3/11 MON

3.1 Exponential Functions

$y = a \cdot b^{x-h} + k$

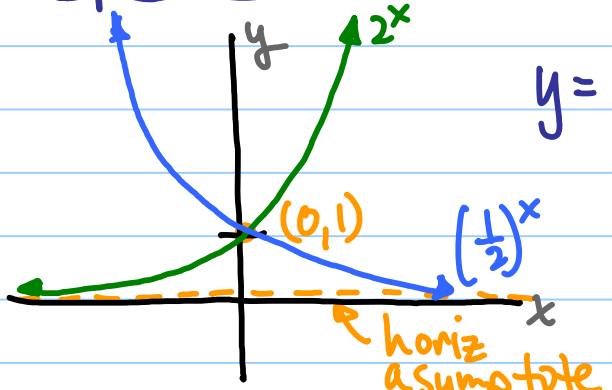
* horiz stretch/shrink
* horiz reflection (backwards)
* horiz transl (shift) backwards
* vert. stretch/shrink
* vert transl. (shift)
* if the coefficient is negative, then there is a reflection.

Transformations of $y = b^x \Rightarrow y = \square \cdot b^{(x-\square)} + \square$

$\square = c$

Graph of 2^x & $(\frac{1}{2})^x$

growth: 2^x decay: $(\frac{1}{2})^x$



$y = b^x$ domain: $(-\infty, \infty)$
range: $(0, \infty)$

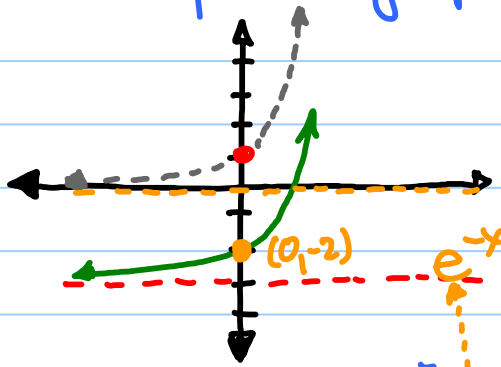
$b > 1$: growth
$0 < b < 1$: decay.

ex 1) Graph $g(x) = 2^x - 3$ & describe the transformation

parent

→ parent graph: $y = 2^x$

vert shift of -3 or down 3



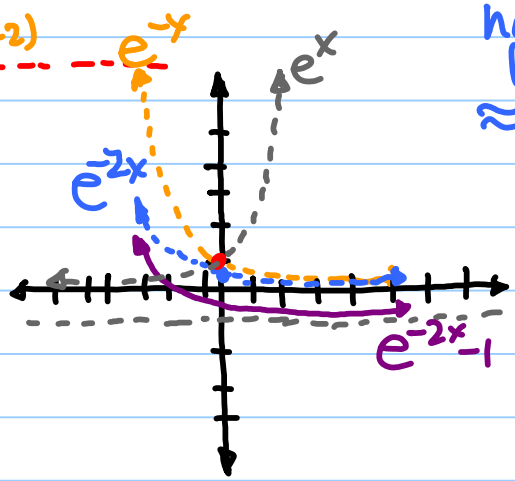
ex 2) Graph & describe $h(x) = e^{-2x} - 1$

natural base: $\approx 2.71828\ldots$

horiz reflection "across the y-axis"

down 1

horiz shrink by $\frac{1}{2}$



PE
MD
AS

Compound Interest ($$$)

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

- A: final amount
- P: principal (initial amount)
- r: annual interest rate (decimal)
- n: number of times interest is compounded per year → monthly, weekly, daily, etc...
- t: time

ex 3) Tristen: $5000; 2.75%; 8 years.

a) Compound interest monthly

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

$$A = 5000\left(1 + \frac{.0275}{12}\right)^{12(8)}$$

$$= \$6228.82$$

b) Compound interest weekly

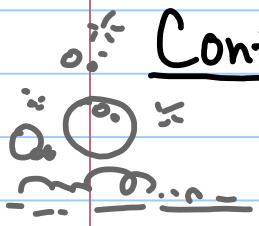
$$A = 5000\left(1 + \frac{.0275}{52}\right)^{52(8)}$$

$$= \$6230.02$$

→ $1.20 more

$$A = P\left(1 + \frac{r}{n}\right)^{nt} \longrightarrow 1\left(1 + \frac{1}{BIG}\right)^{BIG}$$

approaches 2.71828.... = e (natural base)



Continuous Compound Interest

$$A = Pe^{rt}$$

ex 4) see #3, compound continuously ...

$$A = Pe^{rt} = 5000e^{(.0275)8} = \$6230.38$$

HW: p397 #26-46 even, 53-56