Sets & Steps
Math Practice & Worked Solutions

Precalculus

Exponential, Logarithmic & Trig Solution Sets | 7-Topic Precalculus Bundle

7-topic bundle | 672 problems | Four activity formats

Included topics

The following pages list all 7 included resources in the suggested order, with a link to each product. Each resource retains its complete 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.

56 PDFs and 7 READMEs; 512 buyer PDF pages across the 7 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.

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Math Practice & Worked Solutions

Precalculus

Included topics

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01 **Log Properties and Change of Base**

View individual product and its full preview

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View individual product and its full preview

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View individual product and its full preview

7 included resources | Complete resource previews follow this guide.

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Sets & Steps
Math Practice & Worked Solutions

AP Precalculus

Log Properties and Change of Base

Log Properties and Change of Base | APPC-U02-P21

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for value to nearest thousandth, correction and denominator issue, valid subset and failing branch, correct interval, correct form and domain and source domain and extra condensed intervals.

8 PDFs and a README; 60 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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AP Precalculus

Log Properties and Change of Base

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.

Rewrite the logarithm using natural logarithms. 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. Start with $\log_2(7)$. Bank label: _____	Combine the two terms and carry along the original domain. 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. Start with $\log_5(u) + \log_5(v)$. Bank label: _____
Separate the positive factors into individual base-five logarithms. 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. Start with $\log_5(7rs)$. Bank label: _____	Convert the expression to a quotient of common logarithms. 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. Start with $\log_5(11)$. Bank label: _____
Combine the difference into one base-eight logarithm and retain both source restrictions. 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. Start with $\log_8(p) - \log_8(q)$. Bank label: _____	Expand the product into separate logarithms of its constant and variable factors. 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. Start with $\ln(11at)$. Bank label: _____
Represent the value using only natural logarithms. 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. Start with $\log_6(13)$. Bank label: _____	Correct the proposed power-law rewrite so it is equivalent on the full domain of the original expression. 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. The candidate expression is $2\ln(x)$. Start with $\ln(x^2)$. Bank label: _____

AP Precalculus

Log Properties and Change of Base

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. Give the whole requested response, including any reasoning the question asks for.

Expand the logarithm completely, keeping the positive constant inside its own logarithm. Start with $\log_2(3xy)$.	Condense to one logarithm and retain the domain of the displayed expression. Start with $\log_3(x) + \log_3(y)$.
Decide whether the claim is an identity, and justify the decision with one exact counterexample if it is false. Evaluate the claim $\ln(u + v) = \ln(u) + \ln(v)$.	Identify the first invalid line and state what valid law could replace the mistaken idea. The student writes: $\ln(a + b) = \ln(a) + \ln(b) = \ln(ab)$.
Write the expression as a sum and difference of natural logarithms with no powers inside them. Start with $\ln(a^2 \cdot \frac{\sqrt{b}}{c})$.	Produce an equivalent single logarithm and report the original restrictions. Start with $2\ln(a) - \ln(b)$.

AP Precalculus

Log Properties and Change of Base

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

Expand the quotient and simplify the logarithm of the numerical factor. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task.

Start with $\log_6(\frac{x}{36yz})$.

Your response: _____

Incoming: Yes; the equality holds for every allowed a and x.

Combine the shifted logarithms and derive the allowed x-values from the separate terms. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task.

Start with $\log_7(x+2) + \log_7(x-4)$.

Your response: _____

Incoming: $k = \frac{1}{2}$

Express the function using a base-three logarithm and simplify the coefficient. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task.

Use logarithms with base 3.

Start with $\log_9(y)$.

Your response: _____

Incoming: 1.661

Pull the exponent in front without losing inputs less than the center. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task.

Start with $\log_7((z-1)^2)$.

Your response: _____

Incoming: $6\log_5|2x-1|$, with $x \neq \frac{1}{2}$

Test the proposed quotient rule and disprove it exactly if it is not an identity. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task.

Evaluate the claim $\log_4(\frac{u}{v}) = \frac{\log_4(u)}{\log_4(v)}$.

Your response: _____

Incoming: $\log_3(m^4 \cdot \frac{\sqrt[3]{p}}{n^2})$, with $m > 0, n > 0, p > 0$

Find the scaling constant that makes the two logarithmic functions identical. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task.

Use the identity $K\log_3(x) = \log_{81}(x)$.

Your response: _____

AP Precalculus

Log Properties and Change of Base

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.

Evaluate the identity claim and, if needed, refute it using powers of 2. 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.

Evaluate the claim $\log_2(uv) = \log_2(u)\log_2(v)$.

Use base 2 as the change-of-base reference to find the exact value. Student work: $-\frac{3}{1}$ Identify the precise mathematical error or omitted condition, then complete the original task and verify the correction from the supplied givens.

The reference logarithm base is 2.

Start with $\log_{\frac{1}{4}}(8)$.

Log Properties and Change of Base

Full Worked Solutions - excerpt

Worked example

Problem. Expand the logarithm completely, keeping the positive constant inside its own logarithm.

Start with $\log_2(3xy)$.

Answer. $\log_2(3) + \log_2(x) + \log_2(y)$

Explanation and check.

The argument is a product of the three positive factors $3, x$, and y, so the product law separates them.

Worked example

Problem. Decide whether the claim is an identity, and justify the decision with one exact counterexample if it is false.

Evaluate the claim $\ln(u + v) = \ln(u) + \ln(v)$.

Answer. False; $u = v = 1$ gives $\ln(2)$ on the left and 0 on the right.

Explanation and check.

Logarithms convert products, not sums, into sums; the positive pair $1, 1$ directly contradicts the claim.

Sets & Steps
Math Practice & Worked Solutions

AP Precalculus

Solving Exponential Equations

Solving Exponential Equations | APPC-U02-P22

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for real solution set, time-domain conclusion, time or impossibility, solution set, all real solutions and finite none or all.

