Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Contextual Domains & Piecewise Graphs | Algebra 1 | 4-Topic Bundle

4-topic bundle | 384 problems | Four activity formats

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01 **Domain in Context**

View individual product and its full preview

02 **Comparing Function Representations**

View individual product and its full preview

03 **Absolute Value and Piecewise Function Models**

View individual product and its full preview

04 **Interpreting Piecewise Linear Graphs**

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.

32 PDFs and 4 READMEs; 276 buyer PDF pages across the 4 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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Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Domain in Context

Domain in Context | A1-U04-P07

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for justified feasible input set and domain type.

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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Algebra 1

Domain in Context

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.

For a runner, t is the exact elapsed time in seconds after the starting signal. Classify the domain of t and give two admissible values. Bank label: _____	A cyclist's route coordinate is d kilometers from the start. The modeled segment begins at 3 km and ends just before a rest stop at 27 km. State the domain. Bank label: _____
Let m be the number of text messages received during an afternoon. Identify the natural domain kind. Bank label: _____	Water volume in a rectangular aquarium is $V(h) = 1800h$ cubic centimeters. The interior height is 32 cm. Restrict water depth h. Bank label: _____
A banquet hall records g, the number of guests who enter. Is the natural domain of g discrete or continuous? Give two possible inputs. Bank label: _____	The hours per worker are $h(n) = \frac{96}{n}$ when n workers share a job. At most 24 whole workers can be assigned. Find n's domain. Bank label: _____
A dispatcher uses b for the number of buses currently at a school. Decide whether b is discrete or continuous and illustrate. Bank label: _____	A yard uses n whole 2.5-m fence panels. At least $15m$ and at most $32m$ of fence are wanted. Find all feasible n. Bank label: _____

Algebra 1

Domain in Context

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.

During preheating, T is the oven's exact temperature in degrees Celsius. What kind of domain should T have?	Concert profit is $P(n) = 18n - 2400$, where n is attendance and the hall seats 350. The rule allows a loss. State the contextual domain.
A reading log defines p as the number of full pages completed. Is p naturally discrete or continuous?	An arch height is $H(x) = \sqrt{(196 - x^2}$), where x is horizontal distance from the center. Only the section with $x \geq -9$ and $x < 12$ is open to inspection. Restrict x.
A materials trial is valid from 15°C through 85°C inclusive. Let T be the controlled temperature. State its domain and kind.	A fountain model is $h(t) = \sqrt{72 - 8t}$ meters. It is observed from $t = 2$ seconds onward while the radicand remains nonnegative. Restrict t.

Algebra 1

Domain in Context

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: Garden width has domain $4 \le w \le 22$ meters.

A test is valid for $-10 < C \le 35$ degrees Celsius. Using $F = 1.8C + 32$ as the new input scale, find the Fahrenheit domain.

Your response: _____

Incoming: Fahrenheit input has domain $14 < F \le 95$.

Fence length remaining is $L(n) = 244 - 8n$ feet after n equal panels are placed. At least 20 feet must remain for a gate area. Restrict whole panel count n.

Your response: _____

Incoming: Midnight-based input has domain $9 \le k < 17$.

A rectangle has perimeter $52m$, so its length is $26\text{-}w$ when width is w. Both side lengths must be at least $4m$. Restrict w.

Your response: _____

Incoming: Brace input has domain $5 < x < 14$.

A square tile area A may be any real value with $9 < A \le 81$ square centimeters. The input is changed to side length $s = \sqrt{A}$. Find s's domain.

Your response: _____

Incoming: Grain-sack input has domain n in $\{0, 1,...,32\}$.

A package contains 4 tickets and costs $54. A buyer needs at least 18 tickets and has at most $310. If p is the package count, find p's domain.

Your response: _____

Incoming: Pool-filling time has domain $0 \le t \le 9$ hours.

A triangle model uses base b and height 12-b, with A(b)=b(12-b)/2. Both lengths must be positive. Restrict b.

