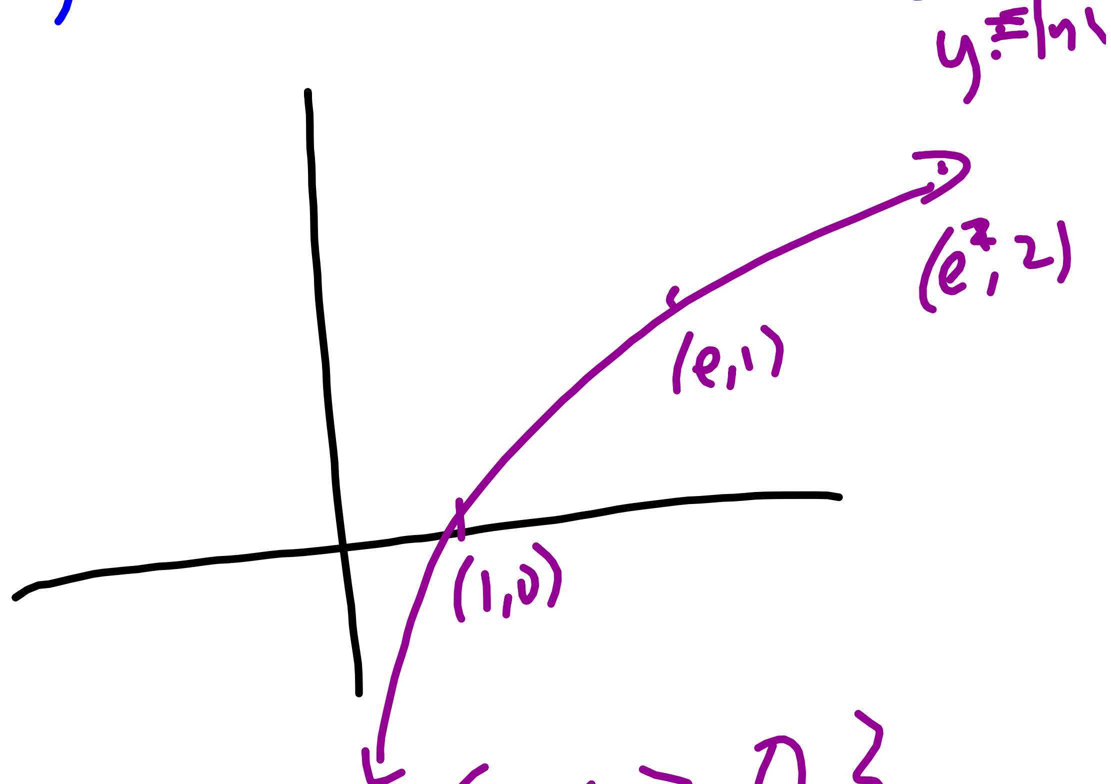
label 2 lattice point

give domain and range.

