

OBJECTIVE 1: The Natural Base "e"

- It is called the Euler Number
- Special number like π or i
- $e \approx 2.71828182846$
- Button on the calculator $2^{nd} \div$
- 2^{nd} LN takes you to e^x

TASK 1: Simplify the expression

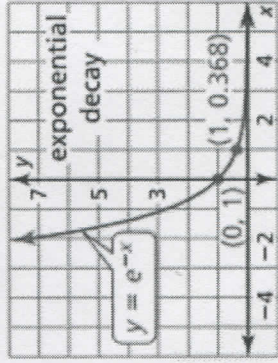
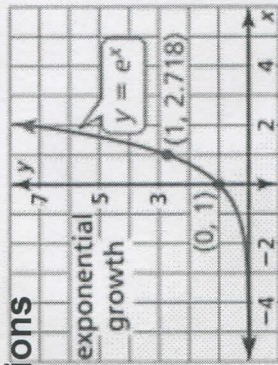
a) $(e^6) \cdot e^3$
 e^{6+3}
 $= e^9$
 ≈ 8103.084

b) $\frac{16e^5}{e^4}$
 $16e^{5-4}$
 $= 16e$
 ≈ 10.873

c) $(3e^{-4x})^2$
 $3^2 \cdot e^{-4x \cdot 2}$
 $9e^{-8x} = \frac{9}{e^{8x}}$

OBJECTIVE 2: Natural Base Functions

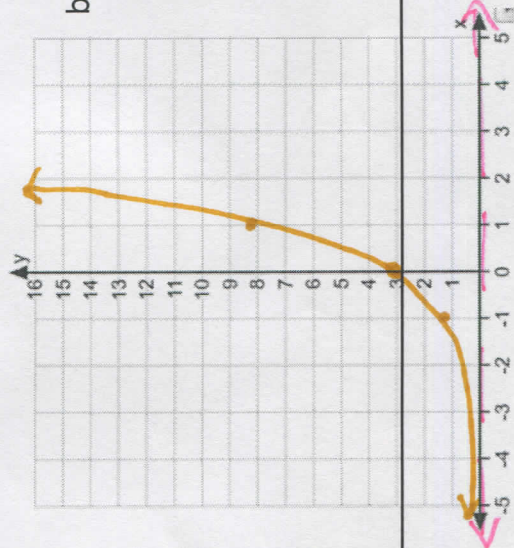
- $y = ae^{rx}$
- $a > 0$ & $r > 0$ then exponential growth
- $a > 0$ & $r < 0$ then exponential decay
- exponential growth parent is $y = e^x$
- exponential decay parent is $y = e^{-x}$



TASK 2: Determine whether growth or decay function is provided and then graph the function by completing the t-chart.
 HINT: type the function in to $y =$ on the calculator to get a visual and use the table to strategically complete your t-chart.

a) $y = 3(e)^x$

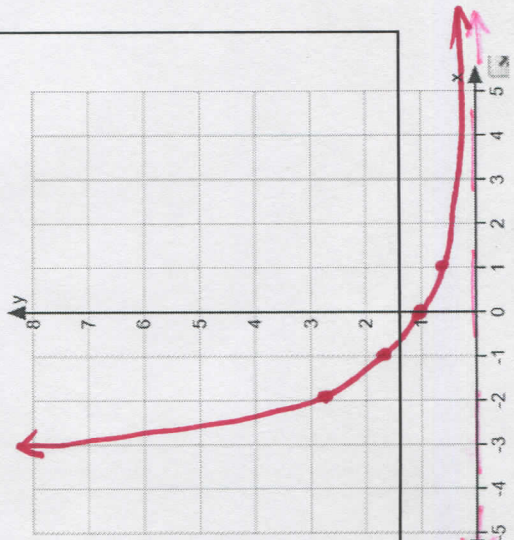
X	Y
-1	1.104
0	3
1	8.155
2	22.167



D: $(-\infty, \infty)$
 R: $(0, \infty)$

b) $f(x) = (e)^{-0.5x}$

X	Y
-2	2.718
-1	1.649
0	1
1	0.607

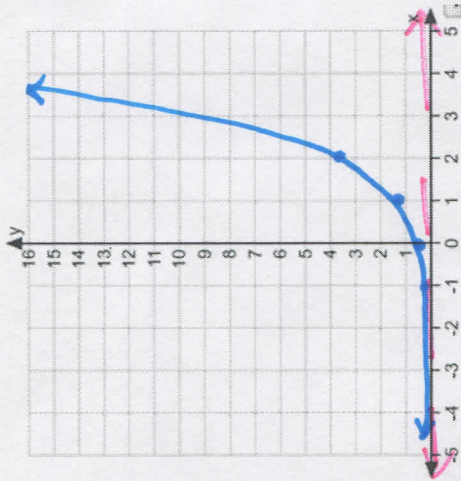


D: $(-\infty, \infty)$
 R: $(0, \infty)$

c) $y = \frac{1}{2}(e)^x$

X	Y
-1	0.184
0	0.5
1	1.359
2	3.695

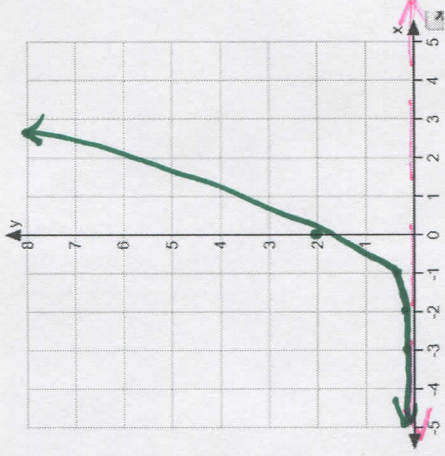
D: $(-\infty, \infty)$
R: $(0, \infty)$



d) $f(x) = 2(e)^{2x}$

X	Y
-3	0.005
-2	0.037
-1	0.271
0	2

D: $(-\infty, \infty)$
R: $(0, \infty)$



OBJECTIVE 3: Continuously Compounded Interest

Principle, Initial Amount

final Amount

$$A = Pe^{rt}$$

ex 2.718

time in years

rate as a decimal

TASK 4: Apply the formula above to the following real-world scenarios below.

a) You deposit \$4250 in an account that earns 5% annual interest compounded continuously. What is the final amount after 10 years?

$t = 10$ $A = 4250e^{0.05(10)}$ $P = 4250$ $r = 0.05$ $= \$7,007.07$

b) You are your friend each have accounts that earn annual interest compounded continuously. Your friend started with \$4500 and a rate of 4%. The balance of your account after t years can be modeled by $A = 3900e^{0.05t}$. Which account has a greater principal? Which account has a greater balance after 14 years?

you: $A = 4500e^{0.04t}$ ME: $A = 3900e^{0.05t}$ friend = \$7878.026

Still need help with:

$t = 14$ years

friend \$4500

ME = \$7853.636

friend/you has more.