Name Schlansky
Mr. Schlansky

Date ____________
Algebra II

Modeling Exponential Functions Practice

$A=P(1\pm r)^t$	Nothing Below!	A = after amount		n
$A=P\left(1+\frac{r}{n}\right)^{nt}$	Compounding (Not Continuous)	P = principal (initial/starting) amount	Annually	1
$A=Pe^{rt}$	Compounding Continuously	r = rate (as a decimal)	Quarterly	4
$A=P\left(\frac{1}{2}\right)^{\frac{t}{h}}$	Half Life	n = number of times compounded per year	Monthly	12
$A=P(1\pm r)^{\frac{t}{h}}$	Irregular Time	t = time (that is passing)	Weekly	52
		h = half life or time it takes for the percent to be applied	Daily	365

1. Jackie deposits \$26,000 into a savings account with interest compounded monthly at a rate of 4.6% each year. Write an equation for $A(t)$, the value of her account after t years. Use your equation to determine how much money will be in her account after 4 years?

P; n = 12, n formula; r

$A=A(t)$
$P=26{,}000$
$r=.046$
$n=12$
$t=t$

$A=P(1+\frac{r}{n})^{nt}$
$A(t)=26{,}000(1+\frac{.046}{12})^{12t}$
$A(t)=26{,}000(1.00383)^{12t}$

$t=4$
$A(4)=26{,}000(1.00383)^{12(4)}$
$A(4)=\$31{,}241.42$

2. The population of Schlansky, Arizona increases by 18% every 3.2 years. If the population is currently 2750, write an equation for $p(t)$, the population after t years. Using your equation, what will be the population, to the *nearest person*, 12 years from now?

+; r; h irregular time; P; t

$A=P(t)$
$P=2750$
$r=.18$
$t=t$
$h=3.2$

$A=P(1\pm r)^{\frac{t}{h}}$
$P(t)=2750(1+.18)^{\frac{t}{3.2}}$
$P(t)=2750(1.18)^{\frac{t}{3.2}}$

$P(12)=2750(1.18)^{\frac{12}{3.2}}$
$P(12)=5116$

3. A bank account is opened with \$2700 and interest is compounded continuously at a rate of 3.76% per year. Write an equation for $b(t)$, the balance of the account after t years. Using your equation, what will be the balance of the account after 8.1 years?

P; Pert; r; t

$A=b(t)$
$P=2700$
$r=.0376$
$t=t$

$A=Pe^{rt}$
$b(t)=2700e^{.0376t}$

$b(8.1)=2700e^{.0376(8.1)}$
$b(8.1)=\$3661.28$

4. A certain car depreciates at a rate of 14% each year. If the car was initially worth \$22,500, write an equation for $v(t)$, the value of the account after t years. Using your equation, what is the value of the car, rounded to the *nearest cent*, 12 years later?

nothing!

$A = v(t)$
$P = 22{,}500$
$r = .14$
$t = t$

$A = P(1 \pm r)^t$
$v(t) = 22{,}500(1 - .14)^t$
$v(t) = 22{,}500(.86)^t$

$v(12) = 22{,}500(.86)^{12}$
$v(12) = \$3682.68$

5. The half life of an element is 73 minutes. If there were initially 7.4 kg of the substance, write an equation for $a(t)$, the amount of the substance remaining after t minutes. Using your equation, to the *nearest hundredth of a kg*, how much will remain after 110 minutes?

half life

$A = a(t)$
$P = 7.4$
$t = t$
$h = 73$

$A = P\left(\frac{1}{2}\right)^{\frac{t}{h}}$
$a(t) = 7.4\left(\frac{1}{2}\right)^{\frac{t}{73}}$

$a(110) = 7.4\left(\frac{1}{2}\right)^{\frac{110}{73}}$
$= 2.60$

6. Skylar bought an antique mirror for \$800. If the value of her mirror increases 6% annually, write an equation for $v(t)$, the value of her mirror after t years. Using your equation, determine the value of Skylar's mirror at the end of 4 years to the *nearest dollar*?

nothing!