Your response: _____

Algebra 1

Domain in Context

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 room-capacity model uses c, the number of chairs set out, but proposes domain $-5 \le c \le 40$. Diagnose and repair it.

A graph of $N(t)$, completed repairs by time t, uses slanted segments between completion times $1.5, 4$, and 6.2 hours. Repairs count only when finished. Diagnose and replace the graph behavior.

A vending controller accepts prices entered to the cent from $\$0.50$ to $\$5.00$, but its proposed domain is the full interval $[0.50, 5.00]$. Repair it.

A weather model covers $6{:}00a.m.$ through noon, but a graph restricts time to $\{6, 8, 10, 12\}$ because those were measurement hours. Audit the graph.

Domain in Context

Full Worked Solutions - excerpt

Worked example

Problem. For a runner, t is the exact elapsed time in seconds after the starting signal. Classify the domain of t and give two admissible values.

Answer. Runner time t has a continuous domain; 0 and 4.73 seconds are admissible values.

Explanation and check.

Exact elapsed time can take intermediate real values, not only the displayed whole seconds.

Worked example

Problem. A cyclist's route coordinate is d kilometers from the start. The modeled segment begins at 3 km and ends just before a rest stop at 27 km. State the domain.

Answer. Modeled route position has domain $3 \le d < 27$ kilometers.

Explanation and check.

The segment includes its 3-km reference point but excludes the rest-stop position.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Comparing Function Representations

Comparing Function Representations | A1-U04-P08

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for coordinated function representation with justification and written qualitative graph description from the given process.

8 PDFs and a README; 57 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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Algebra 1

Comparing Function Representations

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.

A table lists boundary values $(-3, 10)$ and $(5, -6)$ for a line, plus an interior row $(1, 2)$. The domain is $-3 < x < 5$ except $x = 2$. Supply every open mark required.

Bank label: _____

List the ordered pairs for $s(x) = x^2 + 1$ when $x = -4, -2, 0, 3$, and 5.

Bank label: _____

Data at $x = 0, 2$, and 5 give 3, 7, and 13. Two candidates, $2x + 3$ and $2|x| + 3$, both fit. A new row is $(-4, -5)$. What follows?

Bank label: _____

Every allowed input-output pair is $(-6, -9), (-2, -1), (3, 9)$, and $(8, 19)$. They are collinear. Decide graph form.

Input	Output
-6	-9
-2	-1
3	9
8	19

Bank label: _____

Algebra 1

Comparing Function Representations

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.

For $f(x) = 3x - 4$, a table has output 8 in one blank row and output -10 in another. Recover both inputs.

Functions $f(x) = \frac{2x+2}{x+1}$ and $g(x) = 2$ are both declared on all real x except -1. Is their equality established despite the hole?

A table gives $(-1, 0)$, $(0, 2)$, and $(2, 6)$. Test candidates $2x + 1$, $x + 2$, and $x^2 + 2$. Is any consistent with every row?

Input	Output
-1	0
0	2
2	6

Data at $x = -1, 0, 1$ are $1, 0, 1$. A solution says these rows prove the unrestricted rule is x^2 rather than $|x|$. Diagnose the reasoning.

Input	Output
-1	1
0	0
1	1

For $F(x) = (x - 3)^2 - 5$, construct an ordered table at $x = -1, 1, 3, 6,$ and 8.

A table for $y = \frac{12}{x-1}$ has output -4 and a blank input. Its declared domain is $\{-5, -2, 0, 2, 4\}$. Recover the row and verify membership.

Algebra 1

Comparing Function Representations

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: The valid table is $\{(-5, 0), (-4, 3), (-3, 4), (0, 5), (3, 4), (4, 3), (5, 0)\}$; $x = 1$ is excluded by the declared finite domain.

Function A is $A(x) = 9\text{-}x^2$ on $[-2, 3]$. Function B's complete table has highest output 8. Compare maximum values.

Your response: _____

Incoming: A's maximum is 9 at $x = 0$, so A exceeds B's maximum 8 by 1.

A partial table for $a(x) = |x - 4|$ omits the row at the graph's vertex input. Add it.

