

AP Precalculus
Finding Parameters in Function Models

Finding Parameters in Function Models | APPC-U01-P23

96 problems · Four activity formats

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Topic focus

Across 96 tasks this topic asks for existence, free family, freedom, parameter, parameters and check and parameters.

8 PDFs and a README; 59 buyer pages.

AP Precalculus

Finding Parameters in Function Models

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.

Find k using the allowed input. For the answer bank, record the complete response required by the original task; use the given context to distinguish responses that share a numerical value. Use the function $f(x) = \frac{k}{x}$. The graph passes through $(4, 7)$.

Bank label: _____

Read the shifts and calibrate the scale. For the answer bank, record the complete response required by the original task; use the given context to distinguish responses that share a numerical value. Use the function $a(x - h)^2 + k$. The graph passes through $(0, 5)$. The vertex is $(-1, 2)$.

Bank label: _____

State the input-output feature encoded by 7 and 12. For the answer bank, record the complete response required by the original task; use the given context to distinguish responses that share a numerical value. Use the model $y = a(x - 7)^2 + 12$.

Bank label: _____

Use the two observations to recover the slope and intercept. For the answer bank, record the complete response required by the original task; use the given context to distinguish responses that share a numerical value.

Given domain/context: motion

0	4
3	19

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.

Are a and b identifiable? Use the function $f(x) = ax + b$. Complete response required: freedom. <table border="1"> <tbody> <tr> <td>1</td> <td>4</td> </tr> <tr> <td>1</td> <td>4</td> </tr> </tbody> </table> 	1	4	1	4	Give units for a, b, and c. height is measured in meters. Use the model $h(t) = at^2 + bt + c$. time is measured in seconds. 		
1	4						
1	4						
Audit the fitted denominator. The calibration input is 2. A student claims $b = 2$. Use the function $\frac{a}{x-b}$. 	Interpret 100, 500, and a. Use the model $C(q) = a(q - 100)^2 + 500$. 						
Explain the effect of the small slope difference at $x = 100$. Both models have intercept 1. Evaluate at input 100. Their slopes are (2.0, 2.03). 	Find the first observation the claimed fit violates. A student claims (2, 1). Use the function $ax + b$. Given domain/context: linear fit <table border="1"> <tbody> <tr> <td>0</td> <td>1</td> </tr> <tr> <td>1</td> <td>3</td> </tr> <tr> <td>2</td> <td>6</td> </tr> </tbody> </table> 	0	1	1	3	2	6
0	1						
1	3						
2	6						

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Name: _____ Date: _____ Class: _____

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.

START Calibrate k at the allowed input. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task. Use the function $\frac{k}{x-1}$. The graph passes through (4, 6). Your response: _____	Incoming: a has liters per hour cubed, t_0 has hours, and R_0 has liters per hour. Determine a and c. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task. Use the function $ax^2 + c$. Given domain/context: quadratic <table border="1"> <tbody> <tr> <td>0</td> <td>3</td> </tr> <tr> <td>2</td> <td>15</td> </tr> </tbody> </table> Your response: _____	0	3	2	15
0	3				
2	15				
Incoming: $a = 2$ and $b = 2$. Decide uniqueness and recover k. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task. Use the function $10\frac{x}{x+k}$. The graph passes through (2, 5). Your response: _____	Incoming: $a = 3$ and $b = 1$; the third row is consistent but adds no freedom. Recover the limiting level and inverse offset from the two features. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task. Use the function $a + \frac{b}{x+1}$. The horizontal limiting value is 4. The output at input zero is 10. Your response: _____				
Incoming: k is pressure-volume in kilopascal-liters. Recover slope and baseline from the two measurements. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task. Given domain/context: linear <table border="1"> <tbody> <tr> <td>0</td> <td>-2</td> </tr> <tr> <td>4</td> <td>10</td> </tr> </tbody> </table> Your response: _____	0	-2	4	10	Incoming: $a = 3$ and $b = -2$. Decide whether k is identifiable and solve it. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task. Use the function $\frac{k}{x+2}$. The graph passes through (1, 7). Your response: _____
0	-2				
4	10				

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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.

What do 6 and 18 represent? Student work: At reference time $t = 6$, the modeled temperature is 17. Identify the precise mathematical error or omitted condition, then complete the original task and verify the correction from the supplied givens. Use the model $T(t) = m(t - 6) + 18$.

Correct the claimed slope. Identify the precise error or unsupported step in the stated claim or method, then give the corrected conclusion and justify it from the supplied information. A student claims $a = 2$. Use the function $ax + 2$. The graph passes through $(3, 11)$.

Finding Parameters in Function Models

Full Worked Solutions - excerpt

Worked example

Problem. Audit the fitted denominator. The calibration input is 2. A student claims $b = 2$. Use the function $\frac{a}{x-b}$.

Answer. The fit is invalid because $x = 2$ is undefined when $b = 2$.

Explanation and check.

A calibration equation cannot be cleared at a forbidden input.

Worked example

Problem. Interpret 100, 500, and a . Use the model $C(q) = a(q - 100)^2 + 500$.

Answer. The reference quantity is 100, cost there is 500, and a controls curvature away from that quantity.

Explanation and check.

Shifted form attaches parameters to the vertex rather than input zero.