7.4 Exponential Modeling

Corrective Assignment #2

For 1-8, simplify. Your answer should contain only positive exponents

1. $(e^{-7} \cdot e^{3})^{2x}$
2. $-\frac{2e^{7x+1}}{e^{2x}}$
3. $e^{x} \cdot 2e^{-3}$
4. $\left(3e^{-3x}\right)^{3}$
5. $\frac{2e^{6x+7}}{-e^{5}}$
6. $(e^{3x} \cdot e^{2})^{5}$
7. $\left(2e^{-4x}\right)^{3}$
8. $e^{x} \cdot 4e^{2x-3}$

For 9-12, use a calculator to evaluate the expression. Round the result to three decimal places.

9. $-5e^{2}$
10. $0.3e^{7}$
11. $100e^{-4}$
12. $-0.4e^{3}$

Compounding Interest (continuous compounding)	Compounding Interest (periodic compounding)	% increase/decrease per unit of time
$A = Pe^{rt}$	$A = P\left(1 + \frac{r}{n}\right)^{nt}$	$f(x) = ab^{x}$

For 13 – 16, write a model for each scenario and use the model to calculate the value for the given number of years. (Not all problems involve compounding interest!)

13. You deposit $600 in an account that pays 2.3% annual interest compounded continuously. How much will you have after 2.5 years?

14. You deposit $7000 in an account that pays 5% annual interest compounded monthly. How much will you have after 23 years?

15. Your antique motor scooter is currently worth $1,700 and is increasing in value by 4.8% per year. How much will it be worth in 9 years?

16. You deposit $300 in an account that pays 2% annual interest compounded daily. How much will you have after 6 years?

17. Functions of the form $P(t) = P_o e^{-rt}$ describe exponential decay, where r is the decay rate, P_o is the initial amount and t is time.

    Suppose a certain radioactive element has an annual decay rate of 9%. Starting with a 800 gram sample of the element, how many grams will be left in 12 years?

ANSWERS: 1. $\frac{1}{e^{8x}}$ 2. $-2e^{5x-1}$ 3. $2e^{x-3}$ 4. $\frac{27}{e^{9x}}$ 5. $-2e^{6x+2}$ 6. e^{15x+10} 7. $\frac{8}{e^{12x}}$ 8. $4e^{3x-3}$ 9. -36.945 10. 328.99 11. 1.832 12. -8.034 13. ≈ $635.51 14. ≈ $22054.59 15. ≈ $2592.39 16. ≈ $338.25 17. 271.68g