

Precalculus
Reciprocal Trig Functions & Identities | 3-Topic Precalculus Bundle

3-topic bundle | 288 problems | Four activity formats

- 01 Secant and Cosecant Functions**
View individual product and its full preview
- 02 Cotangent Functions**
View individual product and its full preview
- 03 Reciprocal, Quotient, and Pythagorean Trig Identities**
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.

24 PDFs and 3 READMEs; 289 buyer PDF pages across the 3 products.

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

AP Precalculus
Secant and Cosecant Functions

Secant and Cosecant Functions | APPC-U03-P19

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 cosecant order and magnitude, cosecant value and order, cosecant value order and magnitude, exact order, exact signed and magnitude relation and exact values and order.

8 PDFs and a README; 85 buyer pages.

AP Precalculus

Secant and
Cosecant Functions

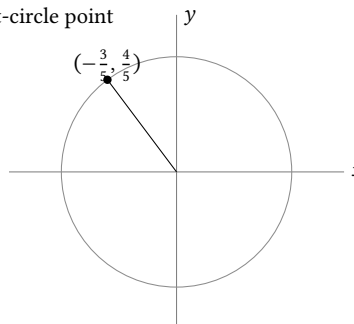
Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

A table gives $\cos \theta = \frac{1}{4}$ and $\sin \theta = \frac{\sqrt{15}}{4}$. Find $\sec \theta$ and $\csc \theta$ exactly.

The terminal point for θ is $(-\frac{3}{5}, \frac{4}{5})$ on the unit circle. Find $\sec \theta$ and $\csc \theta$.

Supplied unit-circle point

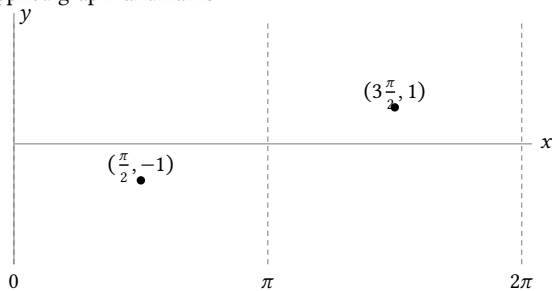


Bank label: _____

Bank label: _____

A graph has poles at $0, \pi, 2\pi$ and vertices $(\frac{\pi}{2}, -1), (3\frac{\pi}{2}, 1)$. Which listed reciprocal formula matches it?

Supplied graph landmarks



$\frac{\pi}{2}$	-1
$3\frac{\pi}{2}$	1

Bank label: _____

If $\sin \theta = 0.8$, compute $\csc \theta$ and compare the two positive values.

Bank label: _____

AP Precalculus

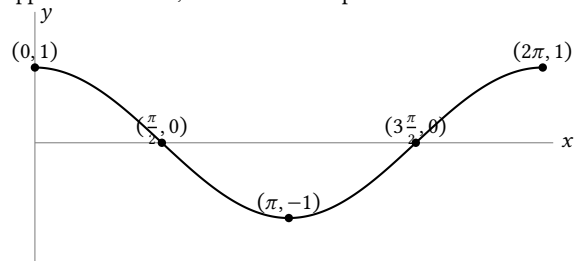
Secant and
Cosecant Functions

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

Construct $y = \sec x$ on $[0, 2\pi]$ from the supplied cosine landmarks. State all poles, reciprocal vertices, and branch signs.

Supplied base curve; construct its reciprocal



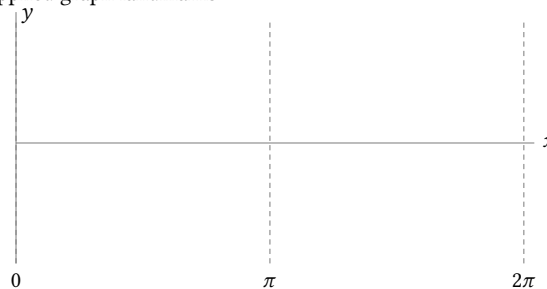
0	1
π	-1
2π	1

Derive the domain and range of $y = 2 \sec x + 3$.

