

AP Precalculus
Trig Signs and Reference Angles

Trig Signs and Reference Angles | APPC-U03-P06

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
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Topic focus

Across 96 tasks this topic asks for three signs with coordinate evidence, all allowed angles, terminal location and reference angle, correct boundary classification, possible location or inconsistency and all consistent pairings or contradiction.

8 PDFs and a README; 107 buyer pages.

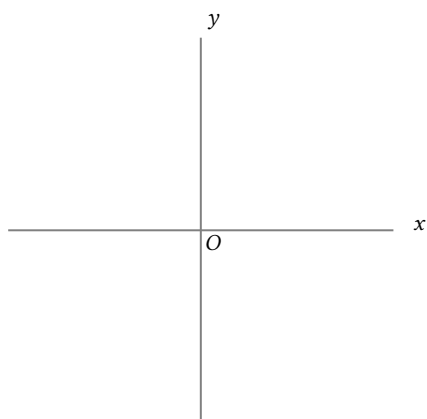
AP Precalculus

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Name: _____ Date: _____ Class: _____

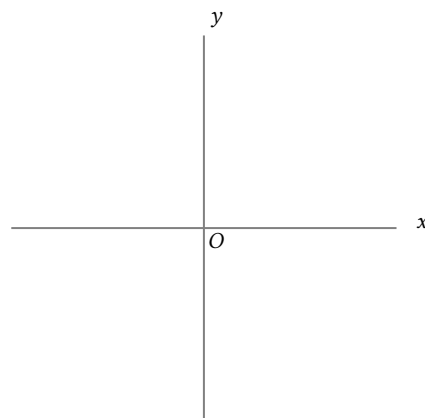
Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Intersect the constraints $\sin \theta > 0$, $\cos \theta \neq 0$. State every possible terminal location, distinguishing axes from open quadrants, or prove the conditions inconsistent.



Bank label: _____

Assume $0 < \alpha < \frac{\pi}{2}$. Rewrite $\cos(2\pi - \alpha)$ using $\cos \alpha$ only, and justify the sign from the terminal coordinates rather than evaluating α .



Bank label: _____

Intersect the constraints $\cos \theta < 0$. State every possible terminal location, distinguishing axes from open quadrants, or prove the conditions inconsistent.

Construct every angle in $[0, 2\pi)$ whose acute reference angle is $\frac{\pi}{3}$ and whose terminal ray is in quadrant IV. Respect both endpoint flags and include all admitted turns.

Bank label: _____

Bank label: _____

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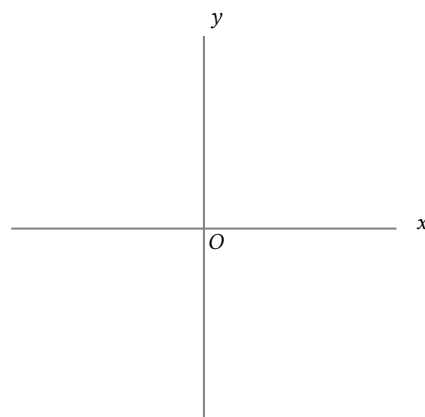
Name: _____ Date: _____ Class: _____

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.

For quadrant IV coordinate box with $x > 0, y < 0$, classify the signs of sine, cosine, and tangent. Derive them from y, x , and $\frac{y}{x}$, including zero or undefined when required.

Given evidence	Sine	Cosine	Tangent
$x > 0, y < 0$	_____	_____	_____

For positive y -axis ray with $x = 0, y > 0$, classify the signs of sine, cosine, and tangent. Derive them from y, x , and $\frac{y}{x}$, including zero or undefined when required.



Reduce the standard-position rotation $\theta = 7\frac{\pi}{6}$ only as needed, then determine its terminal quadrant and acute reference angle. If it is an axis ray, say so explicitly.

Reduce the standard-position rotation $\theta = 11\frac{\pi}{4}$ only as needed, then determine its terminal quadrant and acute reference angle. If it is an axis ray, say so explicitly.

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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: $\theta = 2\frac{\pi}{3}$ For negative x-axis ray with $x < 0, y = 0$, classify the signs of sine, cosine, and tangent. Derive them from y, x, and $\frac{y}{x}$, including zero or undefined when required. <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 25%;">Given evidence</th> <th style="width: 25%;">Sine</th> <th style="width: 25%;">Cosine</th> <th style="width: 25%;">Tangent</th> </tr> </thead> <tbody> <tr> <td>$x < 0, y = 0$</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> </tbody> </table> Your response: _____	Given evidence	Sine	Cosine	Tangent	$x < 0, y = 0$	_____	_____	_____	Incoming: $\theta = 7\frac{\pi}{6}$ Intersect the constraints $\sin \theta = 0, \cos \theta > 0$. State every possible terminal location, distinguishing axes from open quadrants, or prove the conditions inconsistent. Your response: _____
Given evidence	Sine	Cosine	Tangent						
$x < 0, y = 0$	_____	_____	_____						
Incoming: $5\frac{\pi}{6}$ Intersect the constraints $\sin \theta > 0, \cos \theta > 0$. State every possible terminal location, distinguishing axes from open quadrants, or prove the conditions inconsistent. Your response: _____	Incoming: quadrant I Construct every angle in $[0, 4\pi)$ whose acute reference angle is $\frac{\pi}{3}$ and whose terminal ray is in quadrant III. Respect both endpoint flags and include all admitted turns. Your response: _____								

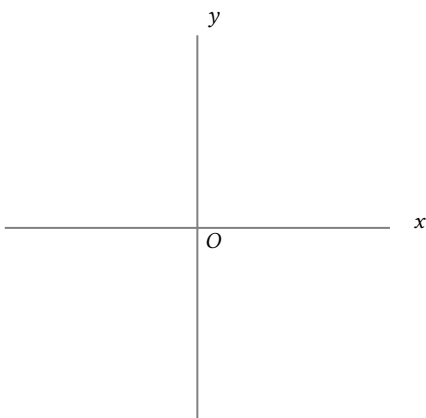
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Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Assume $0 < \alpha < \frac{\pi}{2}$. Rewrite $\cos(3\pi - \alpha)$ using $\cos \alpha$ only, and justify the sign from the terminal coordinates rather than evaluating α . First select and justify the valid method. Method A: Reduce $3\pi - \alpha$ to $\pi - \alpha$ and use the reflected x -coordinate. Method B: Cancel 3π as though it were an integer multiple of a full turn.



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Full Worked Solutions - excerpt

Worked example

Problem. Assume $0 < \alpha < \frac{\pi}{2}$. Rewrite $\sin(3\pi - \alpha)$ using $\sin \alpha$ only, and justify the sign from the terminal coordinates rather than evaluating α .

Answer. $\sin(3\pi - \alpha) = \sin \alpha$

Explanation and check.

The reference magnitude is $\sin \alpha$; reduce to $\pi - \alpha$ in quadrant II. Therefore $\sin(3\pi - \alpha) = \sin \alpha$.

Worked example

Problem. Assume $0 < \alpha < \frac{\pi}{2}$. Rewrite $\tan(2\pi - \alpha)$ using $\tan \alpha$ only, and justify the sign from the terminal coordinates rather than evaluating α .

Answer. $\tan(2\pi - \alpha) = -\tan \alpha$

Explanation and check.

The reference magnitude is $\tan \alpha$; quadrant IV has opposite coordinate signs. Therefore $\tan(2\pi - \alpha) = -\tan \alpha$.