Sets & Steps
Math Practice & Worked Solutions

AP Precalculus

Trig Ratios from Triangles and Coordinates

Trig Ratios from Triangles and Coordinates | APPC-U03-P03

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for exact coordinate ratios, radius and three ratios, selected exact ratios, scale, ray relation, and ratio behavior, domain and ratio comparison and ray directions and quotient behavior.

8 PDFs and a README; 112 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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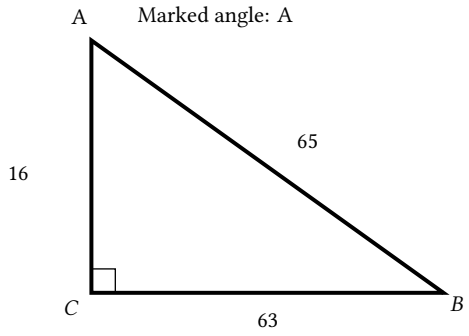
Name: _____ **Date:** _____ **Class:** _____

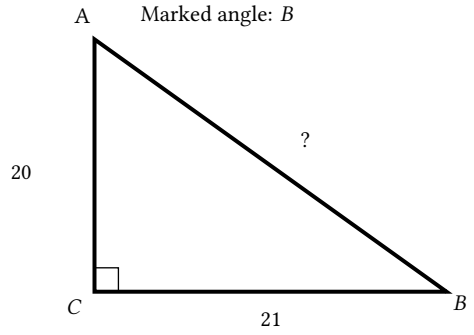
Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

In right triangle ABC, $\angle C = 90^\circ$, AC = 16, BC = 63, and AB = 65. The marked angle is $\angle$A; the drawing may be rotated. Identify the opposite, adjacent, and hypotenuse sides relative to $\angle$A, then write its sine, cosine, and tangent.



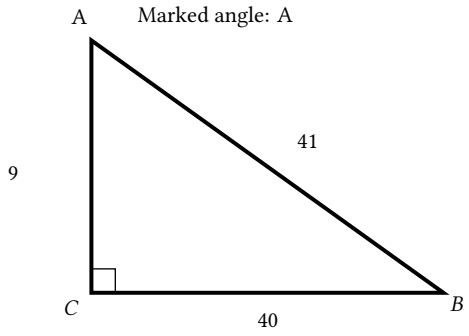
Bank label: _____

Right triangle ABC has $\angle C = 90^\circ$, AC = 20, BC = 21, and marked angle $\angle B$. First recover AB, then use the side roles relative to $\angle B$ to find sine, cosine, and tangent.



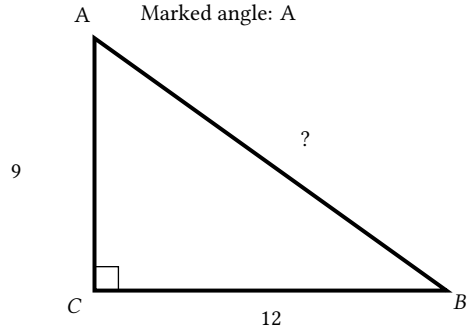
Bank label: _____

In right triangle ABC, $\angle C = 90^\circ$, AC = 9, BC = 40, and AB = 41. The marked angle is $\angle$A; the drawing may be rotated. Identify the opposite, adjacent, and hypotenuse sides relative to $\angle$A, then write its sine, cosine, and tangent.



Bank label: _____

Right triangle ABC has $\angle C = 90^\circ$, AC = 9, BC = 12, and marked angle $\angle$A. First recover AB, then use the side roles relative to $\angle$A to find sine, cosine, and tangent.



Bank label: _____

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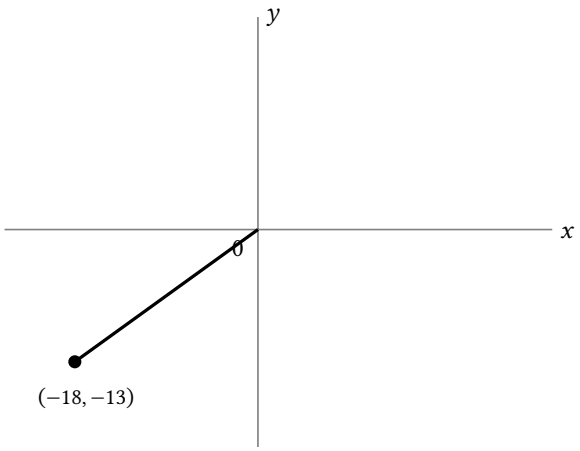
Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

A graphed ray starts at the origin and passes through $(-18, -13)$. Find its slope and interpret that quotient as $\tan\theta$ for the ray's directed angle.



