Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Average Rate of Change in Context

Average Rate of Change in Context | A1-U05-P01

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for a rate, comparison, interpretation, or justified conclusion with units.

8 PDFs and a README; 47 buyer pages.

The following pages use the same questions, given data, and notation as the final files. Question/card serial numbers and internal IDs are omitted in this preview only. Table values and matching responses are retained. Full answer keys are not included.

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Name: _____ **Date:** _____ **Class:** _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

A print shop quotes a variable cost rate of 4 cents per page. What changes, and by how much, when the page count rises by one? Bank label: _____	Pump A fills at 3 liters per minute; pump B fills at 150 liters per hour. Which pump has the greater fill rate? Bank label: _____
A connected graph passes through $(0, 1)$, $(2, 7)$, and $(5, 16)$ with straight segments. Is the output rate constant from $x = 0$ to $x = 5$? Bank label: _____	Battery charge is 93% at hour 2 and 69% at hour 8. Find its average rate in percentage points per hour. Bank label: _____
One graph segment runs from $(2, 9)$ to $(8, 9)$; another runs from $(-3, 1)$ to $(1, 3)$. Compare average rates. Bank label: _____	A concentration changes steadily at $-\frac{7}{4}(\frac{mg}{L})$ per hour for 12 hours. Find ΔC. Bank label: _____
The number of people inside a hall is changing at +25 people per minute. Interpret the plus sign and the rate unit. Bank label: _____	Printer R produces 5 pages per minute. Printer S produces 280 pages per hour. Which output rate is greater? Bank label: _____

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Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

A reservoir's water depth changes at -3 centimeters per day. What does this signed rate say about the depth?	Temperature changes constantly at -3 °C per hour for 6 hours. What is the total temperature change?
A trail profile has a rate of change of $\frac{3}{4}$ meter of elevation per horizontal meter. Explain this rate without using the word slope.	A cart moves at a constant 8 miles per hour for $\frac{3}{2}$ hours. How much does its traveled distance change?
Snow depth is increasing at 2 inches per hour. Translate the rate into an input-output statement.	A robot's signed position changes at $12\frac{m}{s}$ for $\frac{5}{4}$ seconds. Compute Δx.

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Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: Downloaded data increases by 45 megabytes. A balance table uses thousands of dollars: 16 at month 2 and 37 at month 14. Give the average rate in dollars per month. Your response: _____	**Incoming:** The average rate is $\$1,750$ per month. A lift raises its platform at 18 meters per minute for $\frac{5}{6}$ minute. What elevation change occurs? Your response: _____
Incoming: The average rate is 4 megabytes per hour. A connection downloads at a constant 20 MB/s for $\frac{9}{4}$ seconds. Find the change in downloaded data. Your response: _____	**Incoming:** Distance from home increases by 7 kilometers. A chamber contains 3 L at time 0 and 9 L after 8 seconds. What is the average volume rate? Your response: _____
Incoming: The average rate is $\frac{1}{2}$ inch per hour. Snow accumulates at $\frac{1}{4}$ inch per hour for 16 hours. How much does depth increase? Your response: _____	**Incoming:** Pressure changes by -21 kilopascals. A bin holds 48 kg of grain on day 2 and 44 kg on day 6. State the average rate of mass change. Your response: _____

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Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

A student says, 'Reading 12 pages in 3 minutes means the rate is 12 pages.' Diagnose and correct the statement.

A calculation uses output values 2 and 8 at input values 1 and 5, then reports $\frac{2}{3}$ input units per output unit. Find the error.

A hiker is 2 km from camp at both noon and $2p.m.$. A student concludes the hiker's distance never changed. Audit the conclusion.

A value rises from 14 to 38 between hour 3 and hour 9. A student computes $\frac{38-14}{9}$. Diagnose the denominator.

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Full Worked Solutions - excerpt

Worked example

Problem. A print shop quotes a variable cost rate of 4 cents per page. What changes, and by how much, when the page count rises by one?

Answer. The cost increases by 4 cents when the order gains one page.

Explanation and check.

The output is cost and the input is pages, so one page adds four cents.

Worked example

Problem. Pump A fills at 3 liters per minute; pump B fills at 150 liters per hour. Which pump has the greater fill rate?

Answer. Pump A; $3 L/\text{min} = 180 \frac{L}{h}$, which is greater than $150 \frac{L}{h}$.

Explanation and check.

Convert the denominator unit: 3 liters each minute corresponds to

$$3 \times 60 = 180$$

liters each hour.