Warm Up

12/16

Find the Growth **Rate** from these Growth **Factors**:

1.35 1.02 2.1

35% 2% 110%

Find the Growth **Factor** from these Growth **Rates**:

42% 89% 4.5%

1.42 1.89 1.045

Homework Questions?

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Find the growth rate associated with the given growth factor.

10. 1.4 **11.** 1.9 **12.** 1.75

Find the growth factor associated with the given growth rate.

13. 45% **14.** 90% **15.** 31%

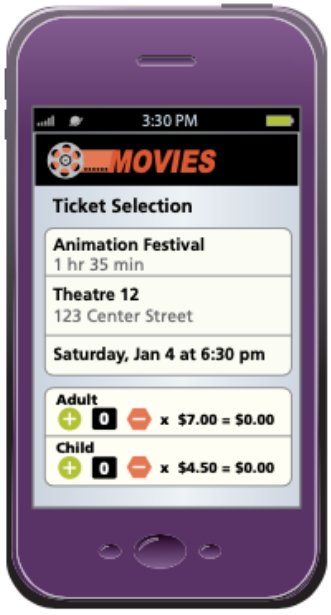
16. Suppose the price of an item increases by 25% per year. What is the growth factor for the price from year to year?

19. Suppose a movie ticket costs about $7, and inflation causes ticket prices to increase by 4.5% a year for the next several years.

a. How much will a ticket cost 5 years from now?

b. How much will a ticket cost 10 years from now? 30 years from now?

c. How many years will it take for the cost of a ticket to exceed $26?



$y = 7(1.045)^x$

41. In 2000, the population of the United States was about 282 million and was growing exponentially at a rate of about 1% per year.

a. At this growth rate, what will the population of the United States be in the year 2020?

$y = 282(1.01)^{20}$

b. At this rate, how long will it take the population to double?

c. The population in 2010 was about 308 million. How accurate was the growth rate?

$y = 282(1.01)^{x}$

For Exercises 43–45, write an equation that represents the exponential function in each situation.

43. A population is initially 300. After 1 year, the population is 361.

y-int

$y = 300(1.2)^x$

$\frac{361}{300} = 1.2$

x	y
0	300
1	361

44. A population has a yearly growth factor of 1.2. After 3 years, the population is 1,000.

(3, 1000)

$y = ab^x$

$y = a(1.2)^3$

$\frac{1000}{1.2^3} = \frac{a(1.2)^3}{1.2^3}$

$579 = a$

x	y
0	579
1	
2	
3	1000

45. The growth rate for an investment is 3 % per year. After 2 years, the value of the investment is $2,560.

Factor = 1.03

x	y
0	
1	
2	2560

3.3 Making a Difference

Connecting Growth Rate and Growth Factor

In Problem 3.2, the value of Sam's stamp increased by the same percent each year. However, each year, this percent was applied to the previous year's value. So, for example, the increase from year 1 to year 2 is 6% of \$2,650, not 6% of the original \$2,500. This type of change is called **compound growth.**

In this Problem, you will continue to explore compound growth. You will consider the effects of both the initial value and the growth factor on the value of an investment.

Problem 3.3

Mrs. Ramos started college funds for her two granddaughters. She gave $1,250 to Cassie and $2,500 to Kaylee. Mrs. Ramos invested each fund in a 10-year bond that pays 4% interest a year. GF = 1.04

A

1. Write an equation to show the relationship between the number of years and the amount of money in each fund.
2. Make a table to show the amount in each fund for 0 to 10 years.
3. Compare the graphs of each equation you wrote in part (1).
   You can use Desmos and make a sketch of what they would look like.
4. **a.** How does the initial value of the fund affect the yearly value increases?

   b. How does the initial value affect the growth factor?

   c. How does the initial value affect the final value?

B A year later, Mrs. Ramos started a fund for Cassie's cousin, Matt. Cassie made this calculation to predict the value of Matt's fund several years from now:

$$\text{Value} = \$2{,}000 \times 1.05 \times 1.05 \times 1.05 \times 1.05$$

1. What initial value, growth rate, growth factor, and number of years is Cassie assuming?
2. If the value continues to increase at this rate, how much would the fund be worth in one more year?

C Cassie's and Kaylee's other grandmother offers them a choice between college fund options.

Option 1	OR	Option 2
$1,000 at 3% interest per year		$800 at 6% per year

Which is the better option? Explain your reasoning.

Homework

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