Sets & Steps
Math Practice & Worked Solutions

Precalculus

Parametric Tables, Elimination & Lines | 3-Topic Precalculus Bundle

3-topic bundle | 288 problems | Four activity formats

---

01 Parametric Tables and Curve Tracing

View individual product and its full preview

02 Eliminating Parameters and Reparameterizing Curves

View individual product and its full preview

03 Parametric Equations of Lines

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; 345 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.

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.

Published by Tusils LLC.

Sets & Steps
Math Practice & Worked Solutions

AP Precalculus

Parametric Tables and Curve Tracing

Parametric Tables and Curve Tracing | APPC-U04-P01

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for equal x and equal y input pairs, filled table, repeated point, equal-y pair, (t,x,y) table, ordered triples, anchor order and repeated-point times and vertex order and closure.

8 PDFs and a README; 157 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.

Published by Tusils LLC.

AP Precalculus

Parametric Tables and Curve Tracing

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.

For $x = t + 3$ and $y = t^2 - 1$, complete the (t, x, y) rows for $t = -1, 0, 2$.

Bank label: _____

Find the common parameter domain of $x = \sqrt{t + 2}$ and $y = \frac{1}{t-1}$.

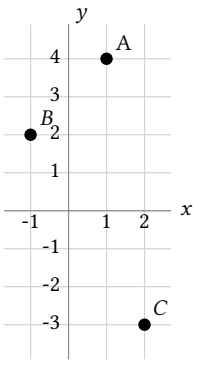
Bank label: _____

For $x = \cos t, y = \cos(2t)$ on $0 \le t \le 2\pi$, find every visit to $(0, -1)$.

Bank label: _____

A unit-scale plane trace labels $t = -2$ at $(1, 4)$, $t = 0$ at $(-1, 2)$, and $t = 3$ at $(2, -3)$. Write the corresponding component table.

Supplied labeled points



Given points only; connections between labels are unspecified here.
A: $t = -2(1, 4)$
B: $t = 0(-1, 2)$
C: $t = 3(2, -3)$

Bank label: _____

AP Precalculus

Parametric Tables and Curve Tracing

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.

Connect consecutive table points by straight segments for increasing t. List the vertex order and decide whether the path closes.

Required response

t	x	y
0	1	0
1	0	2
2	-1	0
3	0	-2
4	1	0

For $x = t^2 - 1, y = t^2$ on $-2 \le t \le 2$, find every t that visits $(0, 1)$. What causes the repeat?

AP Precalculus

Parametric Tables and Curve Tracing

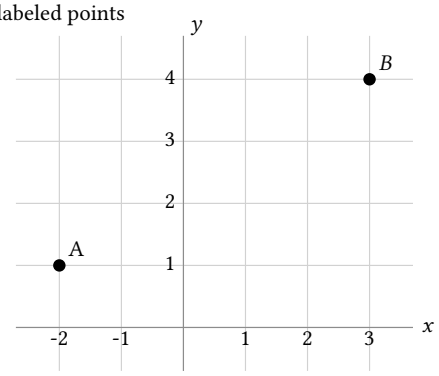
Name: _____ **Date:** _____ **Class:** _____

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

A trace labels $t = 0$ at $(-2, 1)$, $t = 2$ at $(3, 4)$, and $t = 5$ again at $(-2, 1)$. Write the component rows and identify the repeated visit.

Supplied labeled points



Given points only; connections between labels are unspecified here.
A: $t = 0 (-2, 1)$
B: $t = 2 (3, 4)$
A: $t = 5 (-2, 1)$

Your response: _____

Incoming: Rows are $(0, -2, 1), (2, 3, 4), (5, -2, 1)$. The point $(-2, 1)$ is visited at both $t = 0$ and $t = 5$.

Connect consecutive samples in increasing t. Give the point sequence and identify any repeated location.

Required response

t	x	y
0	0	0
1	2	1
2	0	0
3	−1	2

Your response: _____

Incoming: The sequence is $(0, 0) \to (2, 1) \to (0, 0) \to (-1, 2)$. The origin is visited at $t = 0$ and $t = 2$.

Build the paired table for $x = t + 1$ and $y = 2t$ at $t = -2, 0, 3$.

Your response: _____

Incoming: [[−2, −1, −4], [0, 1, 0], [3, 4, 6]]

Determine the joint domain, identify the two denominator holes, and evaluate each attained outer boundary point. Work with -5≤t≤5. Restrict the parameter to [-5,5]. Use x=√((t+1)(t-4))/(t-5). Use y=ln(6-t)/(t+3).

Your response: _____

AP Precalculus

Parametric Tables and Curve Tracing

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 $x = t^2$ and $y = 2t - 1$, a student writes rows $(0, 0, 1), (1, 1, 3), (2, 4, -1)$. Identify the pairing error and give the correct table.

