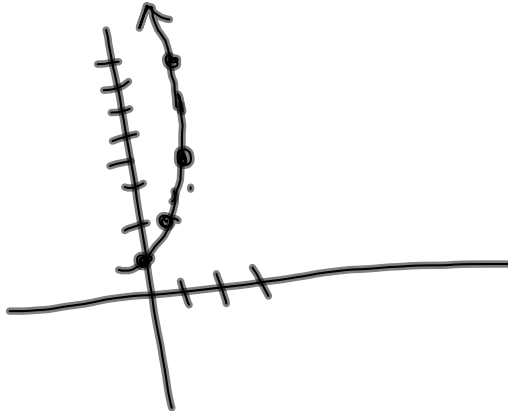


Night	0	1	2	3	4	5	6
# of zombies	1	2	4	8	16	32	64

What equation models this function? $y=2^x$

Sketch a graph:



* growth
* grows very quickly

Exponential Parent Function:

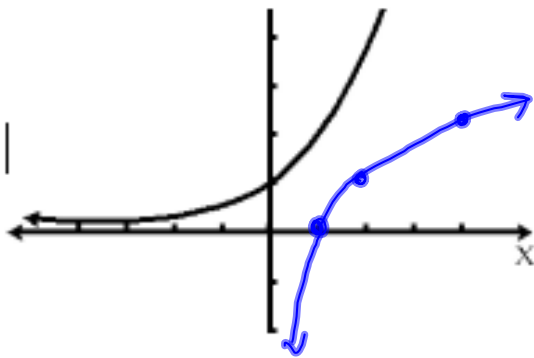
$$y = b^x$$

Base "e":

$e \approx 2.71$ it is irrational like π

$$y = e^x$$

First look at the graph below for $f(x) = 2^x$; now graph $f(x) = \log_2 x$.



x	y
0	1
1	2
2	4

$\log_2 x$ is the inverse

x	y
1	0
2	1/2
4	1

Logarithmic Parent Function:

$$\log_b x$$

base 10
←

Common Logarithm:

$$\log_{10} x$$

Natural Log:

$$\ln x$$

Convert each expression.

Exponential	$x^2 = 9$	$e^7 = x$	$10^x = 100$	$e^x = 7$	$2^x = 16$
Logarithmic	$\log_x 9 = 2$	$\ln x = 7$	$\log_{10} 100 = x$	$\ln_e 7 = x$	$\log_2 16 = x$

$b^x = a$. $\log_b a = x$

Evaluate the following exponential functions. If it's not able to be evaluated write "NP". → not possible

1. $2^x = 16$ $x = 4$	2. $(e^4)(e^{2x}) = e^{12}$ $e^{4+2x} = e^{12}$ $4+2x = 12$ $2x = 8$ $x = 4$	3. $e^{2x} = 7$ NP	4. $3^{x+1} = 3^{2x+3}$ $x+1 = 2x+3$ $-2 = x$
5. $4^x - 2^x = 0$ $4^x = 2^x$ $2^{2x} = 2^x$ $2x = x$ $x = 0$	6. $3^x = 27$ $x = 3$	7. $9^{2x} = 3^{x-2}$ $3^{4x} = 3^{x-2}$ $4x = x-2$ $3x = -2$ $x = -2/3$	8. $5^x = 28$ NP

⊕ Evaluate each log expression.

3. $\log_4 16 = x$

$$4^x = 16$$
$$x = 2$$

4. $\log_{10} 1000 = x$

$$10^x = 1000$$
$$x = 3$$

5. $\log_2 1000 = x$

$$2^x = 1000$$

NP

6. $\log_3 x = 3$

$$3^3 = x$$
$$x = 27$$

7. $\ln_e(e^{\sqrt{2}}) = x$

$$e^x = e^{\sqrt{2}}$$
$$x = \sqrt{2}$$

8. $e^{\ln(0.1)} = x$

$$\ln_e x = \ln_e 0.1$$
$$x = 0.1$$