LESSON MAKER PRO

Change Over Time

Find what changes for each step in x.

HIGH SCHOOL · A1P.AF.H.29

A1P.AF.H.29 "Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. Limit to linear, quadratic, exponential..."

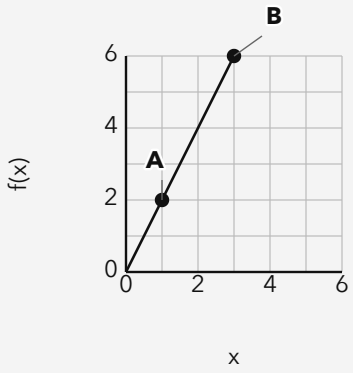
NAME _____ DATE _____

AVERAGE RATE OF CHANGE

Average rate of change tells you how much the output changes for each 1-unit increase in the input. Subtract the starting output from the ending output, then divide by the change in input.

WORKED EXAMPLE

Use points A and B to find the average rate of change.



1. Read A = (1, 2) and B = (3, 6).
2. Output change: 6 - 2 = 4.
3. Input change: 3 - 1 = 2.
4. Divide: 4/2 = 2.

Answer: 2 units of output per unit of input

PRACTICE 4 problems

1 Find the average rate of change of f(x) = 3x + 2 from x = -1 to x = 2.

ANSWER _____

2 Find the average rate of change of $f(x) = x^2 - 2x$ from x = 0 to x = 4.

ANSWER _____

3 Find the average rate of change of $f(x) = 2^x$ from x = 1 to x = 3.

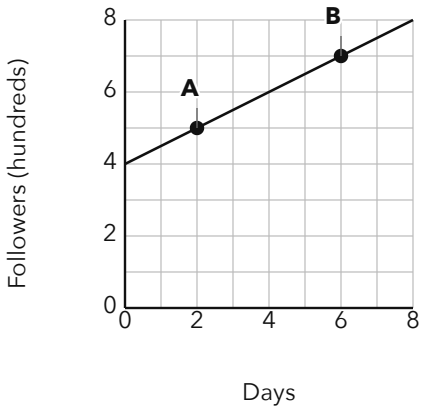
ANSWER _____

4 Find the average rate of change of f(x) = |x - 3| from x = 1 to x = 5.

ANSWER _____

APPLY IT Show your work

1 A creator tracks followers over time. Use points A and B to estimate the average growth in followers per day.



ANSWER _____

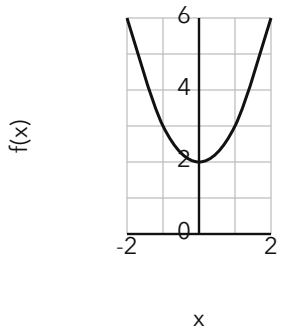
2 A video has $V(t) = 80(2^t)$ views after t days. Find its average gain in views per day from day 1 to day 3.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Use the graph to find the average rates of change from x = -2 to x = 0 and from x = 0 to x = 2. Why is the average rate from x = -2 to x = 2 equal to 0?



WORK SPACE AND ANSWER

ANSWER KEY

Change Over Time

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the average rate of change of $f(x) = 3x + 2$ from $x = -1$ to $x = 2$.	**3**
2	Find the average rate of change of $f(x) = x^2 - 2x$ from $x = 0$ to $x = 4$.	**2**
3	Find the average rate of change of $f(x) = 2^x$ from $x = 1$ to $x = 3$.	**3**
4	Find the average rate of change of $f(x) = \|x - 3\|$ from $x = 1$ to $x = 5$.	**0**

PART 2 · APPLY IT

1. **50 followers per day** The graph shows a gain of 2 hundred followers in 4 days. That is 1/2 hundred, or 50 followers, per day.
2. **240 views per day** V(1) = 160 and V(3) = 640. Divide the gain of 480 views by 2 days.

CHALLENGE

The rates are -2 and 2. The overall rate is 0 because the output is 6 at both x = -2 and x = 2.

Accept equivalent rate units for the worked example and the follower problem. In the challenge, accept any explanation that identifies equal outputs at the interval endpoints.