For $y = \csc(2x)$, give the period, all pole locations, and the reciprocal-vertex pattern.

A cropped graph has integer- π poles, a positive first branch, and a negative second branch. Match its reciprocal formula. Choose from $\csc x$, $-\csc x$, and $\sec x$.

Supplied graph landmarks



AP Precalculus

**Secant and
Cosecant 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 claims $\sec(0) = 0$ because the angle is zero. Diagnose the reciprocal error.

A proposed $y = \csc x$ graph crosses the x -axis at $x = \frac{\pi}{2}$. Diagnose the error using the denominator value there and the reciprocal range.

A student marks $x = 0$ and $x = \pi$ as zeros of $\sec x$. Repair the graph landmarks on $[0, 2\pi]$.

A student copies $\cos \theta = 0.2$ into the secant column. Repair the table entry and state the operation required.

Secant and Cosecant Functions

Full Worked Solutions - excerpt

Worked example

Problem. A table gives $\cos \theta = \frac{1}{8}$. Find $\sec \theta$.

Answer. $\sec \theta = 8$

Explanation and check.

Invert the nonzero cosine value.

Worked example

Problem. A table lists $\sin \theta = 0$. Classify $\csc \theta$.

Answer. $\csc \theta$ is undefined

Explanation and check.

Cosecant would require division by zero.

AP Precalculus
Cotangent Functions

Cotangent Functions | APPC-U03-P20
96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
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Topic focus
Across 96 tasks this topic asks for cotangent status and value, family of compatible rules and missing evidence, sign and domain on each interval, period consecutive pole and zero, range and existence of local extrema and values and domain explanation.
8 PDFs and a README; 142 buyer pages.

AP Precalculus

Cotangent Functions

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.

Use $\sin \theta = \frac{1}{2}$ and $\cos \theta = \frac{\sqrt{3}}{2}$ to find $\cot \theta$.

Solve the problem, then match the entire requested response to one unused entry in the Answer Bank.

Condition or evidence	Supplied value
Given $\cos \theta$	$\frac{\sqrt{3}}{2}$
Given $\sin \theta$	$\frac{1}{2}$

Bank label: _____

AP Precalculus

Cotangent 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: $(a, b) = (2, 2)$ and $(-2, -2)$

For $y = 3 \cot(-x + \frac{\pi}{5})$, solve for its pole and zero families and state the period and branch direction.

Solve the card and move only to the card whose incoming header matches the entire requested response.

Condition or evidence	Supplied value
Original rule	$y = 3 \cot(-x + \frac{\pi}{5})$

Your response: _____

AP Precalculus

Cotangent 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.

Assess the statement “ $\cot x = \frac{1}{\tan x}$ for every real x .” Give a corrected domain-qualified statement and one counterexample to the original.

Identify the error or first invalid step, give the corrected result, and state a brief mathematical reason.

Condition or evidence	Supplied value
Statement to examine	$\cot x = \frac{1}{\tan x}$ for every real x

Cotangent Functions

Full Worked Solutions - excerpt

Worked example

Problem. For $y = 2 \cot(3x)$, state the period, all pole locations, all zeros, and the direction of each branch.

Show a complete response in the numbered workspace, preserving requested exactness, units, interval endpoints, and justification.

Condition or evidence	Supplied value
Original rule	$y = 2 \cot(3x)$

Answer. period $\frac{\pi}{3}$; poles $x = k\frac{\pi}{3}$; zeros $x = \frac{\pi}{6} + k\frac{\pi}{3}$; decreasing branches

Explanation and check.

Set $3x = k\pi$ for poles and $3x = \frac{\pi}{2} + k\pi$ for zeros. The positive output factor preserves cotangent's decreasing direction.