8 PDFs and a README; 64 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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AP Precalculus

Solving Exponential Equations

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.

Rewrite the reciprocal as a power of 3 and equate exponents. 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. Context/domain: real x. equation: $3^{x-2} = \frac{1}{27}$. Bank label: _____	Solve the exponential equation exactly using logarithms. 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. Context/domain: real x. equation: $3^x = 10$. Bank label: _____
Use the indicated positive substitution and recover every admissible x-value. 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. Context/domain: real x. equation: $4^x - 5 \cdot 2^x + 4 = 0$; substitution: $u = 2^x$. Bank label: _____	Find the unique real input where the two exponential expressions are equal. 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. Context/domain: real x. equation: $2 \cdot 3^x = 6 \cdot 2^x$. Bank label: _____
Rewrite the reciprocal and the left side as powers of 2. 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. Context/domain: real x. equation: $4^{x-1} = \frac{1}{8}$. Bank label: _____	Give the exact solution using natural logarithms. 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. Context/domain: real x. equation: $7^x = 13$. Bank label: _____
Factor after substitution and invert both positive values of u. 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. Context/domain: real x. equation: $9^x - 5 \cdot 3^x + 4 = 0$; substitution: $u = 3^x$. Bank label: _____	Divide to obtain one base-two power and solve the crossover exactly. 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. Context/domain: real x. equation: $2 \cdot 4^x = 16 \cdot 2^x$. Bank label: _____

AP Precalculus

Solving Exponential Equations

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.

Choose a so that $x = 2$ is a solution, then decide whether that equation has any other real solution. Context/domain: $a > 0$ and real x. equation: $a \cdot 3^x = 45$; required solution: $x = 2$.	Identify the first invalid logarithm step and solve the original equation correctly. Context/domain: real x. equation: $2^x + 3 = 11$; student work: $[\ln(2^x) + \ln(3) = \ln(11), x = \frac{\ln(11)}{\ln(2)+\ln(3)}]$.
Solve without dividing by an expression that could be zero, and classify the solution set. Context/domain: real x. equation: $5 \cdot 2^x = 7 \cdot 2^x$.	Choose k from the prescribed solution, then inspect whether $x = 3$ remains the only solution. Context/domain: $k > 0$ and real x. equation: $k \cdot 2^x = 4 \cdot 2^{x+1}$; required solution: $x = 3$.
Find the first point at which the student turns an inadmissible substitution root into an x-value. Context/domain: real x. equation: $4^x + 3 \cdot 2^x - 4 = 0$; student work: $[u = 2^x, (u-1)(u+4) = 0, x = 0$ or $x = 2]$.	Solve the level equation conceptually and determine whether its time belongs to the model's operating domain. Context/domain: $t \geq 0$ years. model: $A(t) = 200(1.1)^t$; target: 150 units.

AP Precalculus

Solving Exponential Equations

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

Solve exactly without approximating the irrational exponent. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task. Context/domain: real x. equation: $11^x = 2$.

Your response: _____

Incoming: $x \approx 1.771$, uniquely on $[-2, 3]$

Use the positive substitution and invert both factored roots. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task. Context/domain: real x. equation: $16^x - 5 \cdot 4^x + 4 = 0$; substitution: $u = 4^x$.

Your response: _____

Incoming: n = 4

Express every factor as a power of 3 and solve. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task. Context/domain: real x. equation: $3 \cdot 9^x = 81 \cdot 3^x$.

Your response: _____

Incoming: x = 4

Use the unique exponent that produces 1 for base 5, then solve the resulting algebraic equation. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task. Context/domain: real x. equation: $5^{x^2-3x} = 1$.

Your response: _____

Incoming: x = $\frac{2}{3}$

Isolate the positive exponential quantity and state the exact real solution. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task. Context/domain: real x. equation: $7 \cdot 3^{2x} - 1 = 0$.

Your response: _____

Incoming: x = 1 or $x = \frac{\ln(3)}{\ln(2)}$

Form one exponential ratio and solve for the crossover input. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task. Context/domain: real x. equation: $3 \cdot 5^x = 12 \cdot 2^x$.

Your response: _____

AP Precalculus

Solving Exponential Equations

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.

Determine whether the declining model reaches the higher target after $t = 0$. Student work: No nonnegative time; 360 would require extending the growth model backward. Identify the precise mathematical error or omitted condition, then complete the original task and verify the correction from the supplied givens. error hunt. Context/domain: $t \geq 0$ weeks. model: $A(t) = 300(0.9)^t$; target: 360 units.

Apply the repeated-exponential substitution and verify both recovered exponents. Student work: $x = 1$ or $x = 4$ Identify the precise mathematical error or omitted condition, then complete the original task and verify the correction from the supplied givens. error hunt. Context/domain: real x. equation: $9^x - 30 \cdot 3^x + 81 = 0$; substitution: $u = 3^x$.

Choose a to make $x = 3$ a solution and check whether the solution is unique. Student work: $a = 3$; strict increase makes $x = 3$ not unique Identify the precise mathematical error or omitted condition, then complete the original task and verify the correction from the supplied givens. error hunt. Context/domain: $a > 0$. equation: $a \cdot 4^{x-1} = 48$; required solution: $x = 3$.

Evaluate the x-independent exponential and decide whether the equation is an identity or contradiction. Student work: No x works because the left side is fixed at 171, not 169. Identify the precise mathematical error or omitted condition, then complete the original task and verify the correction from the supplied givens. error hunt. Context/domain: real x. equation: $7 \cdot 5^{0x+2} - 4 = 170$.

Solving Exponential Equations

Full Worked Solutions - excerpt

Worked example

Problem. Use base 3, solve the resulting quadratic, and retain both real roots. Context/domain: real x. equation: $9^{x^2} = 3^{5x+6}$.

Answer. x = $\frac{5-\sqrt{73}}{4}$ or $x = \frac{5+\sqrt{73}}{4}$

Explanation and check.

