

Precalculus
Composite Functions & Decomposition | 2-Topic Precalculus Bundle

2-topic bundle | 192 problems | Four activity formats

01 Composite Functions

[View individual product and its full preview](#)

02 Decomposing Functions

[View individual product and its full preview](#)

In every topic

Answer Bank Challenge	24 tasks
Grid Rounds	24 tasks
Match & Move	24 cards
Error Analysis & Strategy	24 tasks
Quick Answer Key and Full Worked Solutions	included
Teacher / Parent Use Guide and Terms of Use	included

Product previews

The following preview pages show the cover, all four activity formats, and worked examples for each included resource, in the listed order.

16 PDFs and 2 READMEs; 197 buyer PDF pages across the 2 products.

Preview pages are not included in the buyer page count. Check the list against resources you already own.

This is a fixed collection of the listed products. Purchase includes the existing individual resource files. To open a product's online preview, follow its title link and select View Preview.

AP Precalculus
Composite Functions

Composite Functions | APPC-U02-P11
96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for formulas and domains, rules and domains, rules and equality set, commutation conclusion on listed set, both composites and both ordered compositions.
8 PDFs and a README; 110 buyer pages.

AP Precalculus

Composite Functions

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.

Read the inner table first and evaluate $f(g(0))$. 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 input: 0

input	f(input)
-4	10
1	-2
5	7

input	g(input)
-2	5
0	1
3	-4

Bank label: _____

Use the tables to compare the two composition orders at $x = 1$. 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 input: 1

input	f(input)
1	3
2	4
3	2
4	1

input	g(input)
1	2
2	1
3	4
4	3

Bank label: _____

AP Precalculus

Composite Functions

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

A tank fills according to $V(t)$, and its water depth is $d(V)$. Compose the models and state the physically allowed time domain. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task. The input condition is $0 \leq t \leq 30$ minutes. Report depth as a function of time and domain. Use depth model $d(V) = \frac{V}{120}$ centimeters. Use tank capacity 540 liters. Use volume model $V(t) = 18t$ liters.

Your response: _____

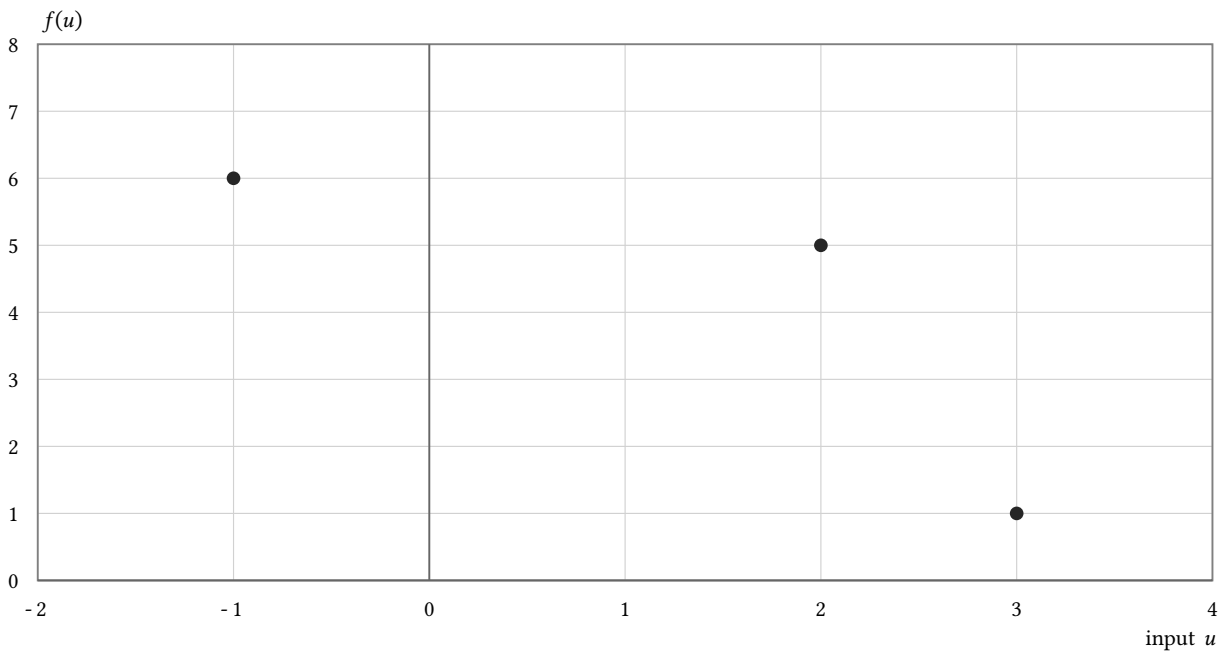
AP Precalculus

Composite Functions

Name: _____ Date: _____ Class: _____

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.