$y = e^x$

$y = 10^x$





$y = \ln x$

$e^y = x$

domain: $\{x > 0\}$

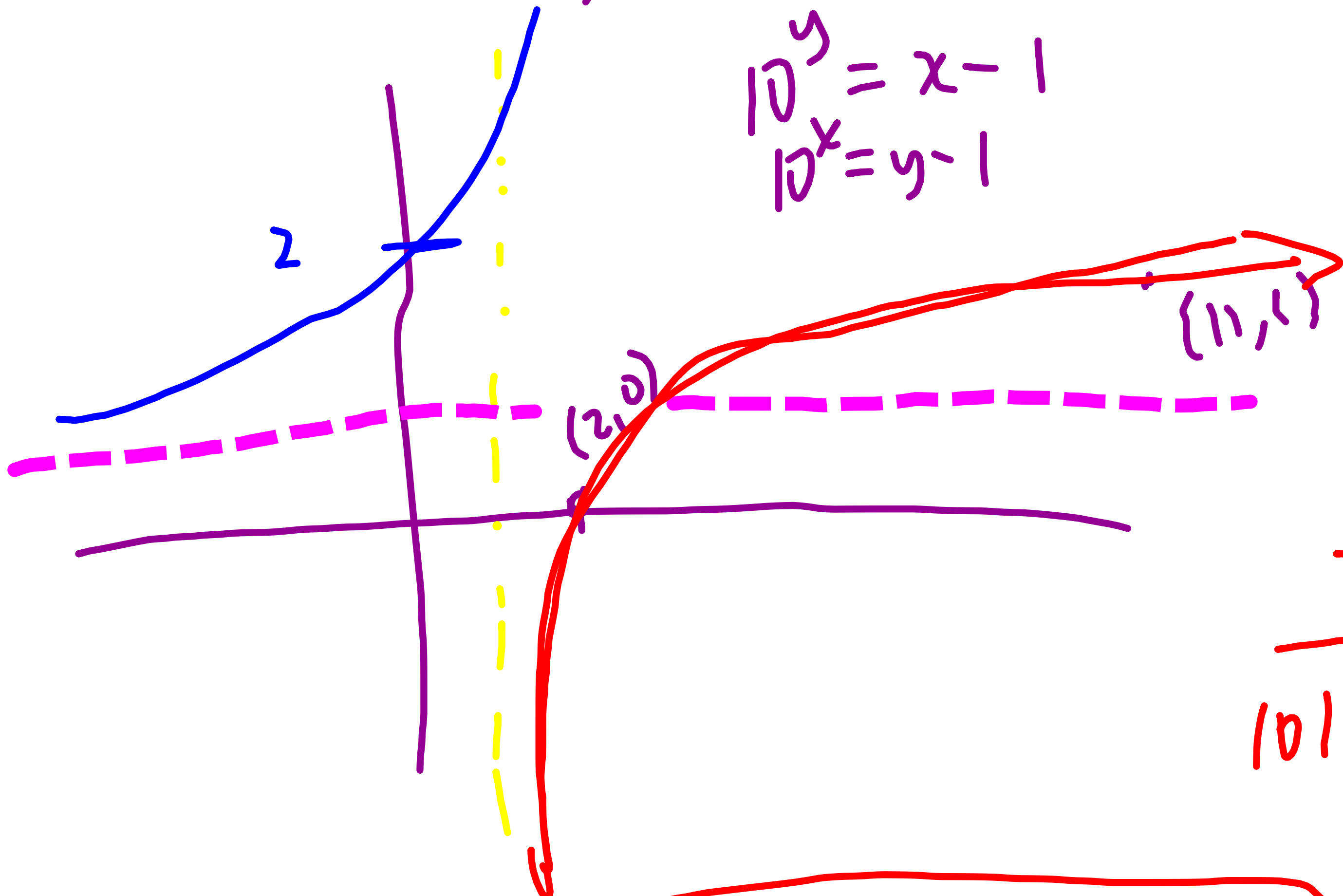
range: $\{\text{all } \mathbb{R}\}$

$$f(x) = \log(x-1)$$

$10^y = x - 1$

$10^x = y - 1$

$y = 10^x + 1$



x	$\log(x-1)$
101	2

prop

$$\boxed{\log_b(1) = 0}$$

$$\boxed{\log_b(b) = 1}$$

$\sum$ sigma adding terms

$$D = \frac{1}{\sum_{i=1}^{s} p_i^2}$$

$s = \#$ species

p_i for each species

$$p_i = \frac{\# \text{ ith species}}{\text{total \# of organisms}}$$

3 oaks $p_o = \frac{1}{3}$

3 maples $p_m = \frac{1}{3}$

3 cherries $p_c = \frac{1}{3}$

$$D = \frac{1}{\left(\frac{1}{3}\right)^2 + \left(\frac{1}{3}\right)^2 + \left(\frac{1}{3}\right)^2} = \frac{1}{1/3} = 3$$

1 oak $p_o = 1/9$

1 maple $p_m = 1/9$

7 pine $p_p = 7/9$

9 total

$$D = \frac{1}{\frac{2}{81} + \frac{49}{81}} = \frac{81}{51}$$

≈ 1.58

* <u>Shannon</u> Index

$$-\sum_{i=1}^{s} p_i \ln(p_i)$$

$$H = e$$

$$= \exp\left(-\sum_{i=1}^{s} p_i \ln p_i\right).$$