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

t	x	y
0	0	1
1	1	3
2	4	-1

A student claims: "At $t = 0$ record $y = 0$, so all four requested rows are valid." Diagnose the first invalid step or assumption, give the corrected conclusion, and justify the correction. Then complete or verify the underlying task: Build the paired table for $x = t^2 - 3t, y = \frac{4}{t}$ at $t = -2, 0, 2, 4$, marking invalid inputs.

Parametric Tables and Curve Tracing

Full Worked Solutions - excerpt

Worked example

Problem. Build the (t, x, y) table for $x = |t| - 1, y = t^2 - 4$ at $t = -2, -1, 1, 3$. Identify any repeated plane point.

Answer. Rows are $(-2, 1, 0), (-1, 0, -3), (1, 0, -3), (3, 2, 5)$. The point $(0, -3)$ repeats at $t = -1$ and $t = 1$.

Explanation and check.

Both components are even in t on the paired ± 1 inputs, so those two rows have the same x and y outputs.

Worked example

Problem. For $x = (t - 1)(t + 1), y = (t - 2)(t + 1)$, find all visits to $(0, 0)$ on $-2 \le t \le 3$.

Answer. Only t = -1 visits $(0, 0)$.

Explanation and check.

$x = 0$ at $t = -1$ or 1, while $y = 0$ at $t = -1$ or 2. The only common root is -1.

Sets & Steps
Math Practice & Worked Solutions

AP Precalculus

Eliminating Parameters and Reparameterizing Curves

Eliminating Parameters and Reparameterizing Curves | APPC-U04-P02

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for covered old t-values and missing branch, parametric pair and parameter domain, pair and mixed t-domain, pair and parameter domain, relation and exact missing point and two exact set differences.

8 PDFs and a README; 63 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.

Published by Tusils LLC.

AP Precalculus

Eliminating Parameters and Reparameterizing Curves

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.

Both pairs eliminate to the same familiar relation. Are their actual images equal?

Work on the domain $t \in \mathbb{R}$; $s \in \mathbb{R} \setminus \{0\}$.

The first parametrization is $x = t$; $y = t^2$.

The second parametrization is $x = \frac{1}{s}$; $y = \frac{1}{s^2}$.

Bank label: _____

Eliminate t from the two affine component rules.

Work on the domain all real t.

The x-coordinate satisfies $x = t - 4$.

The y-coordinate satisfies $y = 2t + 3$.

Bank label: _____

Eliminate t and keep the branch restriction.

Work on the domain $t \geq 0$.

The x-coordinate satisfies $x = t^2$.

The y-coordinate satisfies $y = t - 3$.

Bank label: _____

Eliminate t and describe the traced half of the locus with a Cartesian inequality.

Work on the domain $\frac{\pi}{3} \leq t \leq 4\frac{\pi}{3}$.

The endpoints is $((1, \frac{\sqrt{3}}{2}), (-1, -\frac{\sqrt{3}}{2}))$.

The x-coordinate satisfies $x = 2\cos t$.

The y-coordinate satisfies $y = \sin t$.

Required response

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

Bank label: _____

AP Precalculus

Eliminating Parameters and Reparameterizing Curves

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.

Use $t = -s$ to reparameterize the curve without changing its point set. Give the required s-domain and compare direction.

Work on the domain $-2 \le t \le 1$.

Use the parameter substitution $t = -s$.

The original parametrization is $x = t$; $y = t^2$.

Compare the point set, orientation, and number of visits for the two descriptions.

Work on the domain $0 \le t \le 2\pi$ and $0 \le s \le 2\pi$.

The first parametrization is $x = \cos t$; $y = \sin t$.

The second parametrization is $x = \cos(2s)$; $y = \sin(2s)$.

Use $t = y$, not $t = x$, to parametrize the restricted graph. Derive $x(t)$ and verify the supplied y-range.

Work on the domain $-1 \le x \le 3$.

The observed y range is $[-2, \frac{2}{5}]$.

The relation is $y = \frac{x-1}{x+2}$.

Eliminate t and identify the algebraic-locus point that is excluded by the strict bound.

Work on the domain $0 < t \le 3$.

The x-coordinate satisfies $x = t^2$.

The y-coordinate satisfies $y = t + 1$.

Eliminate t and state how much of the locus is covered.

Work on the domain $0 \le t \le 2\pi$.

The x-coordinate satisfies $x = 4 \sin t$.

The y-coordinate satisfies $y = 4 \cos t$.

Eliminate t and distinguish the two horizontal-axis endpoint statuses.

Work on the domain $\pi < t \le 2\pi$.

