

## Use WZ grapher and Virtual TI-83

In this section we will discuss

- Common and Natural Logarithms.
- Using Common and Natural Logarithms on a Calculator
- Changing Bases for Logarithmic Functions
- Graphing Common and Natural Logarithmic functions.

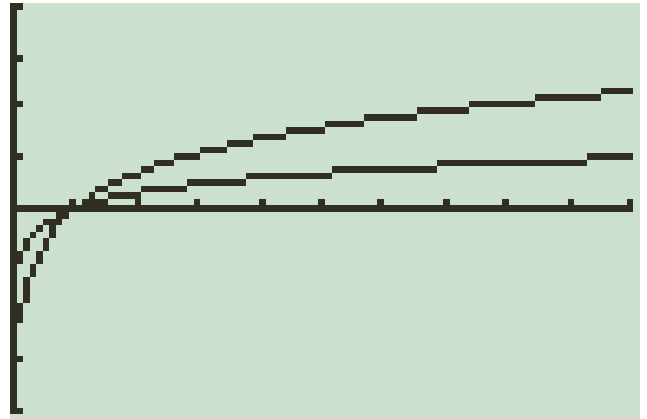
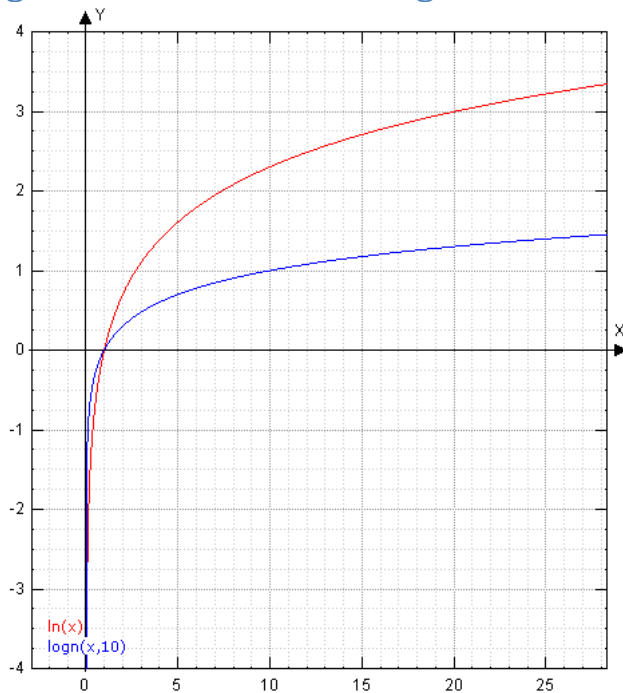
## Common and Natural Logarithms

### Common and Natural Logarithms

Definition:  $e \approx 2.7182818284 \dots$  and is a irrational number

$$\text{Log } x = \text{Log}_{10} x \quad \& \quad \ln x = \text{Log}_e x$$

### Using Common and Natural Logarithms on a Calculator



Ex: Use a calculator to approximate each number to four decimal places.

a)  $\log 5132$

b)  $\frac{\log 6500}{\log 0.007}$

c)  $\ln 4567$

d)  $e^{-1.234}$

e)  $10^\pi$

### Change of Base Formula

The Change of Base Formula  
 For any logarithmic bases  $a, b$  and any positive number  $M$ ,

$$\log_b M = \frac{\log_a M}{\log_a b} = \frac{\log M}{\log b} = \frac{\ln M}{\ln b}$$

Ex: Use your calculator to approximate

a)  $\log_5 7$

b)  $\log_{19} 23$

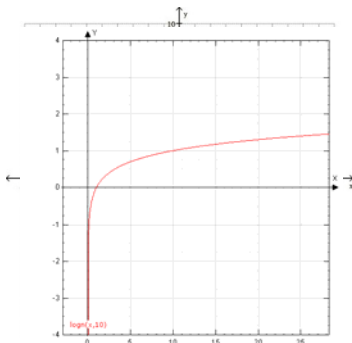
c) Change this into base e:  $\log_{\text{little}} \text{BIG}$

The two noteworthy features for each  
 $y = e^x, 10^x, \ln x, \log x$   
 are:

1. Asymptote
2. Intercept

Graph the following functions, then state the domain and range of each:

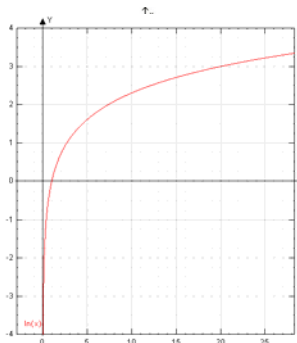
a)  $y = \log x$



Dom: \_\_\_\_\_

Range: \_\_\_\_\_

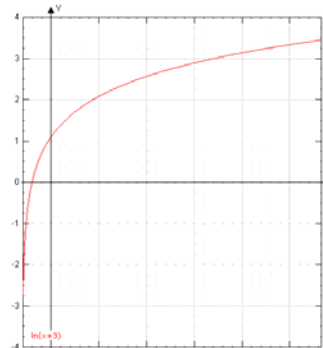
b)  $y = \ln x$



Dom: \_\_\_\_\_

Range: \_\_\_\_\_

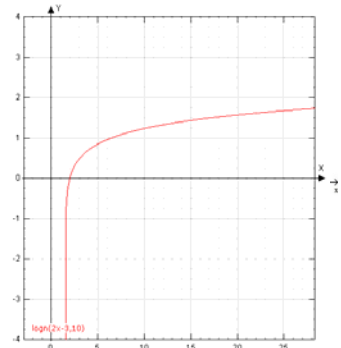
c)  $y = \ln(x + 3)$



Dom: \_\_\_\_\_

Range: \_\_\_\_\_

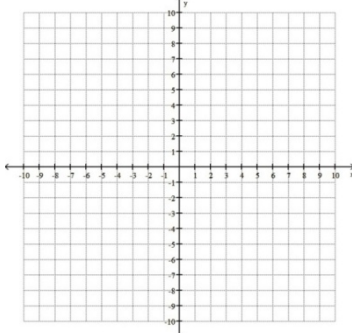
d)  $y = \log(2x - 3)$



Dom: \_\_\_\_\_

Range: \_\_\_\_\_

e)  $y = 2 \log x$



Dom: \_\_\_\_\_

Range: \_\_\_\_\_

