2.5.B Exponential Function Context and Data Modeling

AP Precalculus   Name: _____

Identify the percent increase or decrease of each function.

1. $y = -8(3.2)^x$	2. $f(x) = 15(0.855)^x$	3. $y = 10(0.45)^x$	4. $y = (1.051)^x$

For each problem, create a function to model the scenario.

5. A population p of 500 people doubles every 35 years t.	6. Mr. Kelly bought a new tractor for his farm in New York. It cost him $150,000. Unfortunately, it's value v depreciates in value by 5.4% per year t.	7. A baseball card is worth $50 and its value v increases at a rate of 23.5% per year t.
8. There is 500 grams g of radioactive material. Its half-life is 5,700 years, t.	9. 700 grams of radioactive material m decays at a rate of 2.4% per year t.	10. A plague of mice has hit Australia! Starting with only 30 mice, their population p increases by 650% every month, m.

11. The rodent population p in a large city is being controlled by a new poison that kills half the population every 6 months m. There are currently 2,000,000 rodents.	12. A mutual-fund portfolio has a value v of $1,000 and doubles every 7 years t.

For each of the problems below, identify how the equivalent form reveals a different property.

13. If $f(s) = (1.09)^s$ indicates that the quantity increases by a factor of 1.09 every second, then what does $f(s) = (1.09^{60})^{(s/60)}$ indicate?	14. If $f(d) = 1.001^d$ indicates that the quantity increases by a factor of 1.001 every day, then what does $f(d) = (1.001^{365})^{(d/365)}$ indicate?

Answers to 2.5.B CA #2

1. 220% increase	2. 14.5% decrease	3. 55% decrease	4. 5.1% increase

5. $p(t) = 500(2)^{t/35}$	6. $v(t) = 150{,}000(0.946)^t$	7. $v(t) = 50(1.235)^t$

8. $g(t) = 500\left(\frac{1}{2}\right)^{t/5700}$	9. $m(t) = 700(1.024)^t$	10. $p(m) = 30(7.5)^m$

11. $p(m) = 2{,}000{,}000\left(\frac{1}{2}\right)^{t/6}$	12. $v(t) = 1{,}000(2)^{t/7}$

13. The quantity increases by a factor of 1.09^{60} every minute.	14. The quantity increases by a factor of 1.001^{365} every year.