

Name \_\_\_\_\_

Date \_\_\_\_\_

## Advanced Algebra

## Unit 3: Exponential, Log and Power Functions

## The Natural Base e

## Assignment #14

Use a calculator to evaluate the following: Round your answer to three decimal places

1)  $e^5$   
148.413

2)  $e^3$   
20.09

3)  $e^{-\frac{3}{4}}$   
.4724

4)  $e^{1.2}$   
3.32

5)  $e^{\frac{1}{2}}$   
1.65

6)  $e^{\frac{1}{3}}$   
1.3956

7)  $e^{-\frac{1}{2}}$   
.6065

Simplify the following expressions:

8)  $e^{2*}e^4$   
 $e^6$

9)  $3e^{-3}*e^6$   
 $3e^3$

10)  $e^{x*}4e^{(2x+1)}$   
 $4e^{2x+1+x}$   
 $4e^{3x+1}$

11)  $\frac{e^x}{2e}$   
 $\frac{e^{x-1}}{2}$

12)  $\frac{4e^x}{e^{4x}}$

$4e^{x-4x}$   
 $4e^{-3x}$   
 $\frac{4}{e^{3x}}$

13)  $e^{6*}e^{x*}e^{-2x}$

$e^6 \cdot e^{x-2x}$   
 $e^6 \cdot e^{-x}$   
 $e^{6-x}$

14)  $(3e^{-3x})^{-1}$

$3^{-1} e^{3x}$   
 $\frac{e^{3x}}{3}$

15)  $(\frac{1}{2}e^{-3})^3$

$\frac{1}{8}e^{-9}$   
 $\frac{1}{8e^9}$

16)  $(2e^{5x})^2$

$4e^{10x}$

17)  $(10e^{5x})^{-4}$

$10^{-4} e^{-20x}$   
 $\frac{1}{10^4 e^{20x}}$

18)  $\sqrt{4xe^2}$

$(4xe^2)^{\frac{1}{2}}$   
 $2x^{\frac{1}{2}}e^1$

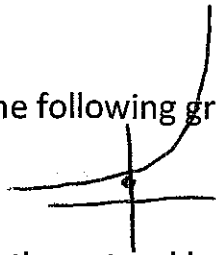
19)  $\sqrt[3]{64xe^6}$

$(64xe^6)^{\frac{1}{3}}$   
 $64^{\frac{1}{3}} x^{\frac{1}{3}} e^2$   
 $4e^2 x^{\frac{1}{3}}$

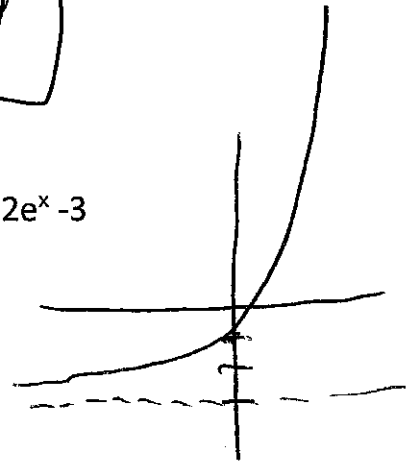
# Assignment #14

Sketch the following graphs:

20)  $e^x$



21)  $y = 2e^x - 3$



I can use the natural base in real life...

From our past units :

$A = P(1 + \frac{r}{n})^{nt}$       Compounded n times per year

$A = Pe^{rt}$       Compounded continuously (every single second!!!)

Compare and contrast :

You deposit \$10,000 into an account that pays 6% interest. Show all you know for the balance after 10 years a) quarterly      b) continuously

$10,000 (1 + \frac{.06}{4})^{40}$

$\$18,140.18$

$10,000 e^{.06(10)}$

$\$18,221.19$

Solve the following Exponential Equations with e as the base.

1)  $12 + e^x = 120$

$e^x = 108$

$x = \ln 108$

$4.68$

2)  $25 * e^x = 1200$

$e^x = 48$

$x = \ln 48$

$3.87$

3)  $25 + 2 * e^x = 165$

$e^x = 70$

$x = \ln 70$

$4.25$

4)  $250 + 4e^x = 1800$

$4e^x = 387.5$

$e^x = (\frac{387.5}{4})$

$x = \ln (\frac{387.5}{4})$

$4.57$