WARMUP

Fill in the chart and then graph:

$f(x) = 2^x$

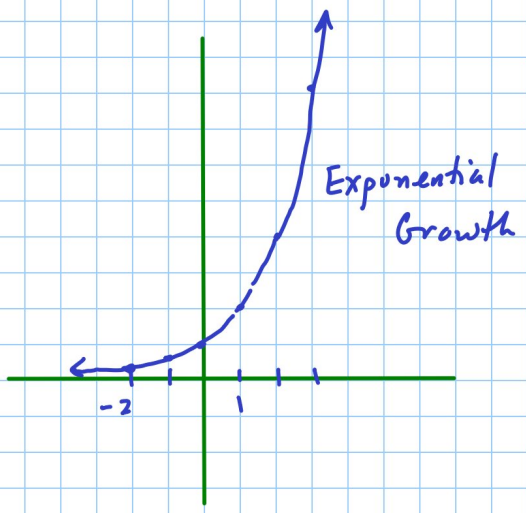
x	f(x)
-2	$\frac{1}{4}$
-1	$\frac{1}{2}$
0	1
1	2
2	4
3	8

$2^{-2} = \frac{1}{2^2} = \frac{1}{4}$

$2^{-1} = \frac{1}{2^1} = \frac{1}{2}$

$2^0 = 1$

$2^1 = 2$



Section 4.2 Exponential Functions

ex: Graph $f(x) = 3 \cdot 2^{-x}$

x	y
-2	12
-1	6
0	3
1	3/2
2	3/4

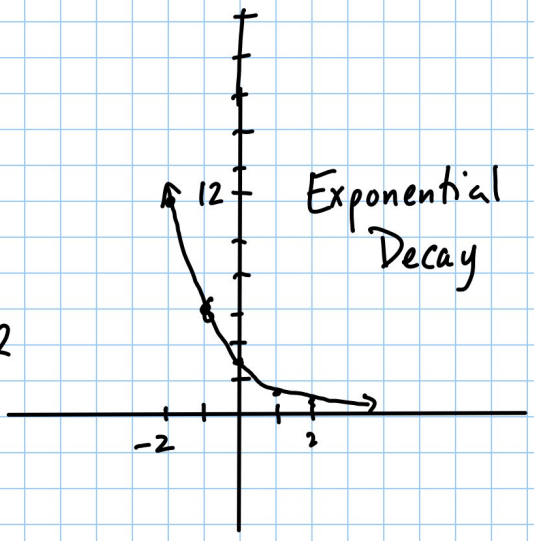
$3 \cdot 2^{-(-2)} = 3 \cdot 2^2 = 3 \cdot 4 = 12$

$3 \cdot 2^{-(-1)} = 3 \cdot 2^1 = 6$

$3 \cdot 2^0$

$3 \cdot 2^{-1}$

$3 \cdot 2^{-2}$



On calculator, the $\wedge$ button is what we use to evaluate exponential expressions.

$3^{2.236} = 11.664$

$e^{1.2} = 3.320$

↑ above LN

$e \approx 2.72$

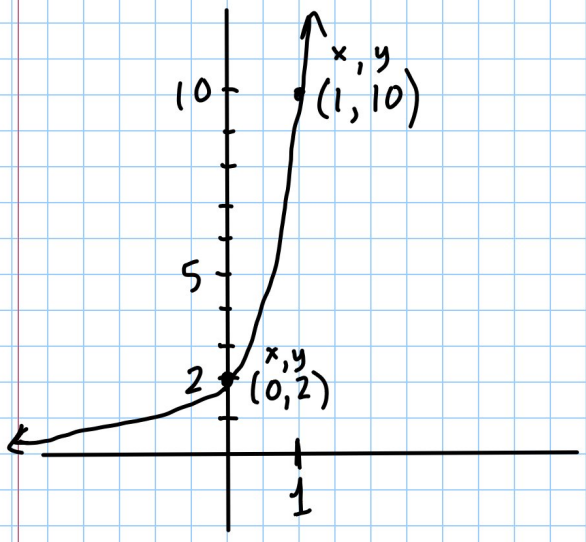
$e = \lim_{n \to \infty} \left(1 + \frac{1}{n}\right)^n$

Euler

An exponential function can be written in the form

$$f(x) = a \cdot b^x$$

b is the base $(b > 0, b \neq 1)$



$$y = a \cdot b^x$$

$$2 = a \cdot b^0$$

$$2 = a \cdot 1$$

$$2 = a$$

a is always the y-intercept

$$y = 2 \cdot b^x$$

$$10 = 2 \cdot b^1$$

$$\frac{10}{2} = \frac{2b}{2}$$

$$5 = b$$

$$\boxed{f(x) = 2 \cdot 5^x}$$

Solving exponential equations

If $a^u = a^v$ then $u = v$

ex: $5^{1-2x} = \frac{1}{5}$

$$5^{1-2x} = 5^{-1}$$

$$1 - 2x = -1$$

$$-2x = -2$$

$$x = 1$$

ex: $9^{2x} = 27$

$$(3^2)^{2x} = 3^3$$

$$3^{4x} = 3^3$$

$$4x = 3$$

$$x = \frac{3}{4}$$

p297-298
6-10, 37-57 odd