Your response: _____

Incoming: The data select y = $-2x + 6$.

A function follows $S(x) = \sqrt{(}25\text{-}x^2)$ on the declared domain $\{-5, -4, -3, 0, 3, 4, 5\}$. A request also includes $x = 1$. Write the complete valid table and address $x = 1$.

Your response: _____

Incoming: The missing inputs are x = -7 and $x = 3$, giving pairs $(-7, 5)$ and $(3, 5)$.

A correct graph has points $(-2, 7), (1, 4)$, and $(5, -3)$. A table sorts inputs as $-2, 1, 5$ but copies outputs in graph-reading order $-3, 4, 7$. Repair the table.

Your response: _____

Incoming: Candidate $A, x^2 - 1$, is the only match; the row $x = 1$ gives 0 rather than 2 or 1.

Two unknown real-domain functions both contain $(0, 1), (1, 3)$, and $(2, 5)$. Is that enough to prove they are identical?

Your response: _____

Incoming: The missing pair is $(4, 11)$.

The formula $y = 5\text{-}x$ is restricted to $-1 < x \leq 4$, but its graph uses a closed point at $(-1, 6)$ and an open point at $(4, 1)$. Repair the marks.

Your response: _____

Algebra 1

Comparing Function Representations

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.

Complete the task, then compare the direct table approach with an equivalent check. Explain why both support the same conclusion. A table supplies $(0, 1), (2, 5), (5, 5)$, and $(7, 0)$, with straight-line travel specified between consecutive rows. Give the graph construction.

Input	Output
0	1
2	5
5	5
7	0

A table says time 2 minutes gives distance 9 meters. The graph plots the corresponding point as $(9, 2)$ while time is labeled horizontal. Diagnose it.

Comparing Function Representations

Full Worked Solutions - excerpt

Worked example

Problem. A table lists boundary values $(-3, 10)$ and $(5, -6)$ for a line, plus an interior row $(1, 2)$. The domain is $-3 < x < 5$ except $x = 2$. Supply every open mark required.

Answer. Place open boundary points at $(-3, 10)$ and $(5, -6)$, and an open hole at $(2, 0)$.

Explanation and check.

The rows determine $y = -2x + 4$; both strict bounds are open, and the removed input 2 locates the additional hole at output zero.

Worked example

Problem. List the ordered pairs for $s(x) = x^2 + 1$ when $x = -4, -2, 0, 3$, and 5.

Answer. The square-plus-one table is $\{(-4, 17), (-2, 5), (0, 1), (3, 10), (5, 26)\}$.

Explanation and check.

Square each input first, then add one to obtain the five exact outputs.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Absolute Value and Piecewise Function Models

Piecewise Functions: Modeling | A1-U04-P09

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for verified conditional rule, value, graph, or model.

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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Algebra 1

Absolute Value and Piecewise Function Models

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.

Admission is free for ages under 4, \$5 for ages 4 through 12, and \$9 for ages over 12. Model price $P(a)$ for nonnegative age a. Bank label: _____	A process score starts at 100 and loses 4 points for each degree T differs from the 22°C target. Write the score model. Bank label: _____
Arriving exactly at 9:00 earns 15 points. One point is lost per minute early or late. Let m be signed minutes after 9:00. Model $P(m)$. Bank label: _____	Let $G(x) = x^2$ for $x < -3$, $G(x) = x + 8$ for $-3 \le x \le 2$, and $G(x) = 1\text{-}x$ for $x > 2$. Evaluate $G(-3)$. Bank label: _____
A rule uses $mx + 1$ for $x \le 2$ and the constant 7 for $x > 2$. Find m so both formulas have the same joining value. Bank label: _____	For $F(x) = 2x + 1$ if $x < -2$, $F(x) = 7$ if $-2 \le x < 4$, and $F(x) = x^2$ if $x \ge 4$, find $F(1)$. Bank label: _____
A ranger starts at trail coordinate 6 km and walks at $4\frac{km}{h}$ in either direction. Model travel time to coordinate x. Bank label: _____	Let $s(x) = 4x$ for $x < 5$ and $s(x) = x - 6$ for $x \ge 5$. Find $s(5)$. Bank label: _____