Equating exponents gives $2x^2 - 5x - 6 = 0$, whose discriminant is 73.

Worked example

Problem. Express every factor as a power of 3 and solve. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task. Context/domain: real x. equation: $3 \cdot 9^x = 81 \cdot 3^x$.

Answer. x = 3 from $2x + 1 = x + 4$

Explanation and check.

The sides become 3^{2x+1} and 3^{x+4}, whose exponents agree only at $x = 3$.

Sets & Steps
Math Practice & Worked Solutions

AP Precalculus

Solving Logarithmic Equations

Solving Logarithmic Equations | APPC-U02-P23

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for complete solution set, solution interval, solution intervals, solution set, correct root and method error and correct solution set and domain error.

8 PDFs and a README; 94 buyer pages.

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AP Precalculus

Solving Logarithmic Equations

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 the intensity ratio represented by the logarithmic scale target. 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. Your complete response must include positive intensity ratio. Use the condition $\frac{I}{I_0} > 0$. Use the model $L = 10\log(\frac{I}{I_0})$. The target is $L = 30$ decibels. Bank label: _____	Solve the quadratic in the logarithmic quantity and exponentiate each real u-root. 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. Your complete response must include positive x-solutions. Use the condition $x > 0$. Solve the equation $(\log_2(x))^2 - 3\log_2(x) + 2 = 0$. Use the substitution $u = \log_2(x)$. Bank label: _____
Solve by exponentiating and verify the logarithm's original argument condition. 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. Your complete response must include real solution set. Use the condition real x. Solve the equation $\log_2(x-1) = 3$. Bank label: _____	Recover the concentration represented by the given pH target. 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. Your complete response must include positive hydrogen-ion concentration. Use the condition $[H+] > 0$ mol/L. Use the model pH=-log($[H+]$). The target is pH=6.5. Bank label: _____

AP Precalculus

Solving Logarithmic Equations

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.

Check both algebraic candidates in the two original logarithm arguments.

Your complete response must include valid solution set and rejection reason.

Use the condition real x.

Solve the equation $\log_2(x-3)+\log_2(x-5)=3$.

The student proposes the candidate values 17.

Condense the logs, solve the quadratic, and enforce both starting restrictions.

Your complete response must include valid roots.

Use the condition real x.

Solve the equation $\log_2(x-1)+\log_2(x+1)=3$.

Exponentiate, solve the quadratic, and test both roots in the original argument.

Your complete response must include all real roots.

Use the condition real x.

Solve the equation $\log_3(x^2-5)=2$.

Use the supplied maximum fact to determine whether the curves ever meet.

Your complete response must include solution set.

Use the condition $x>0$.

Solve the equation $\ln(x)=x$.

Use the supplied evidence: For $x>0, \ln(x)-x$ has maximum -1 at $x=1$.

Recover the intensity ratio, then decide whether the calibrated model supports that target.

Your complete response must include ratio and calibration status.

Use the condition $1 \le \frac{I}{I_0} \le 10^8$ calibration range.

Use the model $L=10\log(\frac{I}{I_0})$.

The target is 100 decibels.

Explain why exponentiating to obtain 9 does not validate the student's answer in the real logarithm setting.

Your complete response must include correct conclusion.

Use the condition real x.

Solve the equation $\log_{-3}(x)=2$.

The student reports $x=9$.

AP Precalculus

Solving Logarithmic Equations

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.

Incoming: x = $2 + \sqrt{3}$ only

Factor the quadratic in u and invert the natural logarithm for both roots. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task.

Your complete response must include positive x-solutions.

Use the condition $x > 0$.

Solve the equation $(\ln(x))^2 - 5\ln(x) + 6 = 0$.

Use the substitution $u = \ln(x)$.

Your response: _____

Incoming: x = 10

Exponentiate the equation and verify positivity of the original argument. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task.

Your complete response must include real root.

Use the condition real x.

Solve the equation $\log_7(2x - 5) = 2$.

Your response: _____

Incoming: x = e^2 or $x = e^3$

Use both roots of the difference of squares and exponentiate each one. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task.

Your complete response must include positive x-solutions.

Use the condition $x > 0$.

Solve the equation $(\log_4(x))^2 - 1 = 0$.

Use the substitution $u = \log_4(x)$.

Your response: _____

Incoming: x = e is the only intersection

Determine the input count that reaches the stated logarithmic capacity target. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task.

Your complete response must include positive device count.

Use the condition $n > 0$ devices.

Use the model $C(n) = 12\log_2(n)$.

The target is $C = 48$ units.

Your response: _____

Incoming: $x \approx 2.763$, the sole intersection for $x > 1$

Intersect the argument restrictions and then equate the arguments. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task.

Your complete response must include valid root.

Use the condition real x.

Solve the equation $\ln(2 - x) = \ln(x + 5)$.

Your response: _____

Incoming: x = $2 + \sqrt{10}$ only

Condense the difference and retain the common positivity restriction. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task.

Your complete response must include valid real root.

Use the condition real x.

Solve the equation $\ln(x + 2) - \ln(x - 4) = \ln(3)$.

Your response: _____

AP Precalculus

Solving Logarithmic Equations

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 injectivity and check the result against both affine positivity conditions. Student work: $x = \frac{9}{3}$ Identify the precise mathematical error or omitted condition, then complete the original task and verify the correction from the supplied givens.

Your complete response must include valid rational root.

Use the condition real x.

Solve the equation $\log_7(3x + 2) = \log_7(11 - x)$.

Factor in u and remember that both negative logarithmic values produce positive inputs. Student work: $x = e^{+1}$ or $x = e^{-5}$ Identify the precise mathematical error or omitted condition, then complete the original task and verify the correction from the supplied givens.

Your complete response must include positive x-values.

Use the condition $x > 0$.

Solve the equation $(\ln(x))^2 + 6\ln(x) + 5 = 0$.

Use the substitution $u = \ln(x)$.