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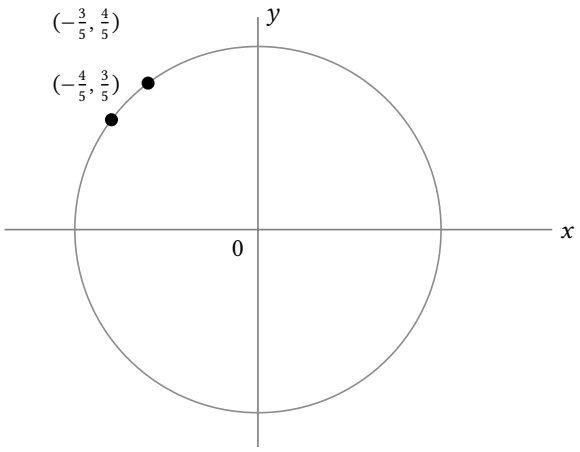
Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

START

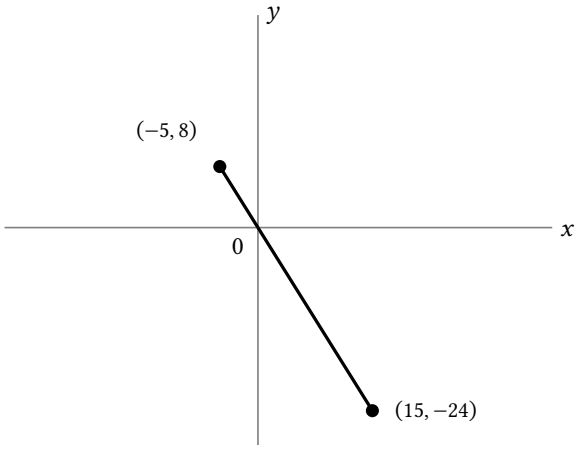
A unit-circle point moves along the shorter counterclockwise arc in the second quadrant from $\left(-\frac{3}{5}, \frac{4}{5}\right)$ to $\left(-\frac{4}{5}, \frac{3}{5}\right)$. Describe the endpoint changes in sine and cosine and compare the initial and final tangent ratios.



Your response: _____

Incoming: sin: $\frac{4}{5} \to \frac{3}{5}$; cos: $-\frac{3}{5} \to -\frac{4}{5}$; tan: $-\frac{4}{3} \to -\frac{3}{4}$

Rays OP and OQ pass through $P = (-5, 8)$ and $Q = (15, -24)$. Compare their directions, slopes, and tangent values. Explain what slope loses that sine and cosine would retain.



Your response: _____

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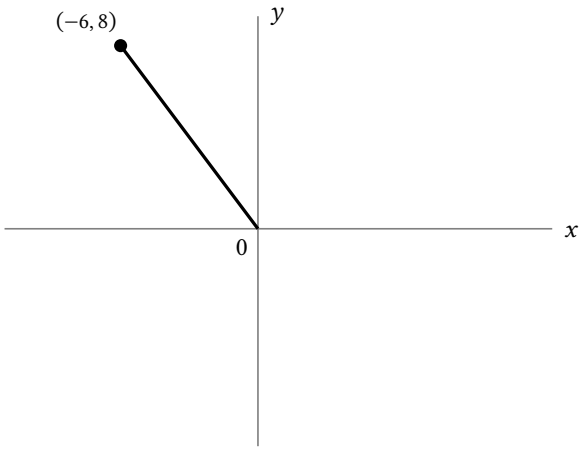
Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

For ray point $(-6, 8)$, a student assigns a negative radius because a coordinate is negative. Diagnose the error, state the correct r, and repair sine and cosine.



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Full Worked Solutions - excerpt

Worked example

Problem. The only information about a nonzero terminal ray is $\tan\theta = -\frac{7}{4}$. Describe the ray or rays that are determined, give representative point(s), and explain the scale or sign ambiguity that remains.

Answer. Two opposite rays, represented by $(4,-7)$ and $(-4,7)$; any positive scaling on either ray also works.

Explanation and check.

Tangent fixes $\frac{y}{x}$, so it fixes a line through the origin but not which of the two opposite rays or the radial scale.

Worked example

Problem. Can a real nonzero ray satisfy $\sin\theta = \frac{6}{5}$ under the coordinate definition? Decide and prove the conclusion using $|\text{coordinate}| \le r$.

Answer. No real ray satisfies the claim.

Explanation and check.

For every real point, the magnitude of the relevant coordinate is at most r, so $|\sin\theta| \le 1$. Here $\left|\frac{6}{5}\right| > 1$, a contradiction.