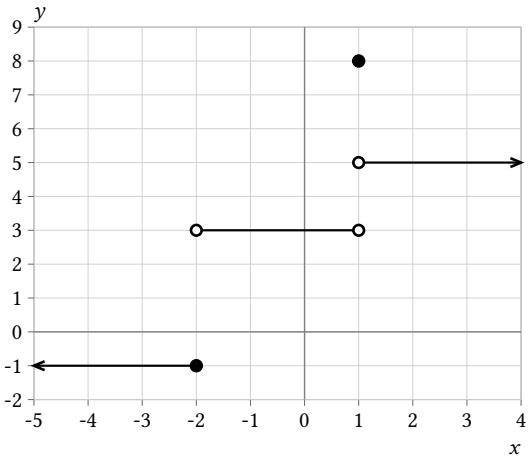
Algebra 1

Absolute Value and Piecewise Function Models

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.

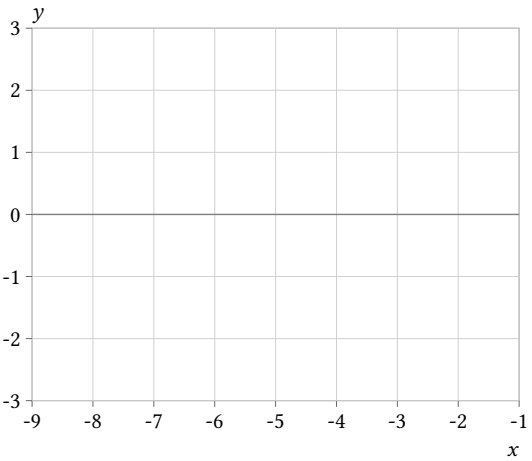
A step graph is $y = -1$ on $x \le -2$, $y = 3$ on $-2 < x < 1$, $y = 8$ only at $x = 1$, and $y = 5$ on $x > 1$. Encode it.



A rule uses $t(x) = 4\text{-}x$ for $x \le 0$ and $t(x) = x + 6$ for $x \ge 0$, producing two outputs at zero. Change only one condition endpoint to make a real-domain function while preserving $t(0) = 4$.

Conditions are $x < -4$, $-4 \le x < 1$, and $x > 1$. If each has one formula, what is the actual domain and what happens at $x = 1$?

Construct $L(x) = -|x + 5| + 2$ only for $x \le -5$.



Algebra 1

Absolute Value and Piecewise Function Models

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: Use $E(T) = 0.2 + 0.05\lvert T - 18\rvert$ for $5 \le T \le 30$. Define $U(x) = x^2 + 2$ for $x < -1, U(x) = 3x$ for $-1 \le x < 4$, and $U(x) = 10\text{-}x$ for $x \ge 4$. Find $U(-2)$ and $U(4)$. Your response: _____	**Incoming:** The requested values are $U(-2) = 6$ and $U(4) = 6$. A function uses $7 - 2x$ for $x \le 4$ and $mx - 5$ for $x > 4$. Determine m for equal values at the join. Your response: _____
Incoming: The delay model is $D(h) = 2\lvert h\rvert$ minutes. A sensor error is 0.2 plus 0.05 per degree away from 18°C, and the sensor is used only for $5 \le T \le 30$. Model error with its domain. Your response: _____	**Incoming:** The alarm index is $A(e) = 1 + 0.04\lvert e - 250\rvert$. A function Q is $x + 1$ on $x < 0$, 4 on $0 < x < 3$, and $x - 2$ on $x \ge 3$. What is $Q(0)$? Your response: _____
Incoming: The value is $v(-6) = 5$. A rule lists $L(x) = x - 1$ for $x \ge 4$ first, then $L(x) = 2x + 3$ for $x < 4$. Evaluate $L(-2)$. Your response: _____	**Incoming:** The required scale is k = 2. Define $J(x) = -x^2$ for $x \le -2$ and $J(x) = 3x + 1$ for $x > -2$. Evaluate $J(-4)$. Your response: _____