Solving Logarithmic Equations

Full Worked Solutions - excerpt

Worked example

Problem. Solve the condensed quadratic and screen its roots against each source logarithm.

Your complete response must include valid solution set.

Use the condition real x.

Solve the equation $\log_5(x) + \log_5(x + 4) = 1$.

Answer. x = 1; discard $x = -5$

Explanation and check.

The source requires $x > 0$. Since $x(x + 4) = 5$ has roots 1 and -5, only 1 remains.

Worked example

Problem. Equate the same-base arguments, then check positivity at each resulting root.

Your complete response must include all valid roots.

Use the condition real x.

Solve the equation $\log_3(x^2 + 2) = \log_3(5x - 4)$.

Answer. x = 2 or $x = 3$; both arguments are positive

Explanation and check.

The equation $x^2 + 2 = 5x - 4$ factors as $(x - 2)(x - 3) = 0$, and both roots make $5x - 4$ positive.

Sets & Steps
Math Practice & Worked Solutions

AP Precalculus

Exponential and Logarithmic Inequalities

Exponential and Logarithmic Inequalities | APPC-U02-P24

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for case intervals, solution by k region, solution intervals by base region, solutions by m sign, solutions by p sign and case solutions.

8 PDFs and a README; 69 buyer pages.

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AP Precalculus

Exponential and Logarithmic Inequalities

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.

Combine the logarithm domain with the transformed inequality. 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.

Context: real x or the stated contextual schedule.

Solve the inequality $\log_2(x-1) > 3$.

Bank label: _____

Solve the quadratic inequality in u and map its positive interval back to x. 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.

Context: real x or the stated contextual schedule.

Solve the inequality $4^x - 5 \cdot 2^x + 4 < 0$.

The substitution is $u = 2^x > 0$.

Bank label: _____

Isolate the positive exponential and solve the strict threshold. 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.

Context: real x or the stated contextual schedule.

Solve the inequality $2^x + 1 > 9$.

Bank label: _____

Translate the base-seven comparison directly into exponent order. 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.

Context: real x.

Solve the inequality $7^{x+2} \le 7^5$.

Bank label: _____

AP Precalculus

Exponential and Logarithmic Inequalities

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.

Use the intersection as a boundary and identify where the exponential is at or below the horizontal line.

Context: real x or the stated contextual schedule.

the horizontal axis measures input; the vertical axis measures output; the displayed window has $-2 \le x \le 4$ and $0 \le y \le 25$.

The comparison is $e^x \le e^2$.

Compare the curves $(y = e^x, y = e^2)$.

The intersection is at $x = 2$; this input is included.

Separate increasing and decreasing valid bases before comparing exponents.

Context: real x or the stated contextual schedule.

Solve the inequality $a^x > a^2$.

Assume $a > 0$ and $a \neq 1$.

Check the order direction for the reciprocal base.

Context: real x or the stated contextual schedule.

Solve the inequality $(\frac{1}{2})^x > (\frac{1}{2})^3$.

Evaluate this student answer: $x > 3$.

Separate positive, negative, and zero scale factors before dividing.

Context: real x or the stated contextual schedule.

Solve the inequality $k \cdot 2^x \le 8k$.

Assume real k.

First reduce the two positivity conditions, then compare the arguments and intersect the sign solution.

Context: real x or the stated contextual schedule.

Solve the inequality $\ln(x^2 - 4) > \ln(3x)$.

Partition the parameter by monotonicity and retain the positive argument domain in both cases.

Context: real x or the stated contextual schedule.

Solve the inequality $\log_a(x) > 1$.

Assume $a > 0$ and $a \neq 1$.

AP Precalculus

Exponential and Logarithmic Inequalities

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

Combine positivity with the nonpositive logarithm condition. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task.

Context: real x.

Solve the inequality $\ln(x+5) \le 0$.

Your response: _____

Incoming: Week 4

Compare exponents of the increasing natural base. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task.

Context: real x.

Solve the inequality $e^{2x-1} > e^{3}$.

Your response: _____

Incoming: $[2, 8]$ within the displayed domain

Remove the factor 2 before using the base-five boundary. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task.

Context: real x.

Solve the inequality $2 \cdot 5^{x} + 3 > 13$.

Your response: _____

Incoming: $\log_{\frac{1}{2}}(3) < x < -1$

Separate coefficient signs before division. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task.

Context: real x and real s.

Solve the inequality $s \cdot 2^{x} < 4s$.

Your response: _____

AP Precalculus

Exponential and Logarithmic Inequalities

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 crossing and graph order on either side. Student work: $(-1, \infty)$ Identify the precise mathematical error or omitted condition, then complete the original task and verify the correction from the supplied givens.

Context: real x.

Use standard Cartesian axes; the horizontal axis measures input; the vertical axis measures function value.

The comparison is $e^x > 1$.

Compare the curves $(y = e^x, y = 1)$.

The intersection is at $x = 0$; this input is excluded.

The displayed window has $-3 \le x \le 3$ and $0 \le y \le 8$.

Use strict positivity of the exponential to classify the threshold. Student work: $x = 0$ is a solution because both sides of $2 - 5^x \ge 2$ are then nonnegative. Identify the precise mathematical error or omitted condition, then complete the original task and verify the correction from the supplied givens.

Exponential and Logarithmic Inequalities

Full Worked Solutions - excerpt

Worked example

Problem. Use strict positivity of the exponential to classify the threshold. Student work: $x = 0$ is a solution because both sides of $2 - 5^x \geq 2$ are then nonnegative. Identify the precise mathematical error or omitted condition, then complete the original task and verify the correction from the supplied givens.

Answer. No real solution

Explanation and check.

The inequality would require $-5^x \geq 0$, impossible because $5^x > 0$.

Worked example

Problem. Reverse when removing the negative factor, then intersect with strict argument positivity.

Context: real x.

Solve the inequality $-\log_2(x^2 - 4) \geq -1$.

