Algebra P4
HW 47

Exponentials and Percent Growth

You have $300. It grows by 10%. How much money do you have? _____

You have 5000 amoebas. They grow by 20%. How many are there? _____

You have 70,000 people in your state. The population grows by 45%. How many are there ? _____

It turns out that there are <u>two ways</u> to do these problems.

	"Add the 10%" method	"Multiply" method
$500, 10% growth	500 + (.10)500 =	500(1.10) =
$500, 20% growth	500 + (.20)500 =	500(1.20) =
$500, 30% growth	500 + (____)500 =	500(_____) =
$500, 73% growth	500 + (_____)____ =	500(_____) =

	"Add the 10%" method	"Multiply" method
$30, 20% growth	30 + (_____)____ =	30(_____) =
$30, 40% growth	____ + (_____)____ =	_____(_____) =
$30, 23% growth	____ + (_____)____ =	_____(_____) =
$30, 65% growth	____ + (_____)____ =	_____(_____) =

	"Subtract the 10%" method	"Multiply" method
200, 10% shrink	200 – (.10)200 =	200(.90) =
200, 20% shrink	200 + (____)200 =	____(.80) =
200, 30% shrink	200 + (____)____ =	_____(_____) =
200, 45% shrink	____ + (____)____ =	_____(_____) =

1. What is the multiplier for the exponential growth/decay in each case?

a. Increase by 20% per year Multiplier:
b. Increase by 45% per year Multiplier:
c. Increase by 100% per year Multiplier:
d. Increase by 3% per year Multiplier:

e. Decrease by 30% per year Multiplier:
f. Decrease by 70% per year Multiplier:
g. Decrease by 4% per year Multiplier:

2. Write the equation of the exponential growth/decay in each case.

a. Start with $500, increase by 20% per year Equation:
b. Start with $1, increase by 8% per year Equation:
c. Start with $30,000, increase by 72% per year Equation:
d. Start with $45, increase by 3.4% per year Equation:

e. Start with $600,000, decrease by 30% per year Equation:
f. Start with $1, decrease by 63% per year Equation:
g. Start with $100, decrease by 4% per year Equation:

3. You start with $5,000, and you invest it with a return of 8% per year. How much money will you have in 20 years?

4. In your country, there are 10,000 people, and it is growing at 2.4% per year. How many people will there be in your country in 20 years?

5. Which will end up with more money: starting with $50,000 and getting 4% interest per year for 30 years, or starting with $3,000 and getting 15% interest per year for 30 years?

6. The mass of a clump of radioactive plutonium decays away at a rate of 20% per year. If you start with 100g of it, how much will remain after 10 years?

7. Your company's sales growth is described by the function $y = 4000(1.36)^x$. By what percent growth is the sales changing every year?

8. Your competition's sales growth is described by the function $y = 20,000(0.91)^x$. How would you describe the sales change of your competitor?