Sets & Steps
Math Practice & Worked Solutions

AP Precalculus

Evaluating Logarithms and Domains

Evaluating Logarithms and Domains | APPC-U02-P17

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for domain, admissible x-values, corrected evaluation and verification, corrected exact value, corrected value with verification and correction.

8 PDFs and a README; 49 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. Give the whole requested response, including any reasoning the question asks for.

State the domain using the strict positivity of the argument. Given: domain: real x; payload: statement: $\ln(x+5)$ Bank label: _____	Find the exact logarithm by rewriting the argument as a power of the base. Given: domain: real logarithm; payload: statement: $\log_4(2)$ Bank label: _____
Determine whether the value is available exactly and explain the common-base comparison. Given: domain: real logarithm; payload: statement: $\log_{16}(8)$ Bank label: _____	Intersect the base and argument restrictions and remove the forbidden base value. Given: domain: real x; payload: statement: log base $(5\text{-}x)$ of $(x+1)$ Bank label: _____
Compare exponents after expressing both quantities as powers of 3. Given: domain: real logarithm; payload: statement: log base $(\frac{1}{3})$ of $\sqrt{27}$ Bank label: _____	Decide whether a rational exponent is available exactly and state it. Given: domain: real logarithm; payload: statement: $\log_{81}(3)$ Bank label: _____
Solve the strict positivity condition for the decreasing argument. Given: domain: real x; payload: statement: $\log(9-3x)$ Bank label: _____	Intersect the base restrictions with the sign condition on the quadratic argument. Given: domain: real x; payload: statement: log base $(-x)$ of (x^2-4) 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. Give the whole requested response, including any reasoning the question asks for.

Determine the real domain, keeping the logarithm's boundary strict. Given: domain: real x; payload: statement: $\log(2x - 6)$	Use a sign chart for the entire logarithm argument. Given: domain: real x; payload: statement: ln((5-x)/(x+2))
Evaluate and verify with one exponential equation. Given: domain: real logarithm; payload: statement: $\log_5(125)$	Determine where the rational argument is strictly positive, noting its repeated zero. Given: domain: real x; payload: statement: $\log(\frac{(x-2)^2}{x+1})$
Build a sign chart and retain only intervals with a positive argument. Given: domain: real x; payload: statement: $\ln(\frac{(x+3)(x-1)}{x-4})$	Combine the linear base and argument constraints, including the base-one exclusion. Given: domain: real x; payload: statement: log base $(2x + 1)$ of $(5\text{-}x)$

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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: -3, since $\frac{1}{27} = 3^{-3}$.

Evaluate using the implied base of the common logarithm.

Given: domain: real logarithm; payload: statement: log(10000)

Your response: _____

Incoming: $x > 2$ with x not equal to 3

Intersect the split domain of the quadratic argument with the upper bound from the second logarithm.

Given: domain: real x; payload: statement: ln(x^2-4)+log(5-x)

Your response: _____

Incoming: The value is exactly 2 because the inputs are declared exact and $2.5^2 = 6.25$.

Find the parameter values that make the displayed base valid.

Given: domain: real x; payload: statement: log base $(x + 4)$ of 2

Your response: _____

Incoming: $\frac{1}{2}$ because $49^{\frac{1}{2}} = 7$.

Use the quadratic base's minimum and its two base-one points inside the argument interval.

Given: domain: real x; payload: statement: log base $(x^2 + x + 1)$ of $(4\text{-}x^2)$

Your response: _____

Incoming: No approximation is needed; the exact value is $\frac{2}{3}$.

Apply both validity conditions to the decreasing variable base.

Given: domain: real x; payload: statement: log base $(7\text{-}x)$ of 4

Your response: _____

Incoming: $(-4, -1)$ union (2,infinity)

Use the repeated factor without treating its zero as a sign change.

Given: domain: real x; payload: statement: $\log((x-4)^2(x+2))$

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.

Diagnose the claim before doing any power calculation.

Given: domain: real logarithm; payload: claim: $\log_3(-9) = 2$

A student reports the logarithm as exactly $\frac{3}{2}$. Decide what the table actually supports.

Given: domain: rounded positive measurements; payload: argument measurement: 27.0; argument precision: nearest tenth; base measurement: 9.0; base precision: nearest hundredth

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Repair the exponent after accounting for the reciprocal in the argument.

Given: domain: real logarithm; payload: claim: $\log_5(\frac{1}{25}) = 2$ because $5^2 = 25$

Identify both the sign mismatch in the cited power and the real-logarithm restriction that settles the claim.

Given: domain: real logarithm; payload: claim: log base -2 of $8 = 3$ because $(-2)^3 = -8$

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Full Worked Solutions - excerpt

Worked example

Problem. Combine the argument inequality with the value that makes the logarithmic denominator zero.

Given: domain: real x; payload: statement: 1/log_3(2-x)

Answer. $x < 2$ with x not equal to 1

Explanation and check.

The argument requires 2-x>0, while log_3(2-x)=0 at 2-x=1, so x=1 is excluded.

Worked example

Problem. Require both logarithms to exist and neither denominator factor to be zero.

Given: domain: real x; payload: statement: 1/(ln(x+2) ln(5-x))

Answer. $-2 < x < 5$, excluding $x = -1$ and $x = 4$

Explanation and check.

Argument positivity gives -2<x<5; ln(x+2)=0 at -1 and ln(5-x)=0 at 4.