

Algebra 1
Functions & Representations Collection | Algebra 1 | 12-Topic Bundle

12-topic bundle | 1,152 problems | Four activity formats

Included topics

The following pages list all 12 included resources in the suggested order, with a link to each product. Each resource retains its complete 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.

96 PDFs and 12 READMEs; 839 buyer PDF pages across the 12 products.

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

Sets & Steps

Math Practice & Worked Solutions

Algebra 1

Included topics

12-topic bundle | 1,152 problems | Four activity formats

01 Relations and Mapping Diagrams

[View individual product and its full preview](#)

02 Is It a Function

[View individual product and its full preview](#)

03 Interpreting Function Notation

[View individual product and its full preview](#)

04 Evaluating Functions from Representations

[View individual product and its full preview](#)

05 Finding Inputs from Function Outputs

[View individual product and its full preview](#)

06 Domain and Range

[View individual product and its full preview](#)

07 Domain in Context

[View individual product and its full preview](#)

08 Comparing Function Representations

[View individual product and its full preview](#)

09 Absolute Value and Piecewise Function Models

[View individual product and its full preview](#)

10 Sequences as Discrete Functions

[View individual product and its full preview](#)

11 Arithmetic Sequence Explicit and Recursive Rules

[View individual product and its full preview](#)

12 included resources | Complete resource previews follow this guide.

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Sets & Steps

Math Practice & Worked Solutions

Algebra 1

Included topics

12-topic bundle | 1,152 problems | Four activity formats

12 Interpreting Piecewise Linear Graphs

[View individual product and its full preview](#)

12 included resources | Complete resource previews follow this guide.

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Algebra 1
Relations and Mapping Diagrams

Relations and Mapping Diagrams | A1-U04-P01

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 chosen method, complete mapping, and a reason rejecting the information-losing method and exact finite relation with representation evidence.
8 PDFs and a README; 75 buyer pages.

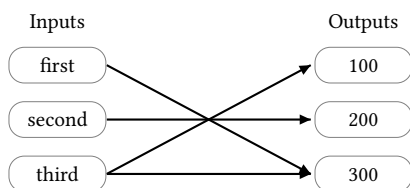
Algebra 1

Relations and Mapping Diagrams

Name: _____ Date: _____ Class: _____

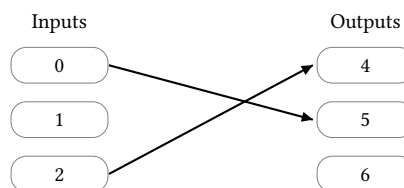
Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Use arrow incidence rather than list position to write the relation.



Bank label: _____

Convert the diagram and name labels that create no pair.



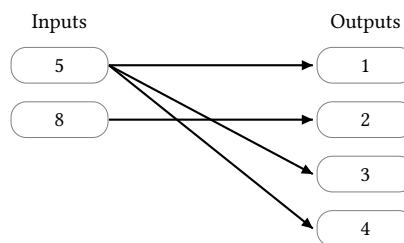
Bank label: _____

List the relation without collapsing rows that share an output.

Input	Output
-3	2
1	2
5	2
7	0

Bank label: _____

Record every destination reached from input 5 and the remaining arrow.



Bank label: _____

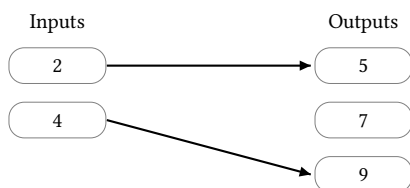
Algebra 1

Relations and Mapping Diagrams

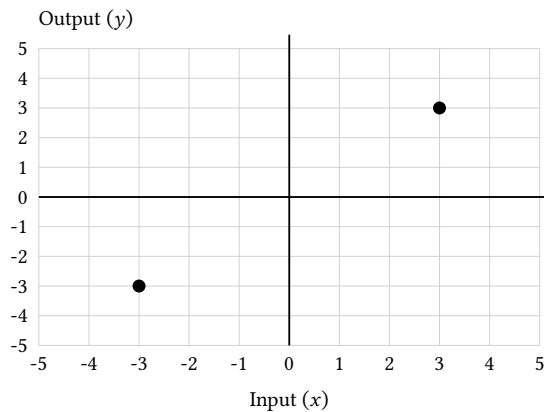
Name: _____ Date: _____ Class: _____

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.

Read the relation and handle the unused output label correctly.



The graph window shows every integer from -5 to 5 on both axes. Which points belong to the relation?



Convert the unsorted rows without *re*-pairing them.

Input	Output
5	9
1	2
3	6

The complete diagram contains labels but no arrows. What relation is represented?



Algebra 1

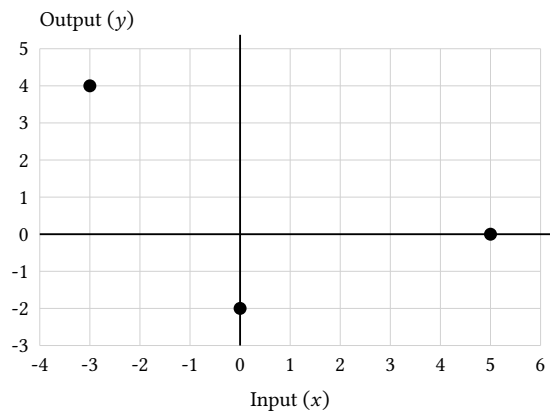
Relations and Mapping Diagrams

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: $\{(7, 3), (2, 8), (7, 5)\}$

An exact plot marks the three listed coordinates. Write its relation.



Your response: _____

Incoming: $\{(-3, 4), (0, -2), (5, 0)\}$

Preserve every association when converting the table.

Input	Output
2	5
2	8
4	9

Your response: _____

Incoming: $\{(1, 4), (3, 7)\}$

Produce the distinct relation from all shown rows.

Input	Output
7	3
2	8
7	5
2	8

Your response: _____

Incoming: $\{(1, 1), (2, 2), (3, 1)\}$

Here null means no association. Form the relation set from the exhaustive rows.

Input	Output
0	-1
0	null
-1	0
-1	0

Your response: _____

Algebra 1

Relations and Mapping Diagrams

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 draft has arrows $1 \rightarrow a$ and $2 \rightarrow b$ for $R = \{(1, a), (1, b), (2, b)\}$. Choose a completion method: A, compare each required pair with the arrows already drawn; or B, draw every possible input-output arrow. Apply your choice and explain why the other method would change R .

The complete pair log is $(0, 4), (0, 4), (2, 6)$. To construct its relation diagram, choose A, remove repeated identical pairs before drawing arrows, or B, replace the two rows with input 0 by one row whose output is 8. Draw the resulting mapping and justify the choice.

For $R = \{(0, 0), (2, 0)\}$, use input labels $\{0, 1, 2\}$ and output labels $\{0, 3\}$. Choose A, omit labels equal to zero before drawing, or B, list every prescribed label and draw arrows only for the supplied pairs. Construct the diagram and explain how your method distinguishes zero from an unused label.

Represent $R = \{(A, 9), (B, 7), (B, 9)\}$ with outputs on the left and inputs on the right. Choose A, make every arrow point left-to-right, or B, make every arrow go from the first coordinate to the second coordinate. Construct the diagram and justify the direction.

Relations and Mapping Diagrams

Full Worked Solutions - excerpt

Worked example

Problem. Do matching label sets establish equality?

Answer. No; for instance (red, 1) occurs only in the first set.

Explanation and check.

Both coordinate inventories match, but every association is crossed.

Worked example

Problem. Does the repeated identical row make a different relation?

Answer. No; both represent $\{(2, 7), (4, 9)\}$.

Explanation and check.

An exact duplicate adds no new ordered pair to a set.

