

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
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 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: _____

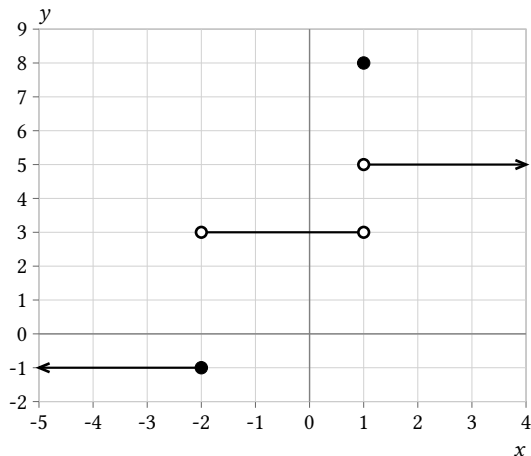
Algebra 1

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Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

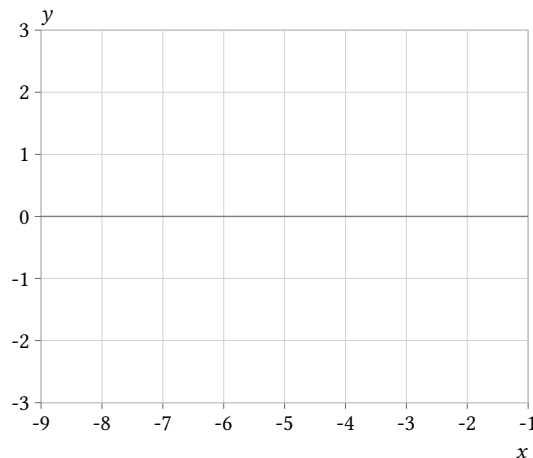
A step graph is $y = -1$ on $x \leq -2$, $y = 3$ on $-2 < x < 1$, $y = 8$ only at $x = 1$, and $y = 5$ on $x > 1$. Encode it.



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 $x \leq -5$.



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

Incoming: 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

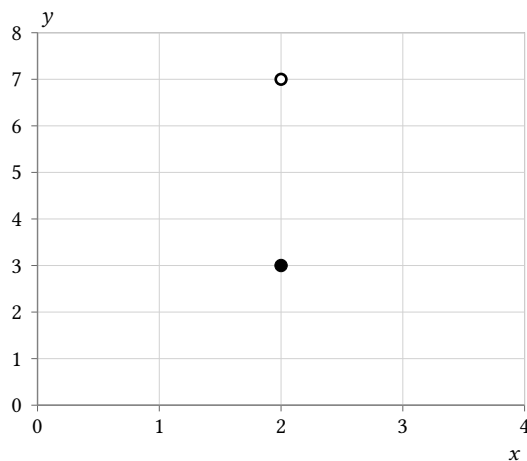
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Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

For $f(x) = 2x$ 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.