Name __Key__   Date _____ Pd __

6.2 The Natural Base e & Compounded Continously CYU

☑ Use when you get it right all by yourself

S Use when you did it all by yourself, but made a silly mistake

H Use when you could do it alone with a little help from teacher or peer

G Use when you completed the problem in a group

X Use when a question was attempted but wrong (get help)

N Use when a question was not even attempted

CONCEPTS	BASIC	INTERMEDIATE	ADVANCED
Simplifying expressions with the Euler Number	1, 3	2, 4	5
Error Analysis		6, 7	
Determining growth or decay with "e"	8 - 11		
Graphing exponentials with "e"		8 – 11	
Solving real-world scenarios of compounded continuously			

*Simplify the expression. Show all work for full credit.*

1. $e^5 \cdot e^5$

$= e^8$
≈ 2980.958

2. $\frac{11e^9}{22e^{10}}$

$= \frac{1}{2e}$
≈ 0.184

3. $(5e^{7x})^4$

$625e^{28x}$

4. $\sqrt{9e^{6x}}$

$3e^{3x}$

5. $e^x \cdot e^{-6x} \cdot e^8$

e^{-5x+8}

**ERROR ANALYSIS** *Describe and correct the error in simplifying the expression.*

6.

X $(4e^{3x})^2 = 4e^{(3x)(2)}$
$= 4e^{6x}$

4 was not squared
$16e^{6x}$

7.

X $\frac{e^{5x}}{e^{-2x}} = e^{5x-2x}$
$= e^{3x}$

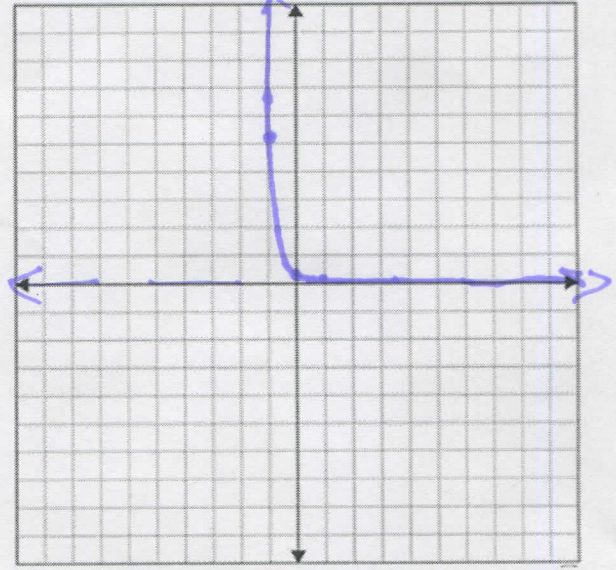denominator exponent added not subtracted; e^{7x}

Tell whether the function represents exponential growth or exponential decay. Then graph the function.
   HINT: create a t-chart using your calculator.