Algebra 1

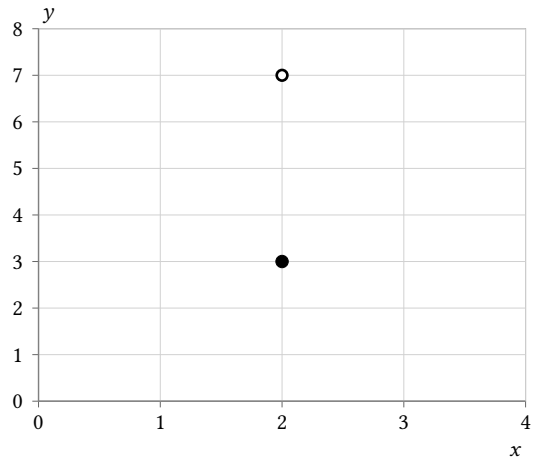
Absolute Value and Piecewise Function Models

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 $f(x) = 2x$ for $x < 3$ and $f(x) = x + 5$ for $x \geq 3$, a student reports $f(3) = 6$. Diagnose and repair.

A graph has an open point $(2, 7)$ from one branch and a closed point $(2, 3)$ from another. A solution states $f(2) = 7$. Correct it.



Absolute Value and Piecewise Function Models

Full Worked Solutions - excerpt

Worked example

Problem. Admission is free for ages under 4, \$5 for ages 4 through 12, and \$9 for ages over 12. Model price $P(a)$ for nonnegative age a.

Answer. Use $P(a) = 0$ for $0 \le a < 4, P(a) = 5$ for $4 \le a \le 12$, and $P(a) = 9$ for $a > 12$.

Explanation and check.

The age thresholds determine three constant branches and both stated equality owners.

Worked example

Problem. A process score starts at 100 and loses 4 points for each degree T differs from the 22 °C target. Write the score model.

Answer. The score is $S(T) = 100 - 4|T - 22|$.

Explanation and check.

Absolute value measures unsigned distance from 22, and the negative rate lowers the baseline score.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Interpreting Piecewise Linear Graphs

Graphing Piecewise-Defined Functions | A1-U04-P12

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for exact behavior intervals, features, construction, or justified conclusion.

8 PDFs and a README; 105 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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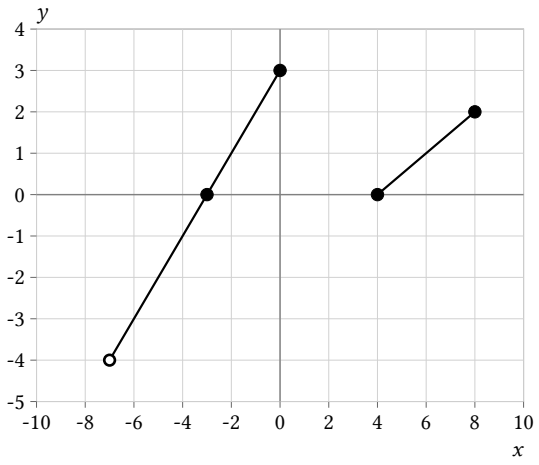
Algebra 1

Interpreting Piecewise Linear Graphs

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

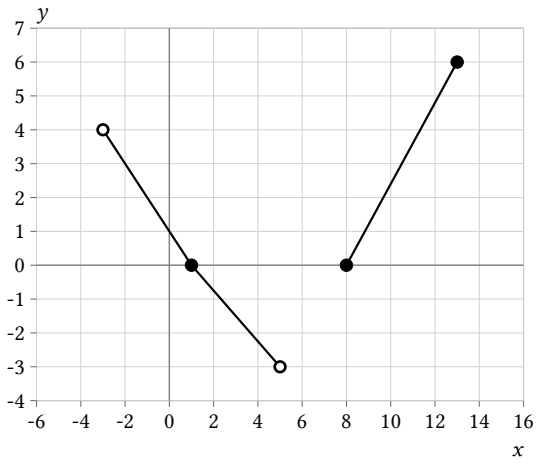
Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Use the stated line segments, not a sketch estimate: component 1: connect $(-7, -4)$ to $(-3, 0)$ to $(0, 3)$; its left endpoint is open and right endpoint is included; component 2: connect $(4, 0)$ to $(8, 2)$; its left endpoint is included and right endpoint is included. List all x-intercepts and the y-intercept, if each exists.