Answer. $[-\sqrt{6}, -2) \cup (2, \sqrt{6}]$

Explanation and check.

The conditions are $x^2 > 4$ and $x^2 - 4 \leq 2$, so $4 < x^2 \leq 6$.

Sets & Steps
Math Practice & Worked Solutions

AP Precalculus

Inverse Trigonometric Functions

Inverse Trigonometric Functions | APPC-U03-P16

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for valid inverse pair and reason for discarding a row, reason proposal fails and a valid restriction, validity and approximate corrected sign, defined or undefined, real-defined or undefined with failed restriction and validity and location of output.

8 PDFs and a README; 67 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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AP Precalculus

Inverse Trigonometric 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.

Evaluate $\arcsin(-\frac{\sqrt{3}}{2})$ exactly. Identify the compatible unit-circle angle that lies in the principal range $[-\frac{\pi}{2}, \frac{\pi}{2}]$. Bank label: _____	Let $\theta = \arcsin(\frac{5}{13})$. A right triangle for θ has opposite side 5 and hypotenuse 13. Find $\cos\theta$ and explain why its sign is forced by the arcsine branch. Bank label: _____
Evaluate $\arcsin(\sin(5\frac{\pi}{6}))$. Do not cancel the two function names; use a symmetry relation to place the result in the arcsine range. Bank label: _____	Find the exact principal value of $\arccos(-\frac{\sqrt{2}}{2})$. Use the sign of cosine and the required range $[0, \pi]$ to select the angle. Bank label: _____
Set $\theta = \arccos(-\frac{8}{17})$ and represent θ by a point (x, y) on a circle of radius 17 with $x = -8$. Determine $\tan\theta$, including its sign, from the principal arccos range. Bank label: _____	In radian mode, estimate $\arcsin(0.98)$ to the nearest thousandth. Verify that the rounded result lies in the correct principal interval. Bank label: _____
Reduce $\arccos(\cos(7\frac{\pi}{6}))$ to its principal value. Explain the reflection that produces an angle in $[0, \pi]$. Bank label: _____	Evaluate $\sin(\arctan(-\frac{7}{24}))$ exactly. Build a signed coordinate triangle compatible with the inverse-tangent range rather than treating the inner ratio as a sine value. Bank label: _____

AP Precalculus

Inverse Trigonometric 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.

Is $\arccos(\frac{6}{5})$ defined as a real number? Name the restriction that decides the question.

AP Precalculus

Inverse Trigonometric 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.

Incoming: $-\frac{\pi}{6}$

Place $13\frac{\pi}{6}$ on the tangent graph and remove enough periods to reach the inverse-tangent branch. Evaluate the composition.

Your response: _____

Incoming: y = arccos *x*.

Both $-\frac{\pi}{6}$ and $5\frac{\pi}{6}$ have tangent $-\frac{\sqrt{3}}{3}$. Which one equals $\arctan(-\frac{\sqrt{3}}{3})$, and why is the other rejected?

Your response: _____

Incoming: $\sqrt{(1-v^2)}$, for $-1 \le v \le 1$

Estimate $\arccos(-0.6)$ to the nearest tenth of a degree. Use the negative input to check the calculator's quadrant.

Your response: _____

Incoming: 126.9 degrees

For $\theta = \arccos(-\frac{3}{5})$, place a point of radius 5 with $x = -3$ in the correct half of the unit-circle model. Find $\sin\theta$.

Your response: _____

Incoming: 0.045 radians

Without finding θ itself, evaluate $\cot(\arctan(-\frac{9}{40}))$. State why this reciprocal is defined.

Your response: _____

Incoming: $\frac{\pi}{3}$

A calculation table records $\arcsin(0.73) = 0.818321$ in radian mode. Report the value to the nearest hundredth and verify its range.

Your response: _____

AP Precalculus

Inverse Trigonometric 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.

A student writes, "$\arccos(\cos(4\frac{\pi}{3})) = 4\frac{\pi}{3}$ because inverse functions cancel." Identify the failed condition and replace the conclusion with the correct principal angle.

A solution interprets $\sin^{-1}(\frac{1}{2})$ as the reciprocal $\frac{1}{\sin(\frac{1}{2})}$. Diagnose the notation error, rewrite the inverse with unambiguous notation, and evaluate it exactly.

A symbolic solution states $\tan(\arcsin u) = \frac{u}{\sqrt{1-u^2}}$ for $-1 \le u \le 1$. Repair the domain and explain what happens at $u = \pm 1$ in the original composition, not just in the formula.

A calculator returns 45 for $\arctan(1)$, and a student reports 45 radians. Diagnose the display and give the correct radian answer.

Inverse Trigonometric Functions

Full Worked Solutions - excerpt

Worked example

Problem. Use radian mode to approximate $\arccos(0.2)$ to three decimal places.

Answer. 1.369 radians

Explanation and check.

The calculator value $1.369438\ldots$ rounds to 1.369 radians.

Worked example

Problem. Find the domain of $G(x) = \arcsin(3 - x)$. Preserve the inequality reversal when isolating x.

Answer. $[2, 4]$

Explanation and check.

Require $-1 \le 3 - x \le 1$. The two bounds give $x \le 4$ and $x \ge 2$, hence $2 \le x \le 4$.

Sets & Steps
Math Practice & Worked Solutions

AP Precalculus

Solving Trigonometric Equations

Solving Trigonometric Equations | APPC-U03-P17

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for count by h-region, count by level case, count for each L, number of distinct solutions for each case, solution count by case and all roots.

8 PDFs and a README; 47 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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AP Precalculus

Solving Trigonometric Equations

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.