Worked example

Problem. For $y = (\frac{1}{2}) \cot(4(x - \frac{\pi}{8}))$, find the period and give the first pole and first zero at or to the right of $x = \frac{\pi}{8}$.

Show a complete response in the numbered workspace, preserving requested exactness, units, interval endpoints, and justification.

Condition or evidence	Supplied value
Original rule	$y = (\frac{1}{2}) \cot(4(x - \frac{\pi}{8}))$

Answer. period $\frac{\pi}{4}$; pole $x = \frac{\pi}{8}$; zero $x = \frac{\pi}{4}$

Explanation and check.

Input scale 4 gives period $\frac{\pi}{4}$. Starting at the phase pole, a zero lies half a period, $\frac{\pi}{8}$, later.

Precalculus

Reciprocal, Quotient, and Pythagorean Trig Identities

Trigonometric Functions | APPC-U03-P21

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
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Topic focus

Use reciprocal and quotient identities, derive Pythagorean forms, simplify expressions, and justify domain restrictions and sign choices.

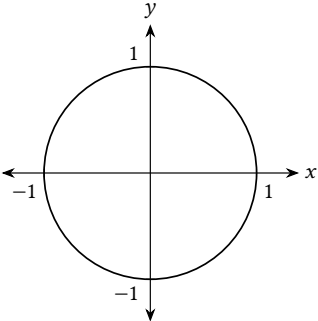
8 PDFs and a README; 62 buyer pages.

Precalculus

Reciprocal, Quotient, and
Pythagorean Trig Identities

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values and the requested justification. Angles are in radians; k is an integer.

Rewrite $\sec x$ using cosine and state the inputs allowed by the original expression. _____ Bank label: _____	A terminal ray lies in quadrant II and $\sin^2 \theta = \frac{9}{25}$. Recover $\sin \theta$.  _____ Bank label: _____
Use the Pythagorean identity to rewrite $1 - \sin^2 \theta$ as one squared trigonometric function. _____ Bank label: _____	Simplify $\frac{1}{\csc x}$, but retain the domain of the written original expression. _____ Bank label: _____

Reciprocal, Quotient, and Pythagorean Trig Identities

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.

[illegible]

Precalculus

Reciprocal, Quotient, and Pythagorean Trig Identities

Name: _____ Date: _____ Class: _____

Evaluate the supplied statements or methods. Explain your decision and complete the requested task. Not every prompt contains an error.

A derivation divides $\sin^2 x + \cos^2 x = 1$ by $\sin^2 x$ “for every real x .” Repair the step and state the resulting identity.

Test the claim $1 - \cos^2 x = \sin x$. Give a counterexample and replace it with the correct identity.

Repair the step $\sqrt{\cos^2 x} = \cos x$. Give a correct all-real formula and explain when the student’s version happens to agree.

Refute $\sqrt{\sin^2 x} = \sin x$ as an all-real identity, then write the correct version.

Reciprocal, Quotient, and Pythagorean Trig Identities

Full Worked Solutions - excerpt

Worked example

Problem. Rewrite $\sec x$ using cosine and state the inputs allowed by the original expression.

Answer. $\sec x = \frac{1}{\cos x}$ for $\cos x \neq 0$

Explanation and check.

$$\sec x = \frac{1}{\cos x}$$

Cosine is defined for every real x , but the denominator must be nonzero. Therefore $\cos x \neq 0$, or equivalently $x \neq \frac{\pi}{2} + k\pi$.

Worked example

Problem. A terminal ray lies in quadrant II and $\sin^2 \theta = \frac{9}{25}$. Recover $\sin \theta$.

Answer. $\sin \theta = \frac{3}{5}$

Explanation and check.

$$\sin^2 \theta = \frac{9}{25}$$

$$\sin \theta = \pm\left(\frac{3}{5}\right)$$

Sin is positive on quadrant II. Select the matching sign.

$$\sin \theta = \frac{3}{5}$$

Check the given square: $\frac{9}{25}$; the selected sign also meets the location condition.