Algebra 1

Is It a Function

Is It a Function | A1-U04-P02

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
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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 complete function or impossibility proof, corrected judgment with decisive evidence, definition-based justification, function verdict with decisive evidence, two function verdicts with decisive evidence and valid repair or impossibility with evidence.

8 PDFs and a README; 125 buyer pages.

Algebra 1

**Is It
a Function**

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

Answer each question and record a bank letter whose complete statement correctly answers that question. A letter may be used more than once or not at all. Give exact values and all reasoning requested by the question; a letter alone is not the whole requested response.

The declared domain is empty and the complete arrow list is empty. Does the function condition hold?

Bank label: _____

Algebra 1

Is It a Function

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.

Can a function satisfy a pair that appears on both the required and forbidden lists?

After consolidating exact duplicate rows, decide whether a genuine conflict remains.

Input	Output
3	4
3	4
6	8
9	1
6	8
3	-4

Algebra 1

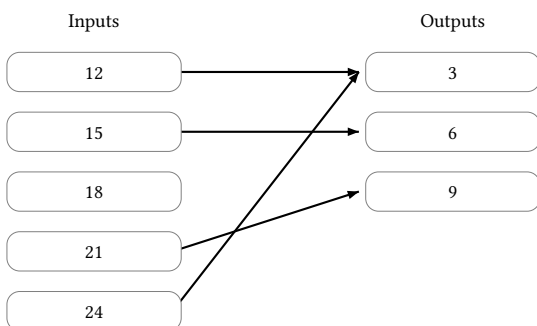
Is It
a Function

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card completely, then match the entire answer and reasoning to another card's Incoming statement. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: No. For example, $x = 2$ gives the included points $(2, 2)$ and $(2, -2)$. Reasoning: Excluding the origin does not remove the two intersections at every positive x .

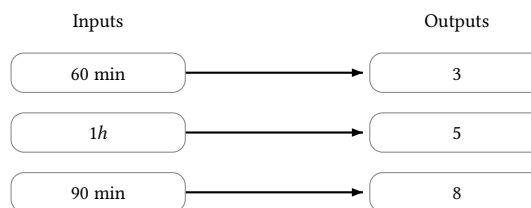
Scan all five declared inputs instead of judging only the drawn arrows.



Your response: _____

Incoming: Not a function on the stated domain; input 18 is unassigned. Reasoning: The four valid arrows do not compensate for the missing output at 18.

Interpret the declared domain as exact durations before testing output uniqueness.



Your response: _____

Algebra 1

Is It a Function

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.

Diagnose the error in the table verdict and give the corrected conclusion.

Input	Output
1	6
3	6
8	2

Audit whether row multiplicity creates distinct output values.

Input	Output
4	9
4	9
7	1

Is It a Function

Full Worked Solutions - excerpt

Worked example

Problem. The declared domain is empty and the complete arrow list is empty. Does the function condition hold?

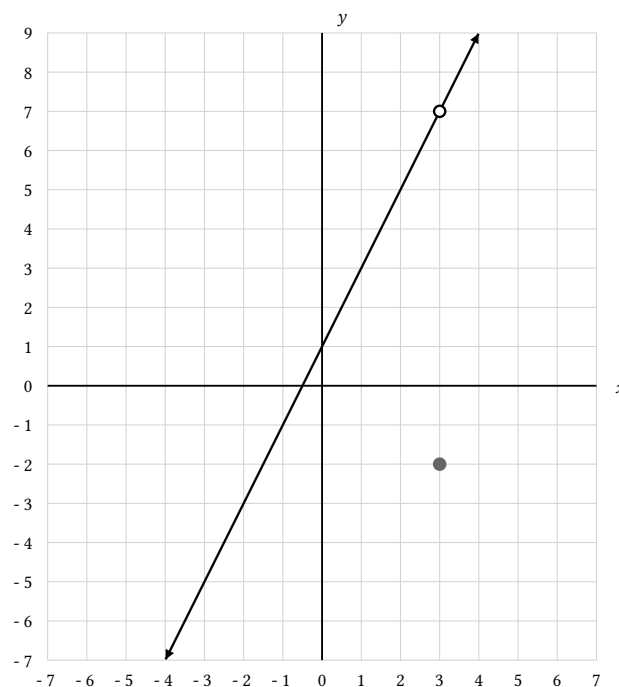
Answer. Yes. There is no declared input that lacks an output or has two outputs.

Explanation and check.

The one-output requirement is satisfied vacuously on the empty domain.

Worked example

Problem. The line has a hole and a replacement point at the same x . Apply the vertical line test to what is included.



Answer. Function. At $x = 3$ only $(3, -2)$ is included; all other x -values lie once on the line.

Explanation and check.

The open point $(3, 7)$ is not an intersection, so the closed replacement supplies one output.

Algebra 1
Interpreting Function Notation

Function Notation and Interpretation | A1-U04-P03

96 problems · Four activity formats

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08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for notation statement or semantic interpretation.
8 PDFs and a README; 52 buyer pages.

Algebra 1

Interpreting Function Notation

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.

The argument is an identifier, not a measurement. Interpret $M(204) = 57$. $M(i)$ is mass in grams of package with item code i. _____ Bank label: _____	Name the given quantity and requested quantity in the ticket instruction. $C(n)$ is cost for n tickets. The instruction is "Find $C(5)$." _____ Bank label: _____
The number 3 appears among known outputs. Does that make $p(3)$ defined? The declared domain is $\{2, 4, 6\}$. _____ Bank label: _____	What does $P(0) = 4$ reveal about this parking charge? $P(n)$ is parking charge in dollars for n completed hours. _____ Bank label: _____
Check the endpoint, a non-whole value, and an over-limit value. The declared domain is whole numbers from 0 through 12 inclusive. Consider the given statements $P(12), P(12.5), P(13)$. _____ Bank label: _____	What is supplied and what is sought in 'determine $R(a + 1)$'? _____ Bank label: _____
Read $R(12) = 0.35$ without interpreting 12 as a count of red pieces $R(k)$ is the ratio of red pieces to all pieces in sample k. _____ Bank label: _____	Identify the role of $b + 3$ without solving the equation. The instruction is "Solve $T(x) = b + 3$ for the possible x-values." _____ Bank label: _____

Algebra 1

Interpreting Function Notation

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 east-positive input and upward-positive output conventions $e(x)$ is elevation change in meters at x kilometers east of camp. Two kilometers west of camp, elevation is 11 meters lower than at camp.	Resolve the date offset and measurement in $R(-3) = 0.8$. $R(d)$ is rainfall in millimeters on the day d days relative to July 10.
Interpret $I(6) = 24$ using both measurement units. $I(d)$ is light intensity in lumens at depth d meters.	Treat the coordinate label as one argument and encode the reading. $Z(i)$ is pressure in kilopascals for sensor position i, where an ordered pair labels a position. Sensor position $(2, -1)$ reads 98 kilopascals.
Describe what happens after f receives a in $3(f(a) - 2)$.	Separate the roles in the two stages before any calculation. The two instructions are: First report $S(0)$. Then identify every t with $S(t) = S(0)$.

