

AP Precalculus
Converting Logarithmic and Exponential Forms

Converting Logarithmic and Exponential Forms | APPC-U02-P16

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
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Topic focus

Across 96 tasks this topic asks for base role and equivalent equation, base role, role and appropriate representation, role and operation, role of N and role of y and corresponding operation.

8 PDFs and a README; 49 buyer pages.

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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.

Recover the positive value represented by coordinate -3. Given: domain: base-10 logarithmic scale; payload: axis: $u = \log_{10}(x)$; coordinate: -3 _____ Bank label: _____	Determine the sign from the position of x relative to 1. Given: domain: $x > 1$; payload: expression: logarithm base 2 of x _____ Bank label: _____						
Record the exponent using logarithmic notation. Given: domain: base 3; payload: statement: $3^4 = 81$ _____ Bank label: _____	Find the multiplicative factor from A's original value to B's. Context/domain: base-2 logarithmic coordinate <table border="1" data-bbox="824 892 1472 955"> <tbody> <tr> <td>A</td> <td>-2</td> </tr> <tr> <td>B</td> <td>1</td> </tr> </tbody> </table> _____ Bank label: _____	A	-2	B	1		
A	-2						
B	1						
Describe the logarithmic coordinate of the smaller amount. Given: domain: relative multiplicative position; payload: factor per interval: 4; output ratio: $\frac{1}{4}$ _____ Bank label: _____	Identify k's role and express it without evaluation. Given: domain: known positive R; payload: relationship: $3^k = R$ _____ Bank label: _____						
Determine which side of exponent zero produces z. Given: domain: $z > 1$; payload: argument: z; base: e _____ Bank label: _____	Convert the marked coordinates to exact original-scale values. Context/domain: base-5 logarithmic scale <table border="1" data-bbox="824 1558 1472 1652"> <tbody> <tr> <td>P</td> <td>-0.5</td> </tr> <tr> <td>Q</td> <td>0</td> </tr> <tr> <td>R</td> <td>1.5</td> </tr> </tbody> </table> _____ Bank label: _____	P	-0.5	Q	0	R	1.5
P	-0.5						
Q	0						
R	1.5						

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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.

Represent and explain the number of multiplicative intervals. Given: domain: successive equal intervals; payload: factor per interval: 3; output ratio: 27 	Describe the unknown without evaluating it. Given: domain: positive quantities; payload: question: In $\log_5(18)$, what quantity is being requested?
Interpret the logarithm of the ratio, including why its sign is allowed. Given: domain: relative to a present amount; payload: earlier to present ratio: $\frac{1}{25}$; growth factor: 5 	State which part of an exponential relationship is unknown. Given: domain: positive quantities; payload: question: How many factors of 6 turn 1 into 50?
Express what the exponent counts in this growth situation. Given: domain: equal growth intervals; payload: factor per interval: 2; final to initial ratio: 8 	Identify the unknown role and express it without evaluating. Given: domain: positive quantities; payload: relationship: $7^x = 30$

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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.

START Rewrite the exponential fact using common logarithm notation. Given: domain: common logarithm notation; payload: statement: $10^{-2} = 0.01$ Your response: _____	Incoming: The result equals zero. Rewrite the relationship so the exponent is the subject. Given: domain: valid base b and positive r; payload: statement: $b^m = r$ Your response: _____
Incoming: $u = \ln(5)$. Describe the logarithmic interval count represented by the ratio. Given: domain: continuous growth assumption; payload: factor per interval: 2; output ratio: $\sqrt{2}$ Your response: _____	Incoming: $(\frac{1}{3})^{-3} = 27$. Describe what N and p represent in the equivalent exponential relationship. Given: domain: $N > 0$; payload: statement: $\log_2(N) = p$ Your response: _____
Incoming: The original quantity is multiplied by 49. Decide whether a logarithm or exponentiation directly answers the stated question. Given: domain: positive N; payload: relationship: $2^5 = N$ Your response: _____	Incoming: $\log_5(\frac{1}{5}) = -1$. Display the exponent-zero relationship explicitly. Given: domain: base 7; payload: statement: $\log_7(1) = 0$ 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 sign error and repair the statement.

Given: domain: real logarithms; payload: student claim: $\log_2(-8) = 3$ because $2^3 = 8$

Explain why $\log_3(20)$ would answer the wrong question.

Given: domain: positive b ; payload: relationship: $b^3 = 20$

Explain why no real logarithm value can satisfy the claim and give a nearby valid example.

Given: domain: real logarithms; payload: student claim: $\log_1(5)$ is some large exponent

Explain why the student's logarithm does not represent the unknown.

Given: domain: positive b ; payload: relationship: $b^3 = 12$; student expression: $\log_{12}(3)$

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Full Worked Solutions - excerpt

Worked example

Problem. Identify the exponent that produces argument 1. Choose between using the base behavior and the argument position relative to 1, or approximating a decimal first. Determine the sign by the exact structural method.

Answer. The value is 0.

Explanation and check.

Any nonzero valid base raised to exponent 0 equals 1.

Worked example

Problem. Identify the original value located at coordinate $u = 2$.

Given: domain: base-10 logarithmic scale; payload: axis: $u = \log_{10}(x)$; coordinate: 2

Answer. $x = 100$.

Explanation and check.

Coordinate 2 means $10^2 = x$.