Exponential Functions

Number e:

Logarithm properties

Solving steps:

- **Isolate the base**
- **Take the log of both sides**
- **Use logarithmic properties to simplify the expression and solve for *x***
- **Round all answers to 4 decimal places**

Example 1: $3(2)^x = 7$	**Example 2:** $4\left(\frac{1}{2}\right)^x - 3 = 9$
Example 3: $1000(1.0765)^{4x} = 15000$	**Example 4:** $15(0.87)^{-3x} = 42$

Solving steps:

- **Isolate *e***
- **Take the natural log of both sides**
- **Use logarithmic properties to simplify the expression and solve for *x***
- **Round all answers to 4 decimal places**

Example 5: $e^{0.4x} + 3 = 7$	**Example 6:** $e^{-4x} = 100$
Example 7: $-5e^{0.015x} + 8 = -14$	**Example 8:** $-3e^{2x-4} = 33$

Graphing

Exponential Growth	Exponential Decay

Horizontal Asymptote:

Function Transformations

How to find *y*-intercept:

Sketch the following functions.

Example 9: $y = 2 \cdot 3^x - 6$

a. Growth or decay?

b. Equation of the asymptote

c. *y*-intercept

d. *x*-intercept(s)

Example 10: $y = -2\left(\frac{1}{3}\right)^x - 1$

a. Growth or decay?

b. Equation of the asymptote

c. *y*-intercept

d. *x*-intercept(s)

Example 11: $y = 1000(1.03)^x$	**Example 12:** $y = 500(0.87)^x$
a. Growth or decay?	a. Growth or decay?
b. Equation of the asymptote	b. Equation of the asymptote
c. *y*-intercept	c. *y*-intercept
d. *x*-intercept(s)	d. *x*-intercept(s)

Example 13: $f(x) = 300e^{-2x}$	**Example 14:** $y = -5e^{-x} + 8$
a. Growth or decay?	a. Growth or decay?
b. Equation of the asymptote	b. Equation of the asymptote
c. *y*-intercept	c. *y*-intercept
d. *x*-intercept(s)	d. *x*-intercept(s)