Algebra 1

Interpreting Function Notation

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: Exchanging 50 US dollars yields 7,250 yen. Use the row with input 5 to write one equation for w. <table border="1" data-bbox="151 527 797 648"> <thead> <tr> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>-3</td> <td>9</td> </tr> <tr> <td>0</td> <td>2</td> </tr> <tr> <td>5</td> <td>-6</td> </tr> </tbody> </table> Your response: _____	Input	Output	-3	9	0	2	5	-6	Incoming: $w(5) = -6$. Treat each coordinate pair as one input object and classify both expressions. The declared domain is $\{(0, 0), (1, 2)\}$. Consider the given statements $V((1, 2)), V(1)$. Your response: _____
Input	Output								
-3	9								
0	2								
5	-6								
Incoming: $Q(3)$ and $Q(3.0)$ are undefined; $Q(-3)$ is defined State the exchange direction encoded by $Y(50) = 7250$. $Y(d)$ is yen received when d US dollars are exchanged. Your response: _____	Incoming: $(6, -11)$. Encode the instantaneous rate observation. $r(t)$ is speed in meters per second at time t seconds. At 4 seconds, the speed is 7.5 meters per second. Your response: _____								
Incoming: Divide n by 2 first and use $\frac{n}{2}$ as q's input. Convert the date to an offset and write the function statement. $R(d)$ is rainfall in millimeters d days relative to September 10. On September 13, rainfall is 4.6 millimeters. Your response: _____	Incoming: $(-2, 5)$. What graph point is represented by $m(3) = 3$? Your response: _____								

Algebra 1

Interpreting Function Notation

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.

Choose an efficient method, explain why it fits the given representation, and then complete the task exactly. Convert the graph-membership sentence to function notation.

Use the function N . The given statement is The point $(c, -d)$ is on the graph of N .

Complete the task, then compare the direct formula approach with an equivalent check. Explain why both support the same conclusion. State the generic ordered-pair form conveyed by $h(n) = 2n + 1$.

Choose an efficient method, explain why it fits the given representation, and then complete the task exactly. Write the table association $\text{small} \rightarrow \text{blue}$ using function C .

Input	Output
small	blue

Choose an efficient method, explain why it fits the given representation, and then complete the task exactly. Ignore the record ID and use the semantic headers to encode the row for Q .

Q-value	input	record ID
-8	3	R17

Interpreting Function Notation

Full Worked Solutions - excerpt

Worked example

Problem. The argument is an identifier, not a measurement. Interpret $M(204) = 57$.

$M(i)$ is mass in grams of package with item code i .

Answer. The package with item code 204 has a mass of 57 grams.

Explanation and check.

Code 204 selects the item; 57 grams is its measured output.

Worked example

Problem. Name the given quantity and requested quantity in the ticket instruction.

$C(n)$ is cost for n tickets. The instruction is "Find $C(5)$."

Answer. The count 5 tickets is given; the cost output is requested.

Explanation and check.

C takes ticket count as input and returns cost.

Algebra 1
Evaluating Functions from Representations

Evaluating Functions | A1-U04-P04
96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
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Topic focus
Across 96 tasks this topic asks for exact function value or justified information status.
8 PDFs and a README; 64 buyer pages.

Algebra 1

Evaluating Functions
from 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.

Use the rule $B(x) = 2x - 3 + 1$. Its domain is all real numbers. Evaluate $B(-1)$ in the correct operation order. _____ Bank label: _____	Interpret exact numerical equality to find $L(0.5)$. <table border="1" data-bbox="824 504 1469 598"> <thead> <tr> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>$\frac{1}{2}$</td> <td>6</td> </tr> <tr> <td>2</td> <td>9</td> </tr> </tbody> </table> _____ Bank label: _____	Input	Output	$\frac{1}{2}$	6	2	9						
Input	Output												
$\frac{1}{2}$	6												
2	9												
Find $p(4)$ even though an output repeats. <table border="1" data-bbox="151 835 797 957"> <thead> <tr> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>5</td> </tr> <tr> <td>4</td> <td>5</td> </tr> <tr> <td>7</td> <td>2</td> </tr> </tbody> </table> _____ Bank label: _____	Input	Output	1	5	4	5	7	2	Use the rule $h(x) = \frac{x^2}{2}$. Its domain is all real numbers. Evaluate $h(3) - 2h(1)$. Compute the exact combination of rule outputs. _____ Bank label: _____				
Input	Output												
1	5												
4	5												
7	2												
Use the rule $W(x) = x + 2$. Its domain is all real numbers. Compute $W(2 - 7)$. _____ Bank label: _____	Ignore the record number and evaluate $N(3)$. <table border="1" data-bbox="824 1171 1469 1291"> <thead> <tr> <th>record</th> <th>input</th> <th>output</th> </tr> </thead> <tbody> <tr> <td>101</td> <td>-2</td> <td>4</td> </tr> <tr> <td>205</td> <td>3</td> <td>8</td> </tr> <tr> <td>310</td> <td>7</td> <td>1</td> </tr> </tbody> </table> _____ Bank label: _____	record	input	output	101	-2	4	205	3	8	310	7	1
record	input	output											
101	-2	4											
205	3	8											
310	7	1											

Algebra 1

Evaluating Functions
from 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.

Use the rule $W(x) = x - 2$. Its domain is all real numbers. Evaluate $\frac{W(5)}{W(1)+W(3)}$. Evaluate the denominator combination before dividing. 	Use the rule $g(x) = (x + 1)^2 - 4$. Its domain is all real numbers. Evaluate $\frac{g(-3)+g(1)}{g(0)-g(-1)}$. Evaluate all four represented outputs before simplifying the ratio. 										
$V(t)$ is volume in liters t hours after opening. The allowed domain is $0 \leq t < 2$. The requested input is 120 minutes. Convert the time and use endpoint inclusion to determine the volume value. 	Consolidate the duplicate record and state $K(5)$. <table border="1" data-bbox="824 957 1469 1119"> <thead> <tr> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>5</td> <td>8</td> </tr> <tr> <td>1</td> <td>3</td> </tr> <tr> <td>5</td> <td>8</td> </tr> <tr> <td>-2</td> <td>4</td> </tr> </tbody> </table> 	Input	Output	5	8	1	3	5	8	-2	4
Input	Output										
5	8										
1	3										
5	8										
-2	4										
Use the rule $o(x) = \frac{1}{x+1}$. Its domain is all real x except -1. Evaluate $o(-\frac{3}{3})$. Compute the quotient argument and check the excluded input. 	The declared domain is whole numbers. Is more table information needed to determine $r(1.5)$? 										

Algebra 1

Evaluating Functions
from 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: $P(-3) = 97$ kilopascals three days before inspection. $z(t)$ is vertical position in meters above a platform t seconds after launch. Use $z(t) = 6t - 20$. The allowed domain is $0 \leq t \leq 5$. The requested input is 2 seconds. Evaluate and interpret a negative position output. Your response: _____	Incoming: $z(2) = -8$ meters, meaning 8 meters below the platform. $L(t)$ is sea-level change in centimeters relative to a fixed reference level, t hours after 6a.m. Use $L(t) = 0.5t - 5$. The allowed domain is $0 \leq t \leq 12$. The requested input is 2p.m. Resolve the clock reference, evaluate, and interpret the level reference. Your response: _____
Incoming: $E(1.5) = 2.9$ kilowatt-hours after 90 minutes. $P(d)$ is pressure in kilopascals d days relative to an inspection. Use $P(d) = 100 + d$. The allowed domain is $-5 \leq d \leq 5$. The requested input is 3 days before inspection. Translate the relative date to an input and evaluate pressure. Your response: _____	Incoming: $h(2) = -5$. $D(t)$ is distance in miles after t hours. Use $D(t) = 55t$. The allowed domain is $t \geq 0$. Use the model to find the traveled distance after 2.5 hours. Your response: _____
Incoming: $A(2.5) = 6.25$ square meters. $P(n)$ is price in dollars for n tickets. Use $P(n) = 7n$. The allowed domain is whole numbers $n \geq 0$. The requested input is 5 tickets. Evaluate the ticket price for five tickets. Your response: _____	Incoming: $Y(32) = 4640$ yen. Use the rule $m(x) = 0.5(3x - 2)^2$. Its domain is all real numbers. Evaluate $m(2)$ with the inner linear value first. Your response: _____

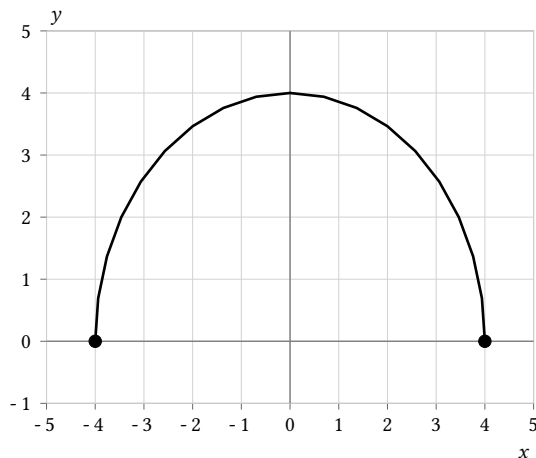
Algebra 1

Evaluating Functions from 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.