Solve $\sin x = \frac{1}{2}$ for $0 \le x \le 2\pi$. Use both unit-circle branches and check the endpoints. Bank label: _____	Solve $\sin(2x) = 0$ on $0 \le x \le \pi$. First map the x-interval to the complete $2x$-interval, then divide the enumerated angle values by 2. Bank label: _____
Solve $2\sin^2 x - 3\sin x + 1 = 0$ for $0 \le x \le 2\pi$. Treat $u = \sin x$, solve both feasible levels, and merge any overlapping angle sets. Bank label: _____	Find every x in $[0, 2\pi)$ satisfying $\sin x \cos x = 0$. Solve the two zero factors separately and combine without duplicating any root. Bank label: _____
Solve $\frac{\sin x}{1-\cos x}=0$ on $[0, 2\pi]$. Record denominator exclusions before using numerator-zero logic. Bank label: _____	Using $\sin^2 x = 1\text{-}\cos^2 x$, solve $\sin^2 x = 1\text{-}\cos x$ on $[0, 2\pi)$. Keep every root produced by the resulting factored equation. Bank label: _____
Solve $\cos x = -\frac{\sqrt{2}}{2}$ for $-\pi \le x < \pi$. Use the signed unit-circle interval rather than converting the final answers to $[0, 2\pi)$. Bank label: _____	Solve $\cos(x - \frac{\pi}{3}) = \frac{1}{2}$ on $[0, 2\pi]$. Enumerate every allowed angle $x - \frac{\pi}{3}$ in the mapped window, including boundary hits. Bank label: _____

AP Precalculus

Solving Trigonometric Equations

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. Give the whole requested response, including any reasoning the question asks for.

Solve $2\sin x + 1 = 2$ for $0 \le x \le 2\pi$. Normalize the output before selecting sine branches.	For $\sin x = c$ on $[0, 2\pi)$, determine the solution count when $c = 1$, when $0 < \lvert c\rvert < 1$, when $c = -1$, and when $\lvert c\rvert > 1$. Base the count on intersections with the extrema.
Solve $-3\cos x + 2 = 5$ on $[0, 2\pi]$. After isolating cosine, use the extreme level to determine multiplicity.	Solve $\sqrt{1 - \cos x} = \sin x$ on $[0, 2\pi]$. After squaring, substitute every candidate into the original equation to enforce the nonnegative left side.
Solve $\sin x = 2$ on $[0, 2\pi]$. Give the range-based reason for your conclusion.	Solve $\sin^2 x = \sin x$ on $[0, 2\pi)$. Explain which solutions would disappear if both sides were divided by $\sin x$.

AP Precalculus

Solving Trigonometric Equations

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.

Incoming: $\{0\}$

Solve $\tan(2x - \frac{\pi}{4}) = 1$ for $0 \le x \le \pi$. Filter the angle family $\frac{\pi}{4} + k\pi$ through the mapped window.

Your response: _____

Incoming: $[0, \frac{\pi}{2}]$ union $[3\frac{\pi}{2}, 2\pi]$

Solve $\sin^2 x - 2\sin x + 1 = 0$ on $[0, 2\pi]$. Explain why a repeated auxiliary root still produces a one-element angle set.

Your response: _____

Incoming: $\{0, \frac{\pi}{2}, \pi, 2\pi\}$

A nonnegative graph of $(\sin x - 0.6)^2$ on $[0, \pi]$ touches zero at two certified minima. Report both roots to the nearest thousandth and explain why sign-change bracketing detects neither.

Required response

0.643501109	0
2.498091545	0

Your response: _____

Incoming: $\{5\frac{\pi}{3}, 7\frac{\pi}{3}\}$

Solve $(2\sin x + 1)(2\sin x - 1) = 0$ on $[0, 2\pi)$. Enumerate the positive and negative half-levels separately.

Your response: _____

Incoming: $\{\frac{\pi}{4}, 5\frac{\pi}{4}\}$

Solve $\cos(-x + \frac{\pi}{6}) = \frac{\sqrt{3}}{2}$ on $[-\pi, \pi]$. Reverse the mapped interval correctly before filtering the two cosine branches.

Your response: _____

Incoming: $\{3.000\}$

Solve $\frac{\sin x}{\cos x} = 1$ on $[0, 2\pi)$. Preserve the cosine exclusions while using the equivalent tangent level where defined.

Your response: _____

AP Precalculus

Solving Trigonometric Equations

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.

A student reports only $x = \frac{\pi}{3}$ for $\sin x = \frac{\sqrt{3}}{2}$ on $[0, 2\pi]$. Identify the missing branch and give the corrected complete set.

A student uses $a2\pi$ repeat and lists $\{-2\pi, 0, 2\pi\}$ for $\tan x = 0$ on $[-2\pi, 2\pi]$. Repair the period and include every missing root.

A solution lists both 0 and 2π for $\cos x = 1$ on $[0, 2\pi)$. Repair the set by applying the interval notation.

A solution factors $\sin^2 x + \sin x - 2 = 0$ but tries to include an angle for $\sin x = -2$. Remove the impossible auxiliary level and finish the solution on $[0, 2\pi]$.

Solving Trigonometric Equations

Full Worked Solutions - excerpt

Worked example

Problem. Solve $\cos x = -1$ on $-2\pi \le x \le 2\pi$. Filter the extreme-value family $\pi + 2k\pi$ through the symmetric interval.

Answer. $\{-\pi,\ \pi\}$

Explanation and check.

The family $x = \pi + 2k\pi$ yields $-\pi$ for $k = -1$ and π for $k = 0$. Adjacent values lie outside the interval.

Worked example

Problem. Solve $5\tan x + 2 = 2$ on $[-\pi, \pi]$. Apply tangent's $\pi-$spaced zero family to the closed endpoints.

Answer. $\{-\pi,\ 0,\ \pi\}$

Explanation and check.

The equation reduces to $\tan x = 0$, whose zeros $x = k\pi$ in the interval are $-\pi, 0, \pi$.

Sets & Steps
Math Practice & Worked Solutions

AP Precalculus

Trigonometric Inequalities

Trigonometric Inequalities | APPC-U03-P18

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for closed interval to tolerance, interval to tolerance, interval union to tolerance, correct intersection and counterexample, correct interval and boundary counterexample and correct set and boundary counterexample.

