

# Graphing Exponential Functions

Nov 28-9:37 AM

**Ch. 8 Graphing Exponential & Logarithmic Functions**

Exponential Functions:  $y = b^x$ , where  $b$  is a positive number other than 1

Graph  $y = 2^x$  using a t-chart.

X	Y
3	8
2	4
1	2
0	1
-1	$\frac{1}{2}$
-2	$\frac{1}{4}$
-3	$\frac{1}{8}$

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General Exponential Function  $y = a b^{x-h} + k$

Sketch the horizontal asymptote with a dashed line ( $y = k$ )

Find the y-intercept of the graph by evaluating the function when  $x=0$ .

Use a t-chart to sketch the graph of  $y = ab^x$

Shift the graph

- h units horizontally
- k units vertically

> or

*stretch/shrink v.*      *left/right*

*up/down*

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1.  $y = 3^x$

② Y-intercept  $(0, 1)$

① Asymptote  $y = 0$

Domain  $(-\infty, \infty)$

Range  $(0, \infty)$

Growth or Decay

x	y
1	3
-1	1/3

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2.  $y = 3^{x+1}$

② Y-intercept  $(0, 3)$

① Asymptote  $y = 0$

Domain  $(-\infty, \infty)$

Range  $(0, \infty)$

Growth or Decay

x	y
0	3
-1	1

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3.  $y = 3^x - 2$

② Y-intercept  $(0, -1)$

① Asymptote  $y = -2$

Domain  $(-\infty, \infty)$

Range  $(-2, \infty)$

Growth or Decay

x	y
0	-1
-1	-1 1/3

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$x \mid y$   
 $1 \mid -1$   
 $0 \mid -\frac{1}{3}$   
 $-1 \mid -\frac{1}{9}$

4.  $y = -\frac{1}{3} \cdot 3^x$   $-\frac{1}{3} + \frac{1}{3}$

Y-intercept  $(0, -\frac{1}{3})$

Asymptote  $y = 0$

Domain  $(-\infty, \infty)$

Range  $(-\infty, 0)$

Growth or Decay

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$2 \cdot 3^{-2} = 2 \cdot \frac{1}{9} = \frac{2}{9}$

5.  $y = 2 \cdot 3^{x-1}$

Y-intercept  $(0, \frac{2}{3})$

Asymptote  $y = 0$

Domain  $(-\infty, \infty)$

Range  $(0, \infty)$

Growth or Decay

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6.  $y = (\frac{1}{2})^x + 3$

Y-intercept  $(0, 4)$

Asymptote  $y = 3$

Domain  $(-\infty, \infty)$

Range  $(3, \infty)$

Growth or Decay

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7.  $y = (\frac{1}{2})^{x-2} - 1$

Y-intercept \_\_\_\_\_

Asymptote \_\_\_\_\_

Domain \_\_\_\_\_

Range \_\_\_\_\_

Growth or Decay \_\_\_\_\_

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Homework

# 1, 3, 5, 6, 9,  
10, 13, 15, 17, 18

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