$A = v(t)$
$P = 800$
$r = .06$
$t = t$

$A = P(1 \pm r)^t$
$v(t) = 800(1 + .06)^t$
$v(t) = 800(1.06)^t$

$v(4) = 800(1.06)^4$
$v(4) = 1009|981$
1009
\$1010

7. A bank account is opened with \$1500 and interest is compounded quarterly at an interest rate of 3.1%. Write an equation for $b(t)$, the balance of the account after t years. Using your equation, how much money will be in the account after 7 years?

n formula $n = 4$

$A = b(t)$
$P = 1500$
$r = .031$
$n = 4$
$t = t$

$A = P\left(1 + \frac{r}{n}\right)^{nt}$
$b(t) = 1500\left(1 + \frac{.031}{4}\right)^{4t}$
$b(t) = 1500(1.00775)^{4t}$

$b(7) = 1500(1.00775)^{4(7)}$
$b(7) = 1861.96$

double time n P

8. The amount of insects in a colony doubles every 6 days. If there are initially 50 insects, write an equation for $P(t)$, the amount of insects in the colony after t days. Using your equation, how many insects, to the *nearest insect*, will be in the colony after 11 days?

$A=P(t)$
$P=50$
$t=t$
$h=6$

$A=P(2)^{\frac{t}{h}}$

$P(t)=50(2)^{\frac{t}{6}}$

t

$P(11)=50(2)^{\frac{11}{6}}$

$P(11)=178$

P r Pe^{rt}

9. A bank account is opened with $9200 and is compounded at a rate of 4.7% continuously. Write an equation for $A(t)$, the amount of money in the account after t years. Using your equation, how much money will be in the account after 5 years?

$A=A(t)$
$P=9200$
$r=.047$
$t=t$

$A=Pe^{rt}$

$A(t)=9200e^{.047t}$

t

$A(5)=9200e^{.047(5)}$

$A(5)=11,637.16$

half life h P

10. The half-life of an element Schlanskium is 4.1 days. If there is a 9000 gram sample, write an equation for $p(t)$, the amount of Schlanskium remaining after t days. To the *nearest hundredth of a gram*, how much Schlanskium will remain after 7 days?

$A=P(t)$
$P=9000$
$t=t$
$h=4.1$

$A=P(\frac{1}{2})^{\frac{t}{h}}$

$P(t)=9000(\frac{1}{2})^{\frac{t}{4.1}}$

t

$P(7)=9000(\frac{1}{2})^{\frac{7}{4.1}}$

$P(7)=2756.06$

P

n formula $n=4$ 11. Emma opens a bank account with an initial balance of $90,210. If interest is compounded quarterly at 4.25% each year, write an equation for $b(t)$, the balance of the account after t years. Using your equation, how much money will be in the account after 14 years?

$A=b(t)$
$P=90{,}210$
$r=.0425$
$n=4$
$t=t$

$A=P(1+\frac{r}{n})^{nt}$

$b(t)=90210(1+\frac{.0425}{4})^{4t}$

$b(t)=90210(1.010625)^{4t}$

t

$b(14)=90210(1.010625)^{4(14)}$

$b(14)=163040.98$

P n t r

12. Sophia is beginning to lift weights to get buff for the summer. She starts by working out 30 minutes and every five days, she will increase the time of her workouts by 25%. Write an equation to represent $d(t)$, the duration of her workout after t days. Using your equation, how many minutes will Sophia be working out after 30 days rounded to the *nearest tenth of a minute*?

illegular time

$A=d(t)$
$P=30$
$r=.25$
$t=t$
$h=5$

$A=P(1\pm r)^{\frac{t}{h}}$

$\frac{t}{5}$

$d(t)=30(1+.25)^{\frac{t}{5}}$

$d(t)=30(1.25)$

$d(30)=30(1.25)^{\frac{30}{5}}$

$d(30)=114.4$