8 PDFs and a README; 111 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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AP Precalculus

Trigonometric Inequalities

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.

Certified numerical evidence locates the crossings of $\sin x$ and $0.2x + 0.1$ at 0.125411 and 2.498473 on $[0, 4]$. Solve the nonstrict inequality to the nearest thousandth.

Certified numerical evidence locates the crossings of $\sin x$ and $0.2x + 0.1$ at 0.125411 and 2.498473 on $[0, 4]$. Solve the nonstrict inequality to the nearest thousandth.

Supplied evidence	Value
equality points	0.125410601 2.498473192

Condition or evidence	Supplied value
Original inequality	$\sin x \geq 0.2x + 0.1$
Requested precision	nearest thousandth
Given shape evidence	the difference is nonnegative exactly between the crossings
Given window	$[0, 4]$

Bank label: _____

Solve $-2\cos x + 1 \leq 0$ on $[0, 2\pi)$. Show the order reversal caused by division by -2.

Solve $-2\cos x + 1 \leq 0$ on $[0, 2\pi)$. Show the order reversal caused by division by -2.

Condition or evidence	Supplied value
Original inequality	$-2\cos x + 1 \leq 0$
Input interval	$[0, 2\pi)$

Bank label: _____

Solve -sin($2x - \frac{\pi}{2}$) ≥ 0 on $[0, \pi]$. Track the output reversal before mapping the inner-angle intervals.

Solve -sin($2x - \frac{\pi}{2}$) ≥ 0 on $[0, \pi]$. Track the output reversal before mapping the inner-angle intervals.

Condition or evidence	Supplied value
Original inequality	-sin(2x-pi/2)>=0
Input interval	$[0, \pi]$

Bank label: _____

Solve $\sin x(1 + \cos x) \geq 0$ on $[0, 2\pi]$. Use that $1 + \cos x$ never becomes negative but does vanish at π.

Solve $\sin x(1 + \cos x) \geq 0$ on $[0, 2\pi]$. Use that $1 + \cos x$ never becomes negative but does vanish at π.

Condition or evidence	Supplied value
Original inequality	$\sin x(1 + \cos x) \geq 0$
Input interval	$[0, 2\pi]$

Bank label: _____

AP Precalculus

Trigonometric Inequalities

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.

Solve $\sin x < 0$ OR $\cos x \le 0$ on $[0, 2\pi)$. Decide which boundaries are contributed by only one condition.

Solve $\sin x < 0$ OR $\cos x \le 0$ on $[0, 2\pi)$. Decide which boundaries are contributed by only one condition.

Condition or evidence	Supplied value
Given conditions	$\sin x < 0$ $\cos x \le 0$
Logical connective	OR
Input interval	$[0, 2\pi)$

During $0 \le t \le 12$ hours, a temperature follows $T(t) = 50 + 10\sin(\pi\frac{t}{6})$. When is $T > 55$, and for how many total hours?

During $0 \le t \le 12$ hours, a temperature follows $T(t) = 50 + 10\sin(\pi\frac{t}{6})$. When is $T > 55$, and for how many total hours?

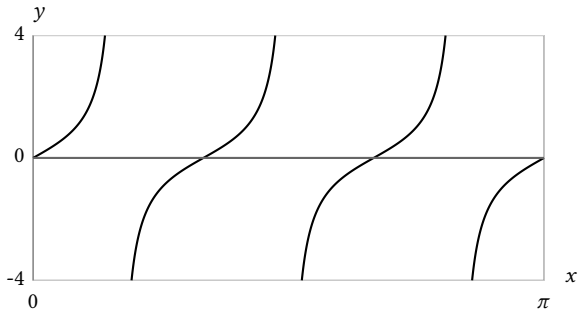
Condition or evidence	Supplied value
Required condition	$T > 55$
Given model	$T(t) = 50 + 10\sin(\pi\frac{t}{6})$
Time interval	$[0, 12]$ hours

For $0 \le t \le 10, V(t) = 12 + 4\cos(\pi\frac{t}{5})$. When is $V \le 8$, and what is the total duration?

For $0 \le t \le 10, V(t) = 12 + 4\cos(\pi\frac{t}{5})$. When is $V \le 8$, and what is the total duration?

Condition or evidence	Supplied value
Required condition	$V \le 8$
Given model	$V(t) = 12 + 4\cos(\pi\frac{t}{5})$
Time interval	$[0, 10]$ hours

Solve $\tan(3x) < 0$ on $[0, \pi]$, marking the three scaled poles before reading signs.



Condition or evidence	Supplied value
Original inequality	$\tan(3x) < 0$
Input interval	$[0, \pi]$

AP Precalculus

Trigonometric Inequalities

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.

Incoming: $[0, 0.125] \cup [2.498, 4]$

Solve $\tan x \geq -\sqrt{3}$ on $[0, \pi)$, treating the two sides of $\frac{\pi}{2}$ as separate branches.

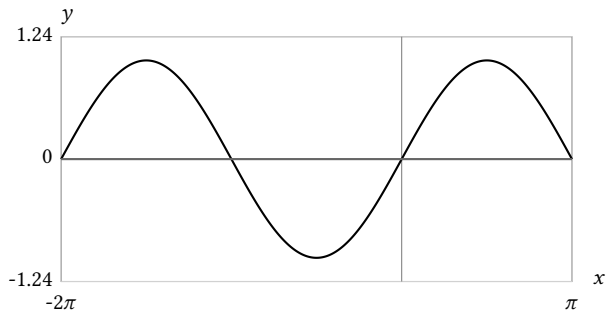
Solve $\tan x \geq -\sqrt{3}$ on $[0, \pi)$, treating the two sides of $\frac{\pi}{2}$ as separate branches.

