LESSON MAKER PRO

Percent Change Patterns

Recognize growth and decay that repeat by the same percent.

HIGH SCHOOL · HSF-LE.A.1c

CCSS.Math.Content.HSF-LE.A.1c "Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another."

NAME _____ DATE _____

PART 1: CONSTANT PERCENT CHANGE

A quantity has constant percent growth or decay when it is multiplied by the same factor during each equal time interval. For growth, use a factor greater than 1. For decay, use a factor between 0 and 1.

WORKED EXAMPLE

A collectible starts at 96 points and grows by 25% each round. Write a model, then find its value after 3 rounds.

1. Convert 25% to 0.25.
2. The growth factor is 1 + 0.25 = 1.25.
3. Write $y = 96(1.25)^x$.
4. Evaluate: $y = 96(1.25)^3 = 187.5$.

Answer: $y = 96(1.25)^x$; after 3 rounds, 187.5 points

PRACTICE 6 problems

1 A quantity is 200, then 220, then 242 at equal time intervals. Does it change by a constant percent? If yes, state the percent rate.

ANSWER _____

2 The model $y = 500(4/5)^x$ represents a quantity after x intervals. What is the percent rate of change?

ANSWER _____

3 The model $y = 30(1.08)^x$ represents a quantity after x intervals. What is the percent rate of change?

ANSWER _____

4 A quantity is modeled by $y = 900(0.96)^x$. Find y when x = 2.

ANSWER _____

5 At equal time intervals, a concert ticket price changes from $250 to $220 to $193.60. Does the price change by a constant percent? If yes, state the percent rate.

ANSWER _____

6 Which model represents 12% decay per interval? A. $y = 75 + 9x$ B. $y = 75(0.88)^x$ C. $y = 75(1.12)^x$

ANSWER _____

APPLY IT Show your work

1 A coding club tracks weekly downloads of its study-planner app. The download totals are in thousands. Does the number of downloads grow by a constant percent each week? If yes, state the rate and predict the downloads in week 8.

STUDY-PLANNER APP DOWNLOADS

Week	Downloads, thousands
4	20
5	30
6	45
7	67.5

ANSWER _____

2 A student's music playlist has 400 saves at the start of a campaign. The number of saves grows by 10% each day for two days. Write an exponential model and find the number of saves after two days.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Two student video channels begin with 40 thousand weekly views. Channel A gains 6 thousand views each week. Channel B grows by 15% each week. After 2 weeks, find each channel's weekly views. Which channel has a constant percent rate of change? Explain.

WORK SPACE AND ANSWER

ANSWER KEY

Percent Change Patterns

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A quantity is 200, then 220, then 242 at equal time intervals. Does it change by a constant percent? If yes, state the percent rate.	**Yes; 10% growth per interval.**
2	The model $y = 500(4/5)^x$ represents a quantity after x intervals. What is the percent rate of change?	**20% decay per interval**
3	The model $y = 30(1.08)^x$ represents a quantity after x intervals. What is the percent rate of change?	**8% growth per interval**
4	A quantity is modeled by $y = 900(0.96)^x$. Find y when x = 2.	**829.44**
5	At equal time intervals, a concert ticket price changes from $250 to $220 to $193.60. Does the price change by a constant percent? If yes, state the percent rate.	**Yes; 12% decay per interval.**
6	Which model represents 12% decay per interval? A. $y = 75 + 9x$ B. $y = 75(0.88)^x$ C. $y = 75(1.12)^x$	**B. $y = 75(0.88)^x$**

PART 2 · APPLY IT

1. **Yes; 50% growth each week; 101.25 thousand downloads in week 8.** Each total is multiplied by 1.5, so the weekly growth rate is 50%. Multiply 67.5 by 1.5 to get 101.25.
2. **$y = 400(1.10)^x$; 484 saves after two days** A 10% increase has a growth factor of 1.10. Evaluate $400(1.10)^2$.

CHALLENGE

Channel A: 52 thousand views. Channel B: 52.9 thousand views. Channel B has a constant percent rate because it is multiplied by 1.15 each week. Channel A adds 6 thousand each week, so it has a constant difference, not a constant percent rate.

Accept equivalent descriptions such as "increases by 10%" for "10% growth" and "multiplies by 0.88" for "12% decay." Accept equivalent exponential models that use x for the number of intervals.