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Exponential Functions

Ex 1: Folding Paper

paper is about 0.003 in thick.

the moon is 239,000 mi from Earth.

Q1: How many times must I fold the paper to reach from the Earth to the moon?

Q2: How many to get back?

Exponential Rules

assume $a \neq 1$ & $b \neq 1$

$a > 0$ & $b > 0$

$x, y \in \mathbb{R}$

$$1) a^x a^y = a^{x+y}$$

$$2) \frac{a^x}{a^y} = a^{x-y}$$

$$3) (a^x)^y = a^{xy}$$

$$4) a^x = b^x \text{ iff } a = b, x \neq 0$$

$$5) a^x = a^y \text{ iff } x = y$$

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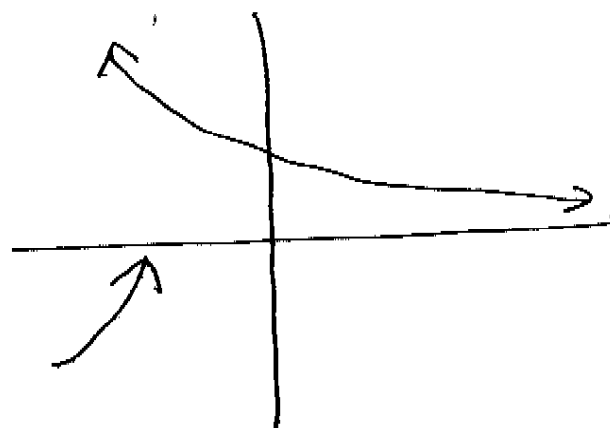
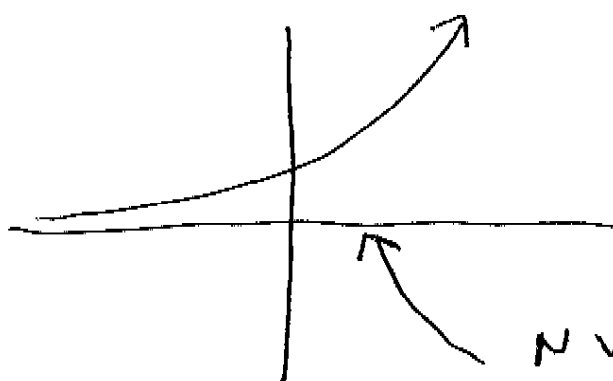
Ex 2: compare $g(x) = 2^x$ w/ $h(x) = (\frac{1}{2})^x$

x	$g(x)$
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x	$h(x)$
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graph of g

graph of h



$b > 1$

$0 < b < 1$

Typical graphs
of $y = b^x$

Domain of exponential function
Range of exp. function.

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Ex 3! Find a formula for a pop. of 5000 that...

- a) increases 15% per year.
- b) decreases 7% per year.
- c) doubles in 4 years.
- d) triples in 4 months.