Choose an efficient method, explain why it fits the given representation, and then complete the task exactly. Read $Q(0)$ from the specified upper half-circle.



Complete the task, then compare the direct table approach with an equivalent check. Explain why both support the same conclusion. Columns are displayed output first. Find $G(4)$.

output	input
8	1
3	4
-2	6

Evaluating Functions from Representations

Full Worked Solutions - excerpt

Worked example

Problem. Use the rule $B(x) = |2x - 3| + 1$. Its domain is all real numbers. Evaluate $B(-1)$ in the correct operation order.

Answer. $B(-1) = 6$.

Explanation and check.

$$2(-1) - 3 = -5$$

so

$$|-5| + 1 = 6$$

Worked example

Problem. Interpret exact numerical equality to find $L(0.5)$.

Input	Output
$\frac{1}{2}$	6
2	9

Answer. $L(0.5) = 6$.

Explanation and check.

Decimal 0.5 equals the listed input $\frac{1}{2}$.

Algebra 1
Finding Inputs from Function Outputs

Inverse Functions and Reverse Lookup | A1-U04-P05

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
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Topic focus
Across 96 tasks this topic asks for all admissible inputs with justification.
8 PDFs and a README; 80 buyer pages.

Algebra 1

Finding Inputs from Function Outputs

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.

Retain only positive inputs. The supplied candidate inputs are $(0, 5)$. The declared domain is $x > 0$. The target output is 1.	Simplify candidates, then impose number type and endpoints. The supplied candidate inputs are $-\sqrt{4}, \frac{1}{3}, \sqrt{2}, 3$. The declared domain is rational x with $-2 < x \leq 3$. The target output is 9.
Which candidates can represent the item-count input? The supplied candidate inputs are $-2, 0, 6$. The declared domain is whole-number item counts. The target output is \$30.	Filter the candidates through the closed interval. The supplied candidate inputs are $(-3, 4)$. The declared domain is $0 \leq x \leq 6$. The target output is 5.
Which candidate times fall within operating hours? The supplied candidate inputs are $8, 14, 19$. The declared domain is hours 9 through 17 inclusive. The target output is target occupancy.	Apply all three domain conditions to the candidate set. The supplied candidate inputs are $-6, -2, 3, 8$. The declared domain is integers x with $-3 \leq x < 8$ and $x \neq 3$. The target output is 4.

Algebra 1

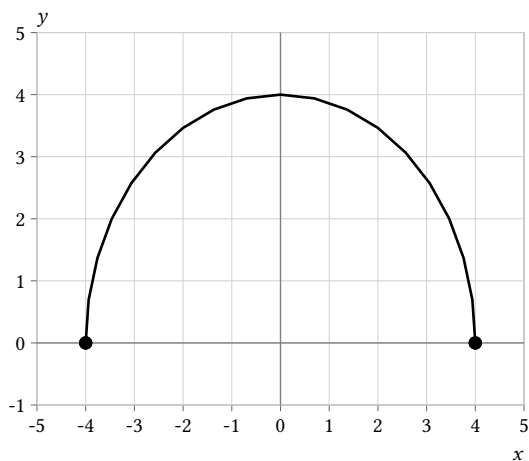
Finding Inputs from
Function Outputs

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: Every x in $[-1, 4]$.

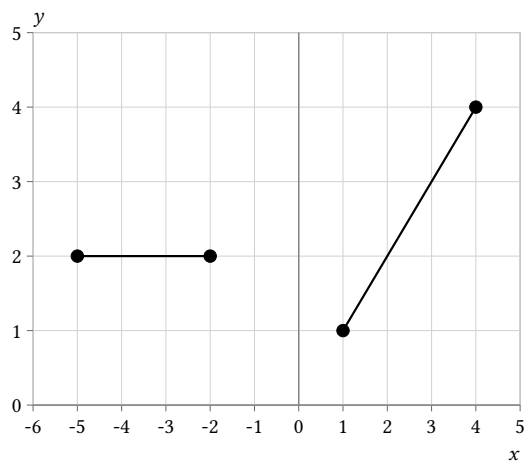
Recover the inputs at the semicircle's zero level.



Your response: _____

Incoming: $x = -4$ and $x = 4$.

Find all inputs at height 2 across both pieces.



Your response: _____

Algebra 1

Finding Inputs from
Function Outputs

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.

Does the output bound make the observed reverse lookup complete?

rows: (1, 7), (4, 2), (8, 7); table scope: partial; additional fact: all outputs are between 0 and 10; target output: 7

Input	Output
1	7
4	2
8	7

Diagnose the direction error and recover the input.

The rule is $f(x) = 2x + 1$. The target output is 9. The supplied student work is: $f(9) = 19$, so the answer is 19.

Finding Inputs from Function Outputs

Full Worked Solutions - excerpt

Worked example

Problem. Is the extra range fact sufficient for a complete reverse lookup?

rows: $(0, 8), (2, 3), (5, 8)$; table scope: partial; additional fact: every unlisted input has output below 0; target output: 8

Input	Output
0	8
2	3
5	8

Answer. Yes. The full set is $\{0, 5\}$.

Explanation and check.

Both listed matches count, and negative unlisted outputs cannot equal 8.

Worked example

Problem. Select all candidates allowed by the even-integer domain.

The supplied candidate inputs are -4, 1, 6. The declared domain is even integers. The target output is 12.

Answer. $\{-4, 6\}$.

Explanation and check.

Both -4 and 6 are even; 1 is not.

Algebra 1
Domain and Range

Domain and Range | A1-U04-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
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 justified domain or range set.
8 PDFs and a README; 60 buyer pages.

Algebra 1

Domain and Range

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.

Merge the overlapping output bands. pieces: continuous curve attaining $-3 \leq y \leq 2$, continuous curve attaining $1 \leq y \leq 6$ _____ Bank label: _____	Read the natural graph domain. graph: $y = \sqrt{x+2}$, including endpoint $(-2, 0)$ and arrow right _____ Bank label: _____
Map the restricted ray through h. rule: $h(x) = 3x - 2$; domain: $x \geq 1$ _____ Bank label: _____	Project the vertical segment onto the x-axis. graph: vertical segment at $x = -4$ from $y = -2$ to $y = 6$, endpoints filled _____ Bank label: _____
List the attained outputs from the finite restriction. rule: $r(x) = 2x$; domain: $-3, 0, 4$ _____ Bank label: _____	Determine whether the apparent break removes an input. pieces: curve on $-4 \leq x < -1$, filled point at $x = -1$, curve on $-1 < x \leq 3$ _____ Bank label: _____
Account for decreasing orientation when finding the range. rule: $g(x) = 7 - x$; domain: $-1 \leq x \leq 3$ _____ Bank label: _____	Find the range with decreasing orientation and mixed endpoints. rule: $C(x) = -3x + 1$; domain: $-2 < x \leq 3$ _____ Bank label: _____

Algebra 1

Domain and Range

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.

