

Algebra 1
Evaluating Linear Models in Context

Evaluating Linear Models in Context | A1-U05-P17

96 problems · Four activity formats

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Topic focus
Across 96 tasks this topic asks for an exact prediction with a context-qualified conclusion.
8 PDFs and a README; 50 buyer pages.

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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 newly appended row has input 4 and output $\frac{47}{6}$. Test it against $Q(t) = -\frac{5}{2} + \frac{7}{3}t$ with absolute tolerance $\frac{1}{2}$, and say what an out-of-band result establishes. _____ Bank label: _____	A supporting table covers inputs -8 through -1, and the rule's domain is $-10 \leq t \leq 3$. Locate $t = -5$ relative to the evidence and classify this within-span prediction. _____ Bank label: _____
For the supplied rule $Q(t) = \frac{11}{3} + \frac{13}{7}t$, evaluate at $t = 14$ and compare with observed value 29. Use $\text{observed-predicted} \leq \frac{2}{3}$ as the consistency rule. _____ Bank label: _____	A supporting table covers inputs 0 through 18, and the rule's domain is $0 \leq t \leq 20$. Locate $t = 11$ relative to the evidence and classify this within-span prediction. _____ Bank label: _____
The supplied model is $Q(t) = 18 + 7t$ on t in $\{0, 1, \dots, 12\}$. At what t, measured in batches, does Q reach 60? Solve and verify that the predicted input is admissible. _____ Bank label: _____	For the forecast $Q(t) = 18 + 5t$ at $t = 12$, the intercept changes by 7 and the rate changes by -1. Combine the two effects exactly and state the net prediction change. _____ Bank label: _____
The supplied model is $Q(t) = 25 + 11t$ on t in $\{0, 1, \dots, 10\}$. At what t, measured in days, does Q reach 102? Solve and verify that the predicted input is admissible. _____ Bank label: _____	The supplied forecast is $Q(t) = \frac{9}{2} + \frac{7}{3}t$. At $t = 3$ it is being used under this condition: completed packages must be whole. Compute the output and decide whether the contextual interpretation is feasible; identify the decisive condition. _____ 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.

The supplied forecast is $Q(t) = -15 + 11t$. At $t = 12$ it is being used under this condition: domain is $2 \leq t \leq 9$ and capacity is 80. Compute the output and decide whether the contextual interpretation is feasible; identify the decisive condition. 	Check observation $Q = -1$ at $t = 9$ against $Q(t) = 12 - \frac{3}{2}t$, allowing error of at most 1. Report the signed and absolute residual before judging agreement.
The established rule is $Q(t) = 320 - 18(t - 12)$, where Q measures stored energy in kilowatt-hours and t is days. Within $0 \leq t \leq 18$, predict $Q(5)$ and interpret the reference shift $t = 12$. 	A decreasing model for reservoir depth is $Q(t) = 51 - 5t$. Its modeled domain is $0 \leq t \leq 9$, Q is measured in feet, and t in days. Evaluate the admissible forecast at $t = \frac{13}{2}$ and state what the sign means.
A decreasing model for candle height is $Q(t) = 24 - 3t$. Its modeled domain is $0 \leq t \leq 8$, Q is measured in centimeters, and t in hours. Evaluate the admissible forecast at $t = 5$ and state what the sign means. 	The supplied forecast is $Q(t) = 72 - 9t$. At $t = 8$ it is being used under this condition: inventory must be nonnegative. Compute the output and decide whether the contextual interpretation is feasible; identify the decisive condition.

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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.

Evidence in a table stops at the span $[0, 7]$, and the model itself is restricted to $0 \leq t \leq 12$. Assess the proposed forecast input 16 against both limits.

Audit this forecast statement: A rule gives distance in miles with t in hours. A student evaluates it correctly but reports the result as miles per hour. Identify the first unjustified step and write a repaired, qualified conclusion.

The first and last tabulated inputs are 9 and 27. For domain $0 \leq t \leq 35$, classify use of the rule exactly at $t = 27$ and distinguish an endpoint from beyond-range use.

A student states a conclusion from the visible representation without preserving all stated associations, constraints, or units. Diagnose the specific reasoning error, then complete the original task: Audit this forecast statement: A rate 2.46 is rounded to 2 before multiplying by 18, and the final forecast is reported to the nearest tenth. Identify the first unjustified step and write a repaired, qualified conclusion.

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Full Worked Solutions - excerpt

Worked example

Problem. A newly appended row has input 4 and output $\frac{47}{6}$. Test it against $Q(t) = -\frac{5}{2} + \frac{7}{3}t$ with absolute tolerance $\frac{1}{2}$, and say what an out-of-band result establishes.

Answer. The model predicts $\frac{41}{6}$; residual observed-predicted is 1, whose absolute value is 1. That is outside the tolerance $\frac{1}{2}$, so the observation is not consistent with the model at this tolerance. This comparison alone does not establish a cause.

Explanation and check.

Prediction $\frac{41}{6}$ and observation $\frac{47}{6}$ have absolute gap 1, larger than allowed tolerance $\frac{1}{2}$.

Worked example

Problem. A supporting table covers inputs -8 through -1 , and the rule's domain is $-10 \leq t \leq 3$. Locate $t = -5$ relative to the evidence and classify this within-span prediction.

Answer. This is interpolation: -5 lies strictly between observed inputs -8 and -1 . It is inside the declared model domain, but the classification alone does not guarantee empirical accuracy; continued linear behavior is an assumption wherever direct observations are absent.

Explanation and check.

The requested input lies between -8 and -1 , so the prediction uses the model within the observed span.