8. $y = e^{3x}$ growth

9. $y = 3e^{-2x}$ decay
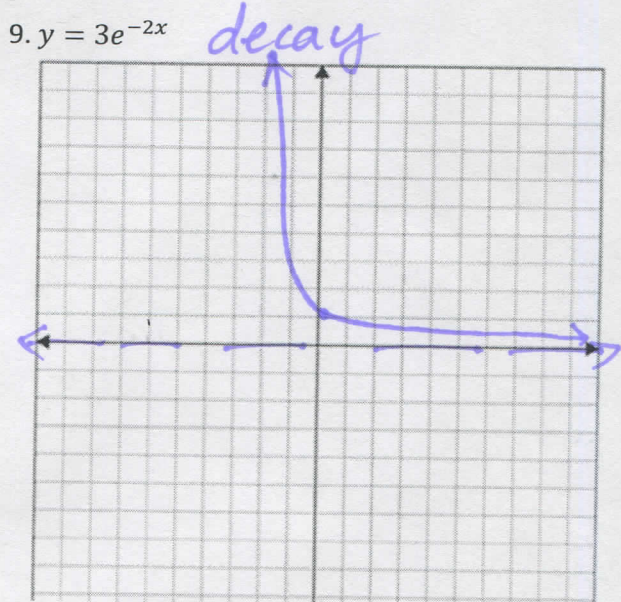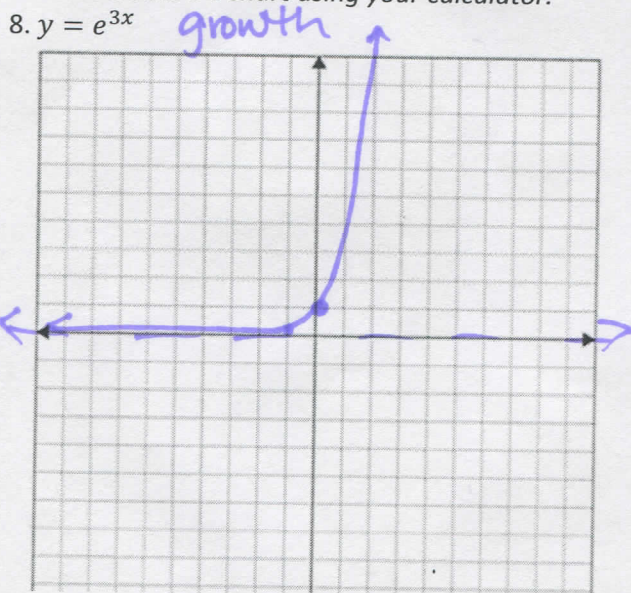
10. $y = 0.5e^x$
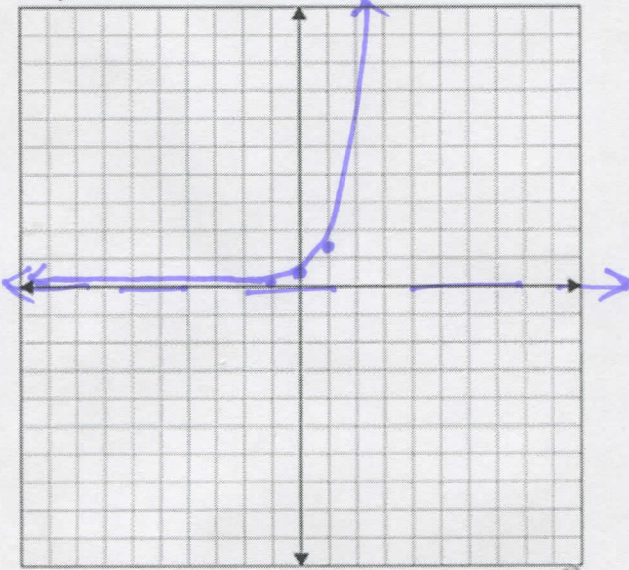
11. $y = 0.25e^{-3x}$

12. **MODELING WITH MATHEMATICS** Investment accounts for a house and education earn annual interest compounded continuously. The balance H (in dollars) of the house fund after t years can be modeled by H = $3224e^{0.05t}$. The graph shows the balance in education fund over time. Which account has the greater principal? Which account has a greater balance after 10 years?

the education fund

the education fund

Education Account
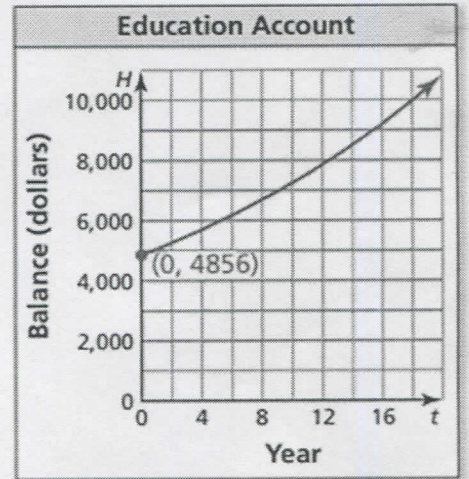
13. **MODELING WITH MATHEMATICS** Tritium and sodium-22 decay over time. In a sample of tritium, the amount y (in milligrams) remaining after t years is given by y = $10e^{-0.0562t}$. The graph shows the amount of sodium-22 in a sample over time. Which sample started with a greater amount ? Which has a greater amount after 10 years?

sodium-22

tritium

Sodium-22 Decay
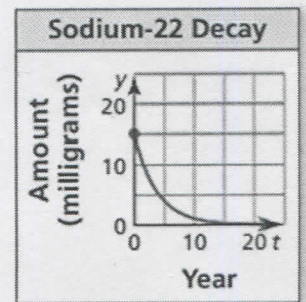
CYU Reflection: *How far can you go: basic, intermediate, or advanced?*
Rate your mastery level!
How confident are you with the skills this CYU covered? Circle the score you would give yourself.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Basic | | Intermediate | | | Advanced | | Solved ALL! |