Determine the natural domain of h. rule: $h(x) = x + 4$ _____ _____	Does the formula make the cropped graph sufficient? exact rule: $f(x) = 2x + 1$ for every real x; visible window: $-2 \leq x \leq 2$ _____ _____
Separate the known full range from input evidence. known: range is exactly $[0, 10]$; two observed inputs are -1 and 4; domain: not supplied _____ _____	Which complete set can be stated? known: domain is all integers; outputs observed are 2 and 5; rule: not supplied _____ _____
Solve the radicand condition. rule: $u(x) = \sqrt{x - 2}$ _____ _____	Which projection is complete under the onto statement? known: f is onto all real outputs; observed inputs: $(0, 2)$; domain: otherwise unstated _____ _____

Algebra 1

Domain and Range

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: Range $\{-3\}$ union $[0, 6]$. Remove the undefined member of the finite domain. rule: $S(x) = \frac{2}{x+2}$; stated domain: $-4, -2, 0, 3$ Your response: _____	Incoming: Domain $\{-4, 0, 3\}$. Separate viewing window labels from the graph domain. graph: filled curve only on $-2 \leq x \leq 2$; coordinate window and tick marks extend from -10 to 10 Your response: _____
Incoming: Range $[-4, 5]$. Unite repeated vertical bands and the isolated value. pieces: segment with range $[0, 4]$, arc with range $[2, 6]$, point at height -3 Your response: _____	Incoming: Use x in $(-2, 3]$. Reverse the inequality when solving the radicand condition. rule: $J(x) = \sqrt{8 - 2x}$ Your response: _____
Incoming: Domain $(-\infty, 5]$. Account for an endpoint height restored elsewhere. graph: vertical segment with open endpoints $y = -3$ and $y = 5$, plus a filled point at $y = -3$ elsewhere Your response: _____	Incoming: The domain is $[-2, 4]$. What output set does the square-root graph attain? graph: $y = \sqrt{x+2}, x \geq -2$ Your response: _____

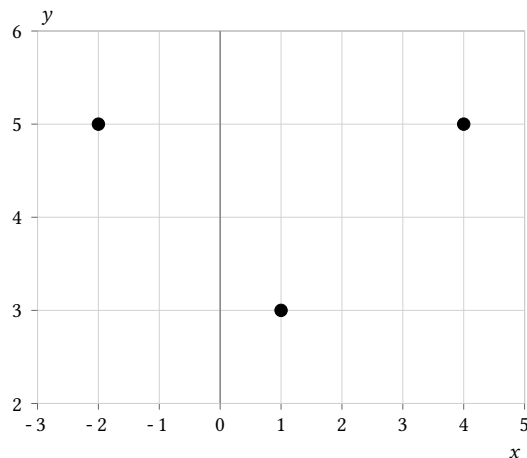
Algebra 1

Domain and Range

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.

Correct the swapped projections.



Supplied solution steps:

1. domain $\{3, 5\}$
2. range $\{-2, 1, 4\}$

Audit the unattained codomain label.

declaration: $f: \{a, b\} \rightarrow \{1, 2, 3\}$; values: $f(a) = 1, f(b) = 3$

Supplied solution steps:

1. range $\{1, 2, 3\}$

Domain and Range

Full Worked Solutions - excerpt

Worked example

Problem. Merge the overlapping output bands.

pieces: continuous curve attaining $-3 \leq y \leq 2$, continuous curve attaining $1 \leq y \leq 6$

Answer. Range $[-3, 6]$.

Explanation and check.

The bands overlap from 1 through 2, so their union has no vertical gap.

Worked example

Problem. Read the natural graph domain.

graph: $y = \sqrt{x + 2}$, including endpoint $(-2, 0)$ and arrow right

Answer. Domain $[-2, \text{infinity})$.

Explanation and check.

The square-root graph starts at included input -2 and continues right.

Algebra 1

Domain in Context

Domain in Context | A1-U04-P07

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 justified feasible input set and domain type.

8 PDFs and a README; 47 buyer pages.

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: _____

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 $4 \leq w \leq 22$ meters. A test is valid for $-10 < C \leq 35$ degrees Celsius. Using $F = 1.8C + 32$ as the new input scale, find the Fahrenheit domain. Your response: _____	Incoming: Fahrenheit input has domain $14 < F \leq 95$. 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 $9 \leq k < 17$. A rectangle has perimeter $52m$, so its length is $26-w$ 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 $9 < A \leq 81$ 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 $\{0, 1, \dots, 32\}$. 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 $0 \leq t \leq 9$ 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 $-5 \leq c \leq 40$. 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 $3 \leq d < 27$ kilometers.

Explanation and check.

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

Algebra 1
Comparing Function Representations

Comparing Function Representations | A1-U04-P08

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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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 coordinated function representation with justification and written qualitative graph description from the given process.
8 PDFs and a README; 57 buyer pages.

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? <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 50%;">Input</th> <th style="width: 50%;">Output</th> </tr> </thead> <tbody> <tr> <td>-1</td> <td>0</td> </tr> <tr> <td>0</td> <td>2</td> </tr> <tr> <td>2</td> <td>6</td> </tr> </tbody> </table> 	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. <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 50%;">Input</th> <th style="width: 50%;">Output</th> </tr> </thead> <tbody> <tr> <td>-1</td> <td>1</td> </tr> <tr> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>1</td> </tr> </tbody> </table> 	Input	Output	-1	1	0	0	1	1
Input	Output																
-1	0																
0	2																
2	6																
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 $A(x) = 9 - x^2$ 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 $S(x) = \sqrt{25 - x^2}$ 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 $y = 5 - x$ 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.

Algebra 1
Absolute Value and Piecewise Function Models

Piecewise Functions: Modeling | A1-U04-P09

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
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05	Quick Answer Key	96 answers
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08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for verified conditional rule, value, graph, or model.
8 PDFs and a README; 67 buyer pages.

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 $-3 \leq x \leq 2$, and $G(x) = 1 - x$ for $x > 2$. Evaluate $G(-3)$. _____ Bank label: _____
A rule uses $mx + 1$ for $x \leq 2$ 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 $-2 \leq x < 4$, and $F(x) = x^2$ if $x \geq 4$, find $F(1)$. _____ Bank label: _____
A ranger starts at trail coordinate 6 km and walks at $4 \frac{\text{km}}{\text{h}}$ in either direction. Model travel time to coordinate x. _____ Bank label: _____	Let $s(x) = 4x$ for $x < 5$ and $s(x) = x - 6$ for $x \geq 5$. Find $s(5)$. _____ Bank label: _____

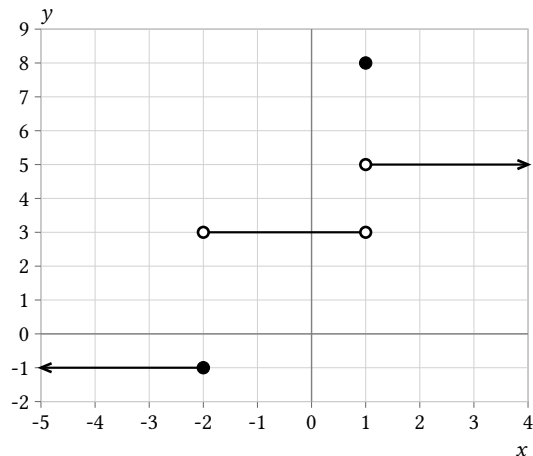
Algebra 1

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.