The x-coordinate satisfies $x = 2 \cos t$.

The y-coordinate satisfies $y = 2 \sin t$.

AP Precalculus

Eliminating Parameters and Reparameterizing Curves

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: They have the same image $y = x^2$ for $-1 \le x \le 1$. The first crosses it once from left to right; the second goes left-to-right and then right-to-left.

Eliminate t from the affine pair and state the x-domain.

Work on the domain all real t.

The x-coordinate satisfies $x = 2t - 1$.

The y-coordinate satisfies $y = t + 4$.

Your response: _____

Incoming: $x^2 + y^2 = 1$ with $x + y > 0$.

Eliminate t and retain the coordinate interval created by the asymmetric parameter bounds.

Work on the domain $-2 \le t \le 4$.

The x-coordinate satisfies $x = |t - 1|$.

The y-coordinate satisfies $y = t + 2$.

Your response: _____

Incoming: $x^2 + y^2 = 1$ with $x \ge 0$ and $y \ge 0$, including $(0, 1)$ and $(1, 0)$.

Do the two descriptions have the same image, and do they trace it in the same way?

Work on the domain $-1 \le t \le 1$ and $-\frac{\pi}{2} \le s \le 3\frac{\pi}{2}$.

The first parametrization is $x = t$; $y = t^2$.

The second parametrization is $x = \sin s$; $y = \sin^2 s$.

Your response: _____

Incoming: $x = -2$ with $-1 < y \le 8$.

Repair the student's $\pm$ choice and test the supplied extra point against the original rules.

Work on the domain $t \ge 0$.

Evaluate this student result: $y = \pm\sqrt{x} - 1$.

Check the point $(4, -3)$.

The x-coordinate satisfies $x = t^2$.

The y-coordinate satisfies $y = t - 1$.

Your response: _____

Incoming: $x = t + 2, y = \frac{1}{t}$ on $1 \le t \le 4$.

Eliminate t and identify the branch restriction inherited from $t \le 1$.

Work on the domain $t \le 1$.

The x-coordinate satisfies $x = (t - 1)^2$.

The y-coordinate satisfies $y = t + 2$.

Your response: _____

Incoming: The new pair is $x = s^3 - s, y = s^3 - s + 1$ and has the same point set. Its t-image is $[-\frac{2}{3\sqrt{3}}, \frac{2}{3\sqrt{3}}]$; $t = 0$ occurs at $s = -1, 0, 1$, and each nonzero interior t-value is attained twice within the interval.

Eliminate t without dropping either sign of the original parameter.

Work on the domain $-2 \le t \le 2$.

The x-coordinate satisfies $x = t^2$.

The y-coordinate satisfies $y = 2t + 1$.

Your response: _____

AP Precalculus

Eliminating Parameters and Reparameterizing Curves

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.

Repair the student's elimination and use the supplied point to expose the extra branch.

Work on the domain $t < 0$.

The original parametrization is $x = t^2$; $y = t$.

Evaluate this student result: $x = y^2$ with both signs of y.

Check the point $(1, 1)$.

Repair the canceled expression result and use the supplied point to show why the domain matters.

Work on the domain $t \in \mathbb{R}, t \neq 1$.

Evaluate this student result: $y = x + 1$ for every real x.

Check the point $(1, 2)$.

The x-coordinate satisfies $x = t$.

The y-coordinate satisfies $y = \frac{t^2-1}{t-1}$.

Eliminating Parameters and Reparameterizing Curves

Full Worked Solutions - excerpt

Worked example

Problem. Eliminate t from $x = t + 2, y = 3t - 1$ and state the x-domain.

Answer. y = $3x - 7$ for all real x.

Explanation and check.

From $x = t + 2, t = x - 2$. Substitution into y gives $3(x - 2) - 1 = 3x - 7$.

Worked example

Problem. Introduce a parameter for $y = x^2 - 3$ restricted to $-2 \le x \le 1$, and verify coverage.

Answer. x = $t, y = t^2 - 3$ with $-2 \le t \le 1$.

Explanation and check.

Choosing the free x-coordinate as t transfers the x restriction directly to t and reaches each permitted x once.

Sets & Steps
Math Practice & Worked Solutions

AP Precalculus

Parametric Equations of Lines

Parametric Equations of Lines | APPC-U04-P05

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for domain, interval notation, closed interval, interval, inequality and sufficiency statement and family.

8 PDFs and a README; 125 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.

Published by Tusils LLC.

AP Precalculus

Parametric Equations of Lines

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 a normal direction of the reference line to parametrize the perpendicular line through the point. point: $[3, -2]$; reference line: $x - 2y = 7$; required relation: perpendicular.

