

AP Precalculus

Building and Selecting Function Models

Building and Selecting Function Models | APPC-U01-P19

96 problems · Four activity formats

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Topic focus
Across 96 tasks this topic asks for conclusion, claim, yes or no, decision, compatible model and model description.
8 PDFs and a README; 56 buyer pages.

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Name: _____ Date: _____ Class: _____

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.

For equally spaced inputs, the outputs are 11, 17, 23, 29. Which supplied rule is supported, and what evidence is decisive?

Candidate formulas: $3x + 11$; $x^2 + 11$; $\frac{11}{x+1}$.

Complete response required: model.

x	y
0	11
2	17
4	23
6	29

A parcel costs \$8 through 5kg, then each kilogram beyond 5 adds \$3. Should the supplied model be one global line or a threshold piecewise rule?

The products xy are constant in the table. Select the supported candidate and state what the finite table does not prove. Candidate formulas: $\frac{24}{x}$; $24 - 3x$; $3x^2$.

Complete response required: model.

x	y
1	24
2	12
4	6
8	3

Inputs are not equally spaced. Which candidate exactly matches all four values, and why would raw first differences be misleading?

Candidate formulas: $2 + 3x$; $2 + x^2$; $2 + x + x^2$.

Complete response required: model.

x	y
0	2
1	4
3	14
6	44

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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: $x = 2$; $A(2) = 7$ and $B(2) = 12$.

A triangle has base $3x\text{cm}$ and perpendicular height $x + 2\text{cm}$. Select the area model.

Your response: _____

Incoming: Input B ; its prediction gap 1.2 exceeds twice the 0.3 uncertainty.

A circular ring has inner radius r and outer radius $r + 2$. Select the area of material.

Your response: _____

Incoming: $\frac{x+2}{x+3}$.

Equal input steps give first differences $-5, -3, -1, 1$. Which supplied candidate is supported? Candidate formulas: $x^2 - 2x - 1$; $-x - 1$; $\frac{4}{x+3}$.

Complete response required: model.

x	y
-2	7
-1	2
0	-1
1	-2
2	-1

Your response: _____

Incoming: Piecewise rising segments separated by downward jumps at replacement times.

A 1-by-1 square is removed from a rectangle measuring $x + 3$ by $x + 1$. Which expression models remaining area?

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.

Given the explicit linear-family assumption, do the two distinct data points determine a unique candidate? Diagnose the student claim: Even within the stated linear family, the two distinct input-output points leave many different linear models. Use the exact supplied assumptions and data to provide a counterexample or decisive calculation and state the strongest justified conclusion.

Complete response required: model.

1	5
4	14

Exhibit two distinct polynomial models matching both data points. Diagnose the student claim: Only one polynomial can pass through these two data points. Use the exact supplied assumptions and data to provide a counterexample or decisive calculation and state the strongest justified conclusion.

Complete response required: two models.

0	2
1	5

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Full Worked Solutions - excerpt

Worked example

Problem. A triangle has base $3x\text{cm}$ and perpendicular height $x + 2\text{cm}$. Select the area model.

Answer. $A(x) = 1.5x(x + 2)$.

Explanation and check.

Triangle area is one half the product of base and perpendicular height.

Worked example

Problem. A circular ring has inner radius r and outer radius $r + 2$. Select the area of material.

Answer. $\pi((r + 2)^2 - r^2)$.

Explanation and check.

Subtract the inner disk area from the outer disk area; both terms have square-length units.