Use the table for g and the point-only graph for f to find $f(g(4))$. Student work: 4 Identify the precise mathematical error or omitted condition, then complete the original task and verify the correction from the supplied givens.



input	g(input)
1	3
2	−1
4	2

Composite Functions

Full Worked Solutions - excerpt

Worked example

Problem. Construct $f(g(x))$ without losing the inner restriction. The input condition is real x with nonnegative inner radicand. Report composite and domain. Use f rule $f(u) = 3u - 2$. Use g rule $g(x) = \sqrt{x + 4}$.

Answer. $f(g(x)) = 3\sqrt{x + 4} - 2$, with $x \geq -4$.

Explanation and check.

Substitute the radical for u ; its radicand controls the domain.

Worked example

Problem. Find the x -intervals for each branch of $f(x^2)$. The input condition is real x . Report piecewise composite on x . Use f rule $f(u) = u + 1$ if $u < 4$; $2u$ if $u \geq 4$. Use g rule $g(x) = x^2$.

Answer. $f(x^2) = x^2 + 1$ for $-2 < x < 2$, and $2x^2$ for $x \leq -2$ or $x \geq 2$.

Explanation and check.

The inner output is below 4 exactly when $x^2 < 4$; the threshold is visited on both sides.

AP Precalculus

Decomposing Functions

Decomposing Functions | APPC-U02-P12

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus

Across 96 tasks this topic asks for actual composite domains, domain-faithful decomposition, validity and domain dependence, validity and intermediate images, validity of both pairs and validity relative to H domain.

8 PDFs and a README; 87 buyer pages.

AP Precalculus

Decomposing Functions

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.

Split H at the affine expression inside the square. 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 input condition real x .

Give two nonidentity components.

Let $H(x) = (5x + 1)^2 - 7$.

Bank label: _____

Use the prescribed outer rule to recover the missing g -values at the listed inputs. 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 f rule: $f(u) = 2u + 1$

input	H(input)
-3	7
0	-1
4	11

Bank label: _____

Write the visible two-stage rule as $H = f$ composed with g . 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 input condition real x .

Give affine and absolute components.

Let $H(x) = |3x - 5| + 2$.

Bank label: _____

List the outer pairs forced by the two aligned tables. 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 g table:

input	H(input)	input	g(input)
-6	0	-6	3
0	5	0	-1
2	12	2	7

Bank label: _____

AP Precalculus

Decomposing Functions

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.

Recompose both proposed pairs and decide whether each is a substantive decomposition of H. Use the input condition real x. Give validity of both pairs. Let $H(x) = (x + 2)^4$. For pair A, use $g(x) = x + 2$, $f(u) = u^4$. For pair B, use $q(x) = (x + 2)^2$, $p(v) = v^2$. 	Recover the outer table values required for $H(x) = f(g(x))$. Given g table: <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <tr> <th>input</th><th>H(input)</th></tr> <tr><td>-2</td><td>7</td></tr> <tr><td>0</td><td>2</td></tr> <tr><td>4</td><td>9</td></tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>input</th><th>g(input)</th></tr> <tr><td>-2</td><td>1</td></tr> <tr><td>0</td><td>3</td></tr> <tr><td>4</td><td>5</td></tr> </table> 	input	H(input)	-2	7	0	2	4	9	input	g(input)	-2	1	0	3	4	5
input	H(input)																
-2	7																
0	2																
4	9																
input	g(input)																
-2	1																
0	3																
4	5																
Explain why the proposed f is not a function of its placeholder alone and repair it. Use the input condition real x. Give correct outer rule. Let $H(x) = (x^2 + 1)^3 + 2(x^2 + 1)$. The student proposes $f(u) = u^3 + 2x$. The student proposes $g(x) = x^2 + 1$. 	Construct the smallest outer table needed to express H as f after g. Given g table: <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <tr> <th>input</th><th>H(input)</th></tr> <tr><td>-3</td><td>6</td></tr> <tr><td>1</td><td>-1</td></tr> <tr><td>5</td><td>8</td></tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>input</th><th>g(input)</th></tr> <tr><td>-3</td><td>0</td></tr> <tr><td>1</td><td>2</td></tr> <tr><td>5</td><td>4</td></tr> </table> 	input	H(input)	-3	6	1	-1	5	8	input	g(input)	-3	0	1	2	5	4
input	H(input)																
-3	6																
1	-1																
5	8																
input	g(input)																
-3	0																
1	2																
5	4																
Find an inner rule whose reciprocal gives H, and retain every stated exclusion. Use the input condition real x except $x = 1$ and $x = -2$. Give inner g and domain. Let $H(x) = \frac{x+2}{x-1}$. Use the prescribed outer function $f(u) = \frac{1}{u}$. 	Compare the recomposed rules and explain why domain declarations are part of the comparison. Use the input condition $x \geq 0$. Give validity relative to H domain. Let $H(x) = x$ on $x \geq 0$. For pair A, use $g(x) = \sqrt{x}$, $f(u) = u^2$. For pair B, use $q(x) = x$, $p(v) = v$. 																