Bank label: _____

Read output sign, not direction of travel, from: component 1: connect $(-3, 4)$ to $(1, 0)$ to $(5, -3)$; its left endpoint is open and right endpoint is open; component 2: connect $(8, 0)$ to $(13, 6)$; its left endpoint is included and right endpoint is included. State where $f(x)$ is positive, negative, and zero.



Bank label: _____

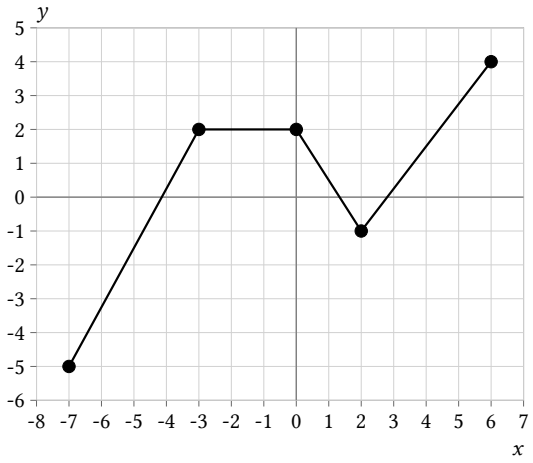
Algebra 1

Interpreting Piecewise Linear Graphs

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 these exact vertices and no points in any domain gap: connect $(-7, -5)$ to $(-3, 2)$ to $(0, 2)$ to $(2, -1)$ to $(6, 4)$; its left endpoint is included and right endpoint is included. List the input intervals where the function is increasing, decreasing, or constant.



The function graph has the following exact connected pieces: connect $(1, 3)$ to $(4, 0)$ to $(8, -5)$; its left endpoint is included and right endpoint is included. List all x-intercepts and the y-intercept, if each exists.

Algebra 1

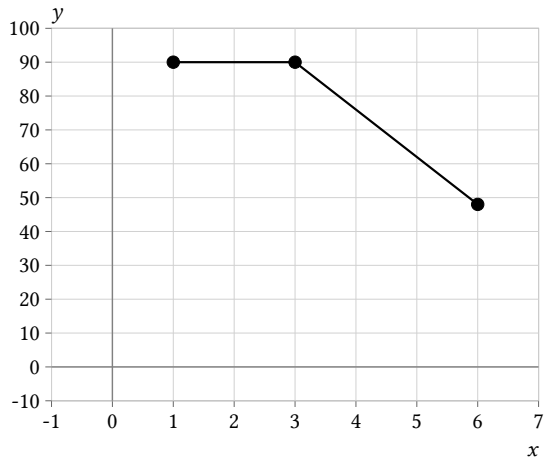
Interpreting Piecewise Linear Graphs

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: The global maximum is 3 at $x = 2$, and the global minimum is -5 at $x = -3$.

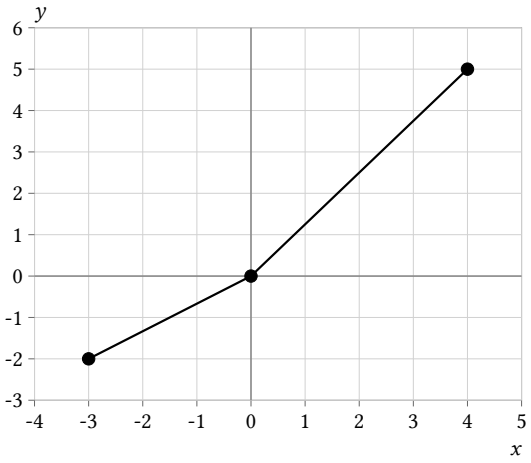
A graph shows inventory $I(d)$ in boxes at the end of day d by connecting $(1, 90), (3, 90), (6, 48)$ in order. Interpret the first segment and the later decrease.