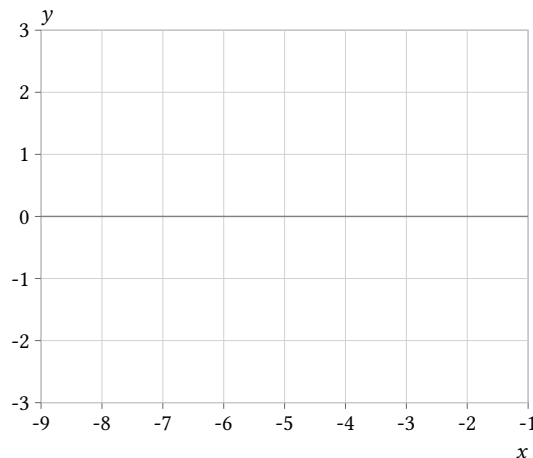
A step graph is $y = -1$ on $x \leq -2$, $y = 3$ on $-2 < x < 1$, $y = 8$ only at $x = 1$, and $y = 5$ on $x > 1$. Encode it.



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

Conditions are $x < -4$, $-4 \leq x < 1$, 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 $x \leq -5$.



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

Algebra 1

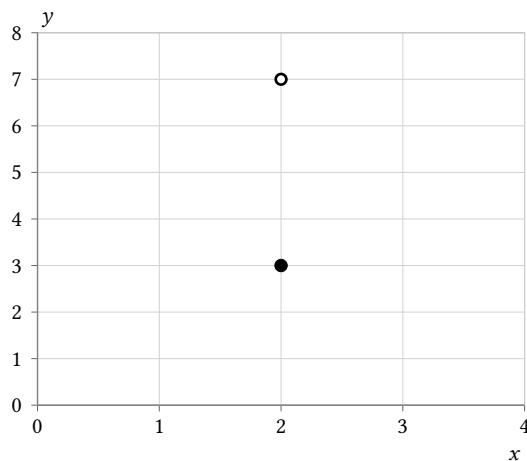
Absolute Value and Piecewise Function Models

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 $0 \leq a < 4$, $P(a) = 5$ for $4 \leq a \leq 12$, 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.

Algebra 1
Sequences as Discrete Functions

Discrete vs. Continuous Functions and Domain | A1-U04-P10

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
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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 verified sequence interpretation, value, domain, graph, or judgment.
8 PDFs and a README; 61 buyer pages.

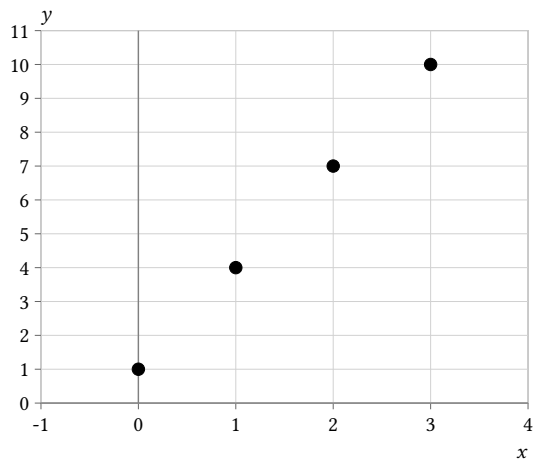
Algebra 1

Sequences as
Discrete 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 graph shows filled points $(0, 1)$, $(1, 4)$, $(2, 7)$, $(3, 10)$ and explicitly says the sequence ends at $n = 3$. Should an arrow extend the pattern?



Bank label: _____

A listed sequence starts at index 3: $x_3=20$, $x_4=17$, $x_5=14$. Which notation names the first listed value?

Index	Value
3	20
4	17
5	14

Bank label: _____

Given $d_1=20$ and $d_n=d_{n-1}-n$ for $n \geq 2$, generate d_2 , d_3 , d_4 .

Bank label: _____

A sequence starts 1, 2, 5 and is explicitly known to have constant second difference 2. Is the next term determined?

Bank label: _____

Algebra 1

Sequences as
Discrete 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.

Given $a_n = n^2 - 3n + 5$ for positive integers, compute a_1, a_4, and a_7. _____ _____	A sequence begins at $n = 4$ and follows $t_n = 5 + 3(n - 4)$. Find t_4 and t_9. _____ _____
For $n = 1, 2, 3, \dots$, the sequence is $a_n = 3n + 2$. Find a_4. _____ _____	A sequence is defined only at perfect-square indices no greater than 25, beginning with 1. List the domain. _____ _____
For $n = 0, 1, 2, \dots$, define q_n as n plus -1 raised to the nth power. Find q_2 and q_3. _____ _____	A sequence is defined only for n in $\{1, 4, 9, 16\}$ by $d_n = \sqrt{n} + n$. Evaluate d_9 and decide whether d_{10} exists. _____ _____

Algebra 1

Sequences as
Discrete 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: Sample 4 has measured temperature 18.5 degrees. The pairs for a sequence are $(1, 5)$, $(2, 8)$, $(3, 5)$. What does q_3 equal? <table border="1" data-bbox="147 590 797 716"> <thead> <tr> <th>Index</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>5</td> </tr> <tr> <td>2</td> <td>8</td> </tr> <tr> <td>3</td> <td>5</td> </tr> </tbody> </table> Your response: _____	Index	Value	1	5	2	8	3	5	Incoming: The lookup gives $q_3 = 5$. Let $e_0=2$ and $e_n=e_{n-1}+2n$ for $n \geq 1$. Determine e_1 through e_3. Your response: _____
Index	Value								
1	5								
2	8								
3	5								
Incoming: The table entry is $c_0 = 7$. The sequence T_k gives the temperature of sample k, and samples are numbered starting at 1. Interpret $T_4=18.5$. Your response: _____	Incoming: No. $A_3 = 9$, whereas $B_3 = 15$. The rule $d_n=5 - 4n$ applies for $n = 1, 2, 3, \dots$. Find d_3. Your response: _____								
Incoming: The rule gives $p_6 = 15$. The rule e_n is supplied for integers $2 \leq n \leq 6$. List its domain. Your response: _____	Incoming: The fifth term is $b_5 = 10$. The rule $j_n=(n-2)^2 + 1$ is defined for $n = 0, 1, \dots, 6$. Fill the entries for $n = 2$ and $n = 5$. Your response: _____								

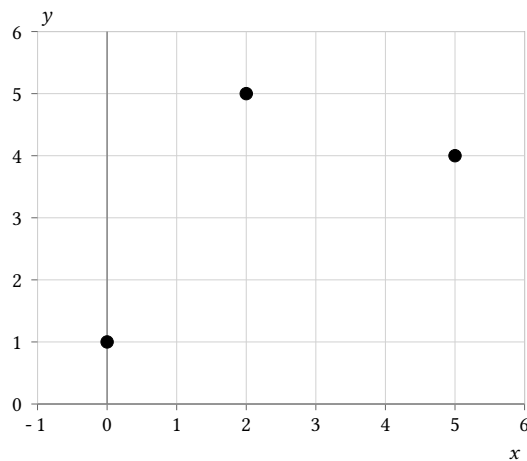
Algebra 1

Sequences as Discrete 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 sequence graph has exactly $(0, 1), (2, 5), (5, 4)$. A student adds points $(1, 3), (3, \frac{14}{3}), (4, \frac{13}{3})$ by connecting segments. Diagnose all added points.