AP Precalculus

Decomposing Functions

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 Replace the prescribed inner expression consistently to recover f. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task. Use the input condition real x. Give outer polynomial. Let $H(x) = (x - 4)^3 - 2(x - 4) + 6$. Use the prescribed inner function $g(x) = x - 4$. Your response: _____	Incoming: $f(u) = u^3 - 2u + 6$. Undo the outer translation to recover g. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task. Use the input condition real x. Give inner function. Let $H(x) = \sqrt{x^2 + 4} + 7$. Use the prescribed outer function $f(u) = u + 7$. Your response: _____
Incoming: $g(x) = \sqrt{x^2 + 4}$. Recover f and state the intermediate inputs on which it must be defined. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task. Use the input condition real x. Give outer rule on image. Let $H(x) = 4x^2 - 12$. Use the prescribed inner function $g(x) = x^2$. Your response: _____	Incoming: $f(u) = 4u - 12$ for $u \geq 0$. Recover the pre-tax subtotal and tax stages. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task. Use the input condition $0 \leq n \leq 80$ tickets. Give subtotal and taxed-total maps. Use the compound model $T(n) = 1.075(14n + 5)$ dollars. Your response: _____
Incoming: $S(n) = 14n + 5$ dollars and $T(S) = 1.075S$ dollars. Treat the recurring logarithm as one intermediate variable. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task. Use the input condition $x > 0$. Give log inner and polynomial outer. Let $H(x) = (\ln(x))^2 - 6 \ln(x) + 2$. Your response: _____	Incoming: $g(x) = \ln(x)$, $x > 0$, and $f(u) = u^2 - 6u + 2$. Remove the outer scaling to identify g. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task. Use the input condition real x. Give inner rule. Let $H(x) = \frac{3}{x^2 + 1}$. Use the prescribed outer function $f(u) = 3u$. Your response: _____

AP Precalculus

Decomposing Functions

Name: _____ Date: _____ Class: _____

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.

Check whether pulling the positive factor outside absolute value gives a second valid decomposition. Student work: Both are invalid for all real x because $|2(x + 3)| = 2|x + 3|$. Identify the precise mathematical error or omitted condition, then complete the original task and verify the correction from the supplied givens.

Use the input condition real x .

Give validity.

Let $H(x) = |2x + 6|$.

For pair A, use $g(x) = 2x + 6$, $f(u) = |u|$.

For pair B, use $q(x) = x + 3$, $p(v) = 2|v|$.

Isolate the quadratic expression evaluated before absolute value. Student work: $g(x) = x^2 + 6x + 2$ and $f(u) = |u| + 5$. Identify the precise mathematical error or omitted condition, then complete the original task and verify the correction from the supplied givens.

Use the input condition real x .

Give quadratic inner and absolute outer.

Let $H(x) = |x^2 - 6x + 2| + 5$.

Decomposing Functions

Full Worked Solutions - excerpt

Worked example

Problem. Can a single f satisfy $x = f(\sin(x))$ for every real x ? Give a decisive pair of inputs. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task.

Answer. No. $\sin(0) = \sin(2\pi) = 0$, but $H(0) = 0$ and $H(2\pi) = 2\pi$.

Explanation and check.

The periodic inner map discards which cycle produced the value, while H retains that information.

Worked example

Problem. Formally undo the logarithm and verify whether the resulting inner function is admissible. Student work: $g(x) = e^{-x^2}$, which is negative for every real x and satisfies $\ln(g(x)) = -x^2$. Identify the precise mathematical error or omitted condition, then complete the original task and verify the correction from the supplied givens.

Answer. $g(x) = e^{-x^2}$, which is positive for every real x and satisfies $\ln(g(x)) = -x^2$.

Explanation and check.

A logarithm may output negative values; only its input must be positive, which the exponential guarantees.