Condition or evidence	Supplied value
Original inequality	$\tan x \geq -\sqrt{3}$
Input interval	$[0, \pi)$

Your response: _____

Incoming: $(\frac{\pi}{2}, \pi)$

Solve $\sin x \geq 0$ on $[-2\pi, \pi]$, using signed cycles and all equality zeros.



Condition or evidence	Supplied value
Original inequality	$\sin x \geq 0$
Input interval	$[-2\pi, \pi]$

Your response: _____

Incoming: $[-2\pi, \pi]$

Let $\alpha = \arccos(0.2)$. Solve $\cos x \leq 0.2$ on $[0, 2\pi)$ in terms of α.

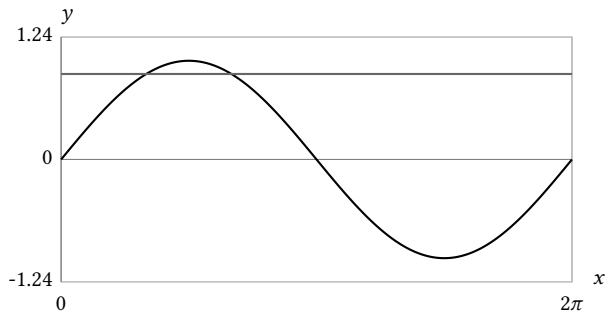
Let $\alpha = \arccos(0.2)$. Solve $\cos x \leq 0.2$ on $[0, 2\pi)$ in terms of α.

Condition or evidence	Supplied value
Original inequality	$\cos x \leq 0.2$
Input interval	$[0, 2\pi)$

Your response: _____

Incoming: $[-2, 2]$

Solve $\sin x > \frac{\sqrt{3}}{2}$ on $[0, 2\pi]$.



Condition or evidence	Supplied value
Original inequality	$\sin x > \frac{\sqrt{3}}{2}$
Input interval	$[0, 2\pi]$

Your response: _____

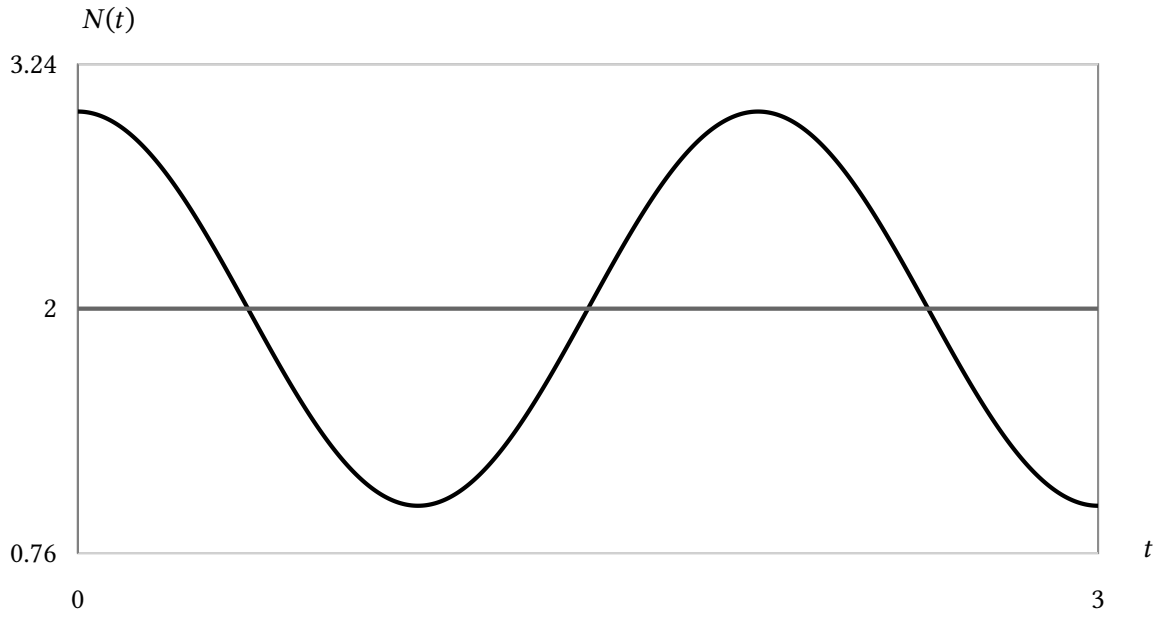
AP Precalculus

Trigonometric Inequalities

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.

For $0 \le t \le 3, N(t) = 2 + \cos(\pi t)$. Find when $N > 2$ and add the unequal visible window lengths. First choose and justify a valid method. Method A: Add the actual lengths of the two admitted time windows. Method B: Multiply the number of windows by a common assumed length.



Condition or evidence	Supplied value
Required condition	$N > 2$
Given model	$N(t) = 2 + \cos(\pi t)$
Time interval	$[0, 3]$ hours

Trigonometric Inequalities

Full Worked Solutions - excerpt

Worked example

Problem. Determine the solution set of $\cos x > 1$ on $[0, 2\pi]$ without solving an equality first.

Determine the solution set of $\cos x > 1$ on $[0, 2\pi]$ without solving an equality first.

Condition or evidence	Supplied value
Original inequality	$\cos x > 1$
Input interval	$[0, 2\pi]$

Answer. $\varnothing$

Explanation and check.

Cosine's maximum value is 1, so it can never be strictly greater than 1. The solution set is empty.

Worked example

Problem. Solve $-3\sin x + 2 < -1$ on $[0, 2\pi]$, reversing the inequality when the sine term is isolated.

Solve $-3\sin x + 2 < -1$ on $[0, 2\pi]$, reversing the inequality when the sine term is isolated.

Condition or evidence	Supplied value
Original inequality	$-3\sin x + 2 < -1$
Input interval	$[0, 2\pi]$

Answer. $\varnothing$

Explanation and check.

Isolation gives $\sin x > 1$. Since the upper endpoint of sine's range is 1, the strict inequality is impossible.