Name _____ Date _____
Mr. Schlansky Algebra II

Converting Rates

Round all coefficients to 6 decimal places

1. Gerard took out a $72000 loan for college that has a 12.7% interest rate.

Write an equation to find the value of the loan after *t* years.

Write an equation to find the monthly growth rate after *t* years.

Write an equation to find the monthly growth rate after *m* months.

What is the monthly growth rate rounded to the nearest thousandth of a percent?

Write an equation to find the weekly growth rate after *t* years.

Write an equation to find the weekly growth rate after *w* weeks.

What is the weekly growth rate to the nearest thousandth of a percent?

Write an equation to find the daily growth rate after *t* years.

Write an equation to find the daily growth rate after *d* days.

What is the daily growth rate to the nearest thousandth of a percent?

2. The population of a small neighborhood in Brooklyn, NY is 452,000 and is growing by a rate of 11.6% each year.

Write an equation that represents the population of the neighborhood after t years.

Write an equation to find the monthly growth rate after t years.

Write an equation to find the monthly growth rate after m months.

What is the monthly growth rate to the nearest thousandth of a percent?

Write an equation to find the weekly growth rate after t years.

Write an equation to find the weekly growth rate after w weeks.

What is the weekly growth rate to the nearest thousandth of a percent?

Write an equation to find the daily growth rate after t years.

Write an equation to find the daily growth rate after d days.

What is the daily growth rate to the nearest thousandth of a percent?

3. Each year, the amount of students in Eastbury High School increases by 7.15%. Which of the following expressions could be used to find the *weekly* rate of increase of Eastbury High School after *w* weeks?

1) $(1.0715)^{w}$ 2) $(1.0715^{\frac{1}{52}})^{52w}$ 3) $(1.0715^{\frac{1}{52}})^{w}$ 4) $(1.0715)^{52w}$

4. Each year, the amount of students in Eastbury High School increases by 7.15%. Which of the following expressions could be used to find the *weekly* rate of increase of Eastbury High School after *t* years?

1) $(1.0715^{\frac{1}{52}})^{t}$ 2) $(1.0715^{\frac{1}{52}})^{52t}$ 3) $(1.0715)^{52t}$ 4) $(1.0715)^{t}$

5. A study of the annual population of the red-winged blackbird in Ft. Mill, South Carolina, shows the population, $B(t)$, can be represented by the function $B(t) = 750(1.16)^{t}$, where the *t* represents the number of years since the study began. In terms of the monthly rate of growth, the population of red-winged blackbirds can be best approximated by the function

1) $B(t) = 750(1.012)^{t}$ 3) $B(t) = 750(1.012)^{12t}$

2) $B(t) = 750(1.16)^{12t}$ 4) $B(t) = 750(1.16)^{\frac{t}{12}}$

6. Last year, the total revenue for Home Style, a national restaurant chain, increased 5.25% over the previous year. If this trend were to continue, which expression could the company's chief financial officer use to approximate their monthly percent increase in revenue? [Let *m* represent months.]

1) $(1.0525)^{m}$ 3) $(1.00427)^{m}$

2) $(1.0525)^{\frac{12}{m}}$ 4) $(1.00427)^{\frac{m}{12}}$

7. Rasmus invested $65,000 in the stock market and makes an average of 9.2% each year on his investments. Which equation could be used to find his monthly percent increase after *t* years?

1) $v = 65000(1.092)^{t}$ 3) $v = 65000(1.0074)^{t}$

2) $v = 65000(1.0074)^{12t}$ 4) $v = 65000(1.092)^{12t}$

8. The population, $p(t)$, of a small county in Western New York has grown according to the formula $p(t) = 87218(1.421)^{t}$ after *t* years. What is the *weekly* percent of increase rounded to the nearest hundredth of a percent?

9. A student studying public policy created a model for the population of Detroit, where the population decreased 25% over a decade. He used the model $P = 714(0.75)^d$, where P is the population, in thousands, d decades after 2010. Another student, Suzanne, wants to use a model that would predict the population after y years. Suzanne's model is best represented by

1) $P = 714(0.6500)^y$
2) $P = 714(0.8500)^y$
3) $P = 714(0.9716)^y$
4) $P = 714(0.9750)^y$

10. Stephanie found that the number of white-winged cross bills in an area can be represented by the formula $C = 550(1.08)^t$, where t represents the number of years since 2010. Which equation correctly represents the number of white-winged cross bills in terms of the monthly rate of population growth?

1) $C = 550(1.00643)^t$
2) $C = 550(1.00643)^{12t}$
3) $C = 550(1.00643)^{\frac{t}{12}}$
4) $C = 550(1.00643)^{t+12}$

11. On average, college seniors graduating in 2012 could compute their growing student loan debt using the function $D(t) = 29,400(1.068)^t$, where t is time in years. Which expression is equivalent to $29,400(1.068)^t$ and could be used by students to identify an approximate daily interest rate on their loans?

1) $29,400\left(1.068^{\frac{1}{365}}\right)^t$
2) $29,400\left(\frac{1.068}{365}\right)^{365t}$
3) $29,400\left(1+\frac{0.068}{365}\right)^t$
4) $29,400\left(1.068^{\frac{1}{365}}\right)^{365t}$

12. A population of insects grows according to the formula $p(t) = 2100(1.37)^t$ where $p(t)$ is the population of insects after t weeks. What is the daily interest rate rounded to the nearest tenth of a percent?

13. Over the past several years, the value of a stock has decreased by 3.2% each year. The value of the stock is now $87.24. Which of the following equations does not represent the value of the stock after t years or m months?

1) $a(t) = 87.24(1.032)^t$
2) $a(t) = 87.24(1.0026)^{12t}$
3) $a(m) = 87.24(1.0026)^{12m}$
4) $a(m) = 87.24(1.0026)^m$