Your response: _____

Incoming: Inventory stays at 90 boxes from day 1 through day 3, then falls to 48 boxes by day 6.

Determine both kinds of axis intercept from this exact graph: connect $(-3, -2)$ to $(0, 0)$ to $(4, 5)$; its left endpoint is included and right endpoint is included. List all x-intercepts and the y-intercept, if each exists.



Your response: _____

Algebra 1

Interpreting Piecewise Linear Graphs

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.

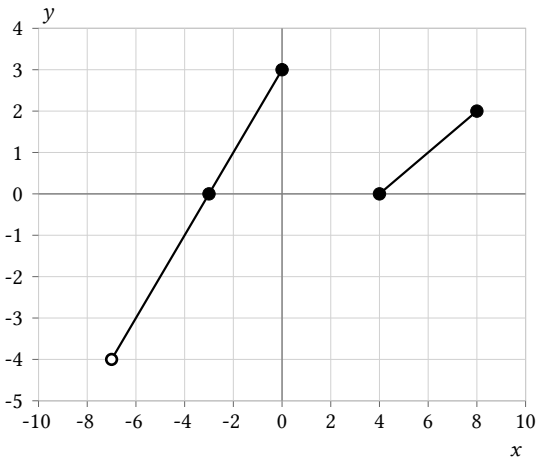
Audit this qualitative analysis: A graph rises from $(-5, -4)$ to $(2, 6)$. A student reports that it increases on $-4 < y < 6$. Correct the claim.

Interpreting Piecewise Linear Graphs

Full Worked Solutions - excerpt

Worked example

Problem. Use the stated line segments, not a sketch estimate: component 1: connect $(-7,-4)$ to $(-3,0)$ to $(0,3)$; its left endpoint is open and right endpoint is included; component 2: connect $(4,0)$ to $(8,2)$; its left endpoint is included and right endpoint is included. List all x-intercepts and the y-intercept, if each exists.



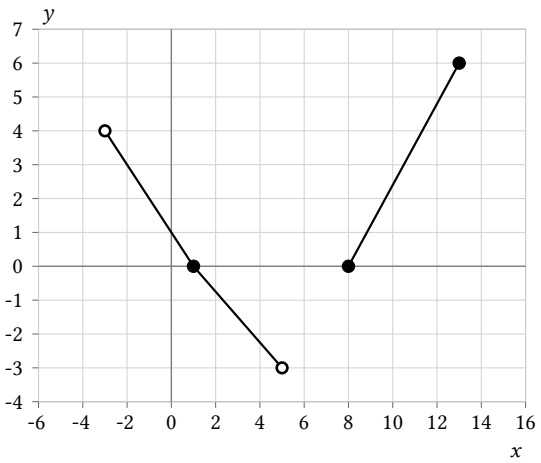
Answer. x-intercept set: $(-3,0),(4,0)$; y-intercept: $(0,3)$. The exact domain is $(-7,0]$ union $[4,8]$.

Explanation and check.

Use the exact segment equations implicit in the listed vertices for crossings, and retain only included points at either axis.

Worked example

Problem. Read output sign, not direction of travel, from: component 1: connect $(-3,4)$ to $(1,0)$ to $(5,-3)$; its left endpoint is open and right endpoint is open; component 2: connect $(8,0)$ to $(13,6)$; its left endpoint is included and right endpoint is included. State where $f(x)$ is positive, negative, and zero.



Answer. Positive on $(-3,1),(8,13]$; negative on $(1,5)$; zero on $x=1, x=8$.

Explanation and check.

Direction of travel is irrelevant here: only being above, on, or below $y=0$ determines positive, zero, or negative output.