Chapter 7: Exponential Functions

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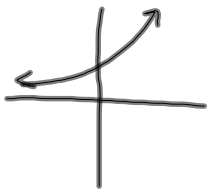
exponential function:

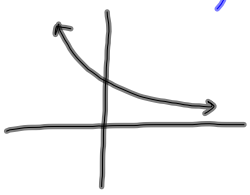
→ variable is the exponent

$$y = c^x$$

$c > 1$ — increasing



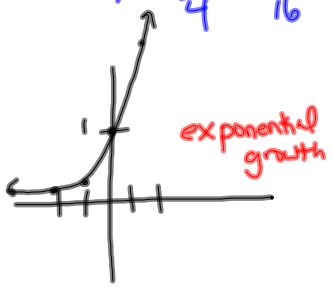
$0 < c < 1$ — decreasing



ex.1) $y = 4^x$

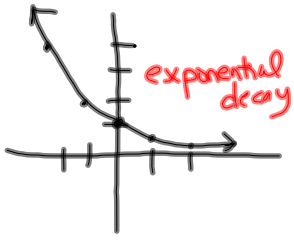
x	y
−2	1/16
−1	1/4
0	1
1	4
2	16

$4^{-2} = \frac{1}{4^2} = \frac{1}{16}$



ex.2) $f(x) = \left(\frac{1}{2}\right)^x$

x	y
−2	4
−1	2
0	1
1	1/2
2	1/4



Characteristics: $y = c^x$

→ Domain: $\{x \mid x \in R\}$

→ Range: $\{y \mid y > 0, y \in R\}$

→ no x-intercepts

→ y-intercept (0,1)

↘ Horizontal Asymptote $y = 0$ (graph approaches but never reaches)

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Graph given, you determine equation

$y = \left(\frac{1}{4}\right)^x$

Half-Life Story Problems

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$$y = a\left(\frac{1}{2}\right)^{\frac{t}{h}}$$

a ↑ initial amount

$$y = 1\left(\frac{1}{2}\right)^{t/15}$$ ← half life of 15 days

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