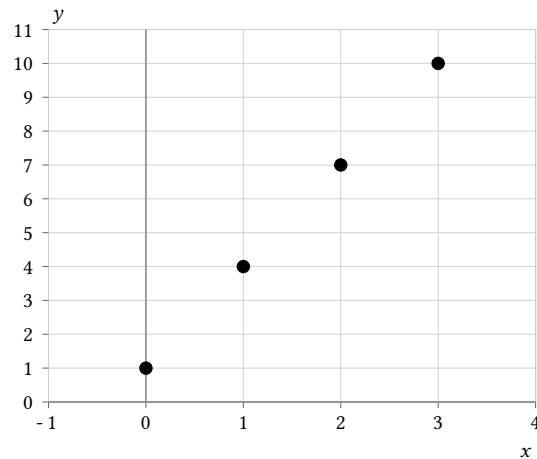


Sequences as Discrete Functions

Full Worked Solutions - excerpt

Worked example

Problem. A graph shows filled points $(0, 1), (1, 4), (2, 7), (3, 10)$ and explicitly says the sequence ends at $n = 3$. Should an arrow extend the pattern?



Answer. No. The graph is exactly those four points and has no continuation arrow.

Explanation and check.

A visible pattern does not override the stated finite domain $\{0, 1, 2, 3\}$.

Worked example

Problem. Given $d_1 = 20$ and $d_n = d_{n-1} - n$ for $n \geq 2$, generate d_2, d_3, d_4 .

Answer. The values are $d_2 = 18, d_3 = 15$, and $d_4 = 11$.

Explanation and check.

Subtract 2, then 3, then 4 from the current preceding value.

Algebra 1
Arithmetic Sequence Explicit and Recursive Rules

Arithmetic Sequence Explicit and Recursive Rules | A1-U04-P11

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
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Topic focus
Across 96 tasks this topic asks for derived rule, comparison, diagnosis, or justified conclusion.
8 PDFs and a README; 46 buyer pages.

Algebra 1

Arithmetic Sequence Explicit and Recursive Rules

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 declared arithmetic sequence has $a_1 = 4$ and $a_2 = 7$. Its domain is the integers $n \geq 1$. Derive both an explicit rule and a recursive rule. _____ Bank label: _____	A book club log has 0 pages at index 0 and changes by 15 pages per index. Here n counts finished sessions. Write matching explicit and recursive rules for the recorded quantity b_n. _____ Bank label: _____
Translate this initialized recurrence into one explicit formula: $a_6 = -2$, $a_n = a_{n-1} + 4$ for integers $n \geq 7$. _____ Bank label: _____	The same sequence is given by $c_n = -5 + 2(n - 4)$; $c_4 = -5$, $c_n = c_{n-1} + 2$. For the task 'explain the change from one stage to the next', choose a useful form and justify the choice. _____ Bank label: _____
Translate this initialized recurrence into one explicit formula: $a_1 = 3$, $a_n = a_{n-1} + 4$ for integers $n \geq 2$. _____ Bank label: _____	A planted tree row has 23 trees at index 4 and changes by 3 trees per index. Here the first supplied row is row 4. Write matching explicit and recursive rules for the recorded quantity p_n. _____ Bank label: _____
Replace the repeated update with direct index access: $a_1 = 10$, $a_n = a_{n-1} - 2$ for integers $n \geq 2$. _____ Bank label: _____	$d_2 = 6$, $d_3 = 2$, and $d_n = 2d_{n-1} - d_{n-2}$ for $n \geq 4$. Find d_4, d_5, d_6 and decide whether the observed change is constant. _____ Bank label: _____

Algebra 1

Arithmetic Sequence Explicit and Recursive Rules

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.

Express the same indexed sequence without predecessor notation: $a_7 = 5, a_n = a_{n-1} - 1$ for integers $n \geq 8$. _____ _____	A savings envelope has 25 dollars at index 0 and changes by 6 dollars per index. Here n counts completed weekly deposits. Write matching explicit and recursive rules for the recorded quantity a_n. _____ _____
Write a closed arithmetic rule equivalent to $a_1 = -7, a_n = a_{n-1} - 4$ for integers $n \geq 2$. _____ _____	A candle measurement has 30 centimeters at index 0 and changes by -1 centimeters per index. Here n counts elapsed hours. The record stops at index 30. Write matching explicit and recursive rules for the recorded quantity c_n. _____ _____
Express the same indexed sequence without predecessor notation: $a_1 = 8, a_n = a_{n-1} + 0$ for integers $n \geq 2$. _____ _____	A constant-additive sequence includes $a_1 = 12$ and $a_5 = 0$. Its domain is the integers $n \geq 1$. Derive both an explicit rule and a recursive rule. _____ _____

Algebra 1

Arithmetic Sequence Explicit and Recursive Rules

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: $a_3 = 15$. Translate this initialized recurrence into one explicit formula: $a_{-2} = 9, a_n = a_{n-1} - 4$ for integers $n \geq -1$. Your response: _____	Incoming: For integers $n \geq -2, a_n = 9 - (4)(n + 2)$. Reverse the known additive updates to recover the anchor: $a_n = a_{n-1} + \frac{3}{2}$ for $n \geq 1$, and $a_9 = \frac{27}{2}$. The sequence begins at $n = 0$. Find a_0. Your response: _____
Incoming: For integers $n \geq 8, a_n = 17 - (3)(n - 8)$. Determine the missing initial value for this forward recurrence: $a_n = a_{n-1} + \frac{7}{3}$ for $n \geq 4$, and $a_{15} = 43$. The sequence begins at $n = 3$. Find a_3. Your response: _____	Incoming: For integers $n \geq 3, a_n = 11 - (6)(n - 3)$. Supply both parts of the recursive specification for $a_n = (0)n + 6$ for integers $n \geq 1$. Your response: _____
Incoming: For integers $n \geq 0, a_n = -\frac{3}{2} + (\frac{5}{2})(n)$. Work backward by the indexed number of steps: $a_n = a_{n-1} + 0$ for $n \geq 8$, and $a_{19} = 19$. The sequence begins at $n = 7$. Find a_7. Your response: _____	Incoming: $a_4 = 25, a_n = a_{n-1} + 6$ for integers $n \geq 5$. $b_0 = 1, b_1 = 4$, and $b_n = b_{n-1} + 2b_{n-2}$ for $n \geq 2$. Compute b_2, b_3, b_4. Your response: _____

Algebra 1

Arithmetic Sequence Explicit and Recursive Rules

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 sequence work: Terms are 5, 8, 11, ... at $n = 1, 2, 3, \dots$. A student proposes $a_n = 5 + 3n$. Identify the defect and state a correction.

Audit this sequence work: A student converts $b_n = 9 + 4n$ for $n \geq 0$ to $b_0 = 9, b_n = b_{n-1} + 9$. Identify the defect and state a correction.

Audit this sequence work: A table gives $g_2 = 11, g_5 = 2$ for an arithmetic sequence. A proposed rule is $g_n = 11 - 9(n - 2)$. Identify the defect and state a correction.

Audit this sequence work: For $a_n = 7 - 2(n - 4), n \geq 4$, a student gives the recurrence $a_1 = 7, a_n = a_{n-1} - 2$. Identify the defect and state a correction.

Arithmetic Sequence Explicit and Recursive Rules

Full Worked Solutions - excerpt

Worked example

Problem. Convert the explicit arithmetic rule to a complete recurrence: $a_n = (3)n + 2$ for integers $n \geq 1$.

Answer. $a_1 = 5, a_n = a_{n-1} + 3$ for integers $n \geq 2$.

Explanation and check.

The coefficient of n is the consecutive-term difference; evaluate the formula at the first allowed index for the anchor.

Worked example

Problem. Convert the explicit arithmetic rule to a complete recurrence: $a_n = (-5)n + 20$ for integers $n \geq 6$.

Answer. $a_6 = -10, a_n = a_{n-1} - 5$ for integers $n \geq 7$.

Explanation and check.

The coefficient of n is the consecutive-term difference; evaluate the formula at the first allowed index for the anchor.