Bank label: _____

AP Precalculus

Parametric Equations of Lines

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.

Write parametric equations for the line through the point with the given direction. direction: $[3, 4]$; point: $[2, -1]$.	State the parameter interval that produces the full supporting line.
Determine whether changing both the anchor and direction scale changed the geometric line. domains: t and s real; first: $(x, y) = (-2 + t, 4 + 3t)$; second: $(x, y) = (1 + 2s, 13 + 6s)$.	Use the given direction angle and scale to parametrize the full line from the marked point. coordinate speed: 2; direction angle degrees: 150; point: $[1, 1]$.

AP Precalculus

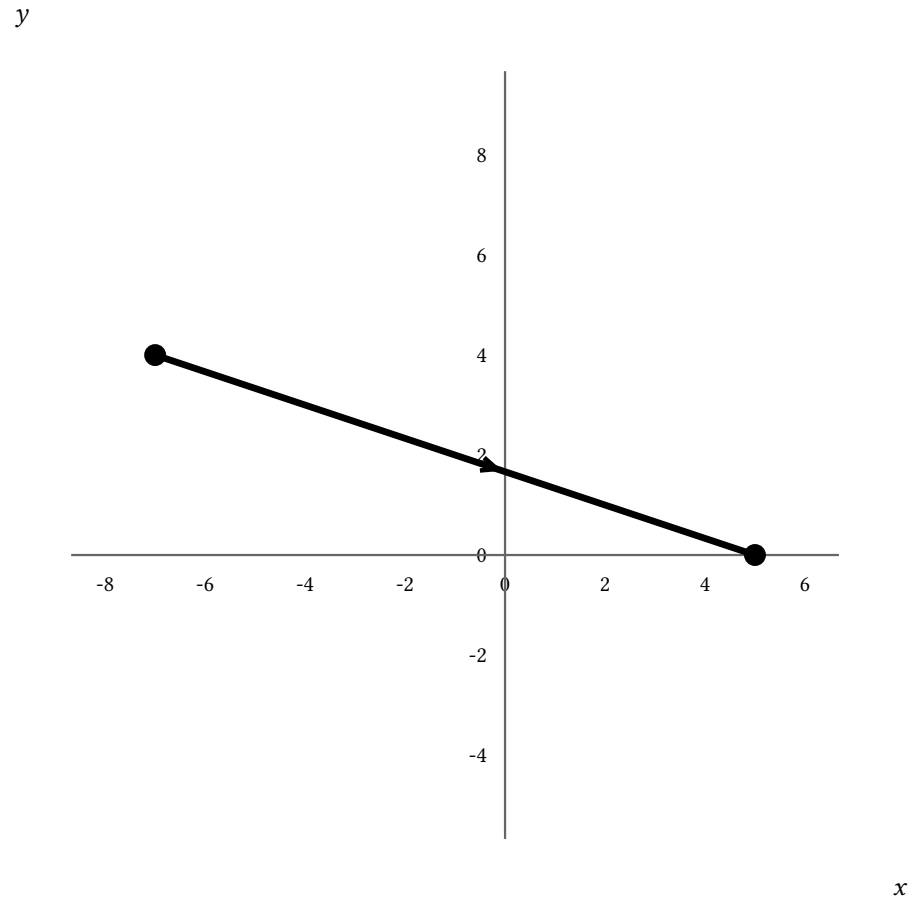
Parametric Equations of Lines

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 = 2 and $b = 4$

Choose the t-values that trace exactly the highlighted closed segment. endpoint membership: both included; endpoint parameters: $[-2, 2]$; map: $x = 3t - 1, y = 2\text{-}t$; domain: to be selected.



Your response: _____

AP Precalculus

Parametric Equations of Lines

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.

The student interchanged point coordinates and direction components. Repair the parametrization. required direction: $[3, 1]$; required point: $[4, -2]$; student map: $x = 3 + 4t, y = 1 - 2t$.

The rates are right but the clock origin is not. Repair the student's timed segment. required: $(1, 4)$ at $t = 2$ and $(7, 1)$ at $t = 5$; student map: $x = 1 + 2t, y = 4 - t, 0 \le t \le 3$.

Parametric Equations of Lines

Full Worked Solutions - excerpt

Worked example

Problem. Find a parameter-free equation for the line image. map: $x = -3 + 2t, y = 5 + 5t$; domain: t real.

Answer. $5x - 2y = -25$

Explanation and check.

The combination $5(-3 + 2t) - 2(5 + 5t)$ is constantly -25.

Worked example

Problem. Give an affine parametrization of this horizontal line. equation: $y = -7$; domain: full line.

Answer. x = $t, y = -7$, with t real.

Explanation and check.

Let x vary freely while y remains equal to -7.