Algebra 1
Interpreting Piecewise Linear Graphs

Graphing Piecewise-Defined Functions | A1-U04-P12

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
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07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

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.

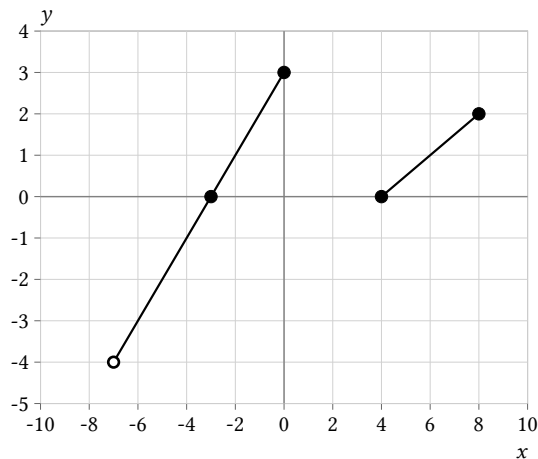
Algebra 1

Interpreting Piecewise Linear Graphs

Name: _____ Date: _____ Class: _____

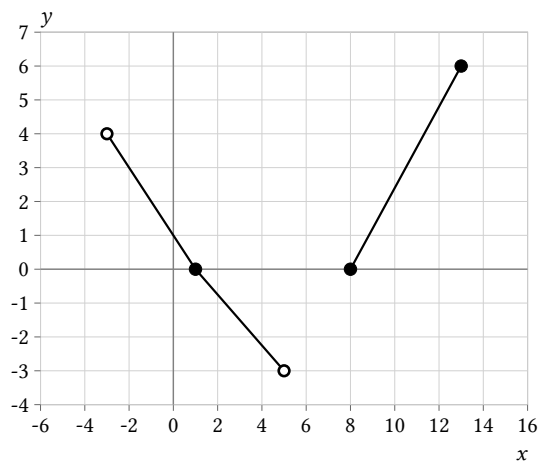
Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

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: _____

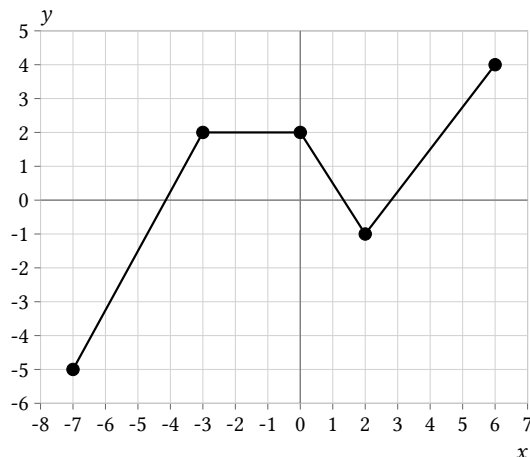
Algebra 1

Interpreting Piecewise Linear Graphs

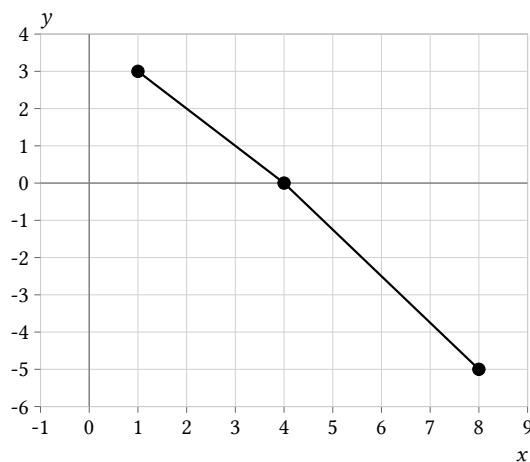
Name: _____ Date: _____ Class: _____

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

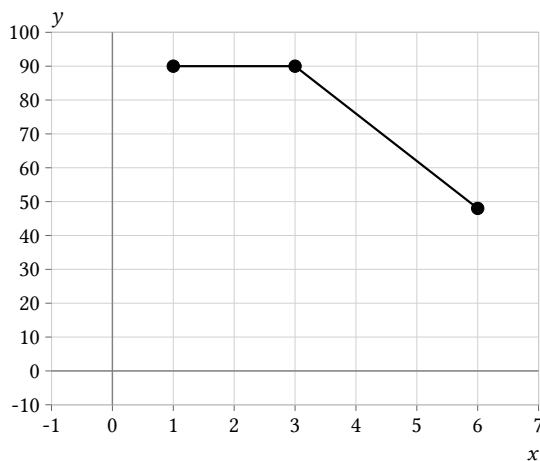
Interpreting Piecewise Linear Graphs

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 $x = -3$.

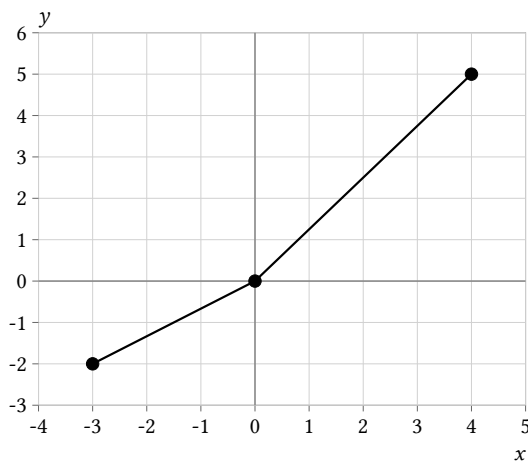
A graph shows inventory $I(d)$ in boxes at the end of day d by connecting $(1, 90)$, $(3, 90)$, $(6, 48)$ in order. Interpret the first segment and the later decrease.



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.

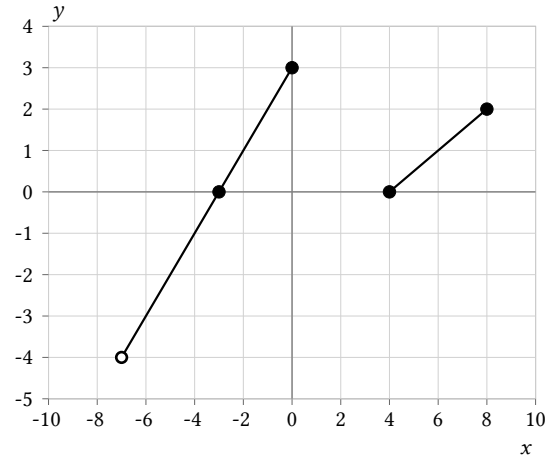
Audit this qualitative analysis: A graph rises from $(-5, -4)$ to $(2, 6)$. A student reports that it increases on $-4 < y < 6$. Correct the claim.

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.



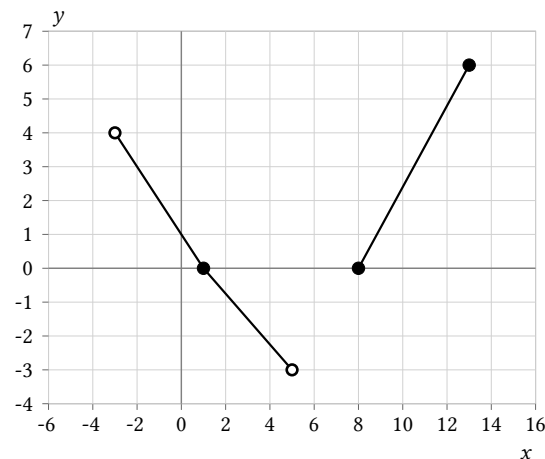
Answer. x -intercept set: $(-3, 0), (4, 0)$; y -intercept: $(0, 3)$. The exact domain is $(-7, 0]$ union $[4, 8]$.

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.