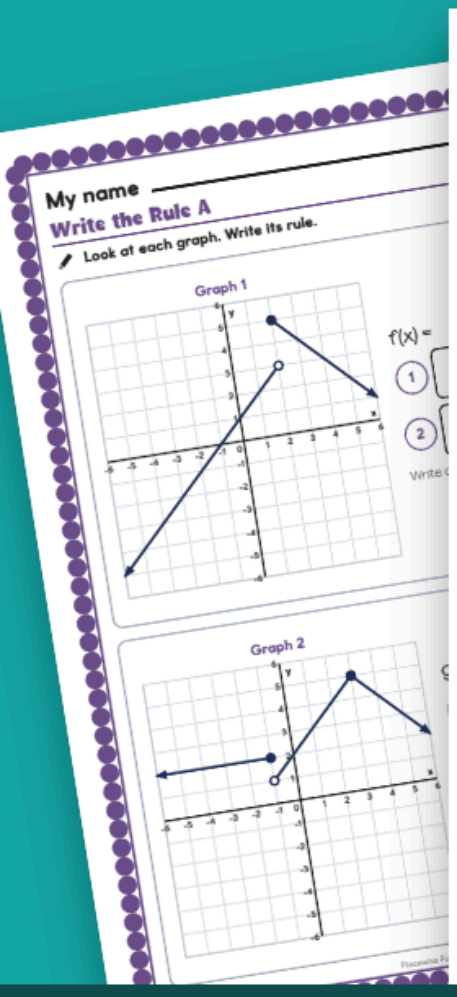
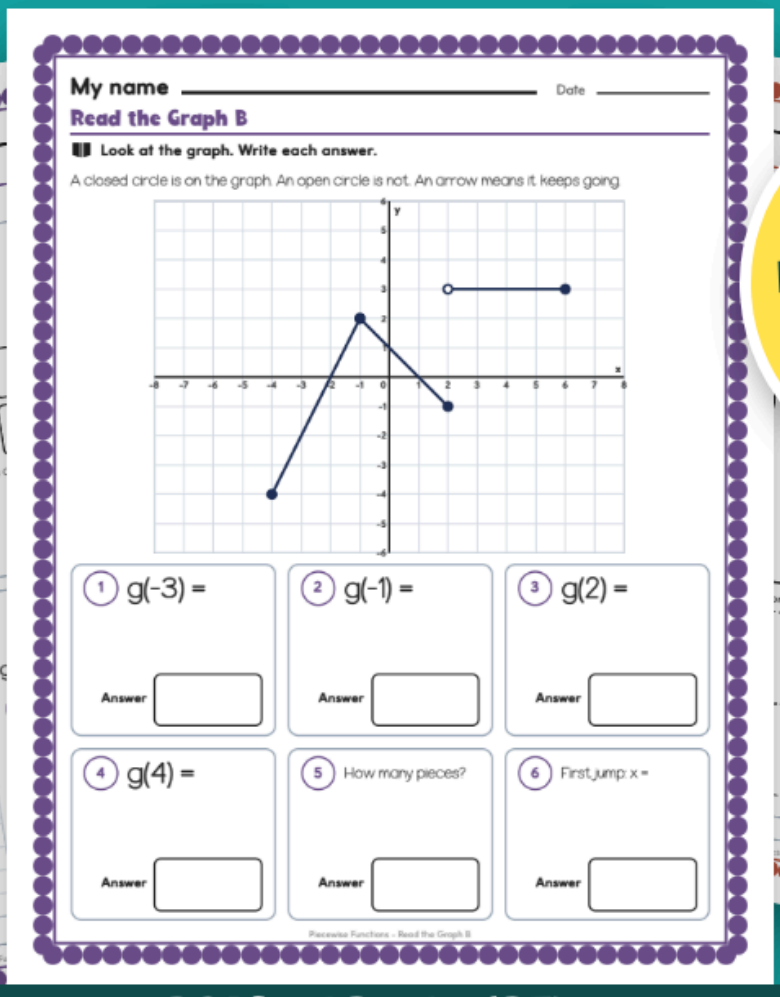
PIECEWISE FUNCTIONS

WORKSHEETS FOR ALGEBRA 1-2







49 PAGES

BRIGHT PATH SPED

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This is a fillable PDF

- Open it in a PDF reader (Adobe Acrobat Reader, Preview, or your browser), click into a line or a box, type, and Save As.
- The name line, every answer box, every ruled work box, every table cell to fill in and every check box on the student pages are type-in fields, and so are the tracker, class grid, team note and family page. You can also print any page and write by hand. The graph grids are for drawing by hand.
- It works offline. No account, no subscription, no internet connection needed after you download it.

Print at 100 percent

Turn off fit to page and shrink to fit so the ruled lines stay 0.34 inch apart and the grids stay square. Every student page still reads when it is copied in black and white.

Student work

A filled-in tracker, class grid or team note carries a real student's name. Keep it in the data folder, and use a first name only on any page that leaves your hands.

Need help?

If a field will not behave or a page will not print the way you expect, use Ask a Question on the product page before leaving a review. Every question is read, and a fix to the file ships as a free update: re-download it any time from My Purchases.

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PREVIEW

How To Read a Page

The parts of a student page, then the page types in the order they come.

The parts of a page

- **The rule and the condition.** Each row of a piecewise function is one rule, then the word if, then a condition on x.
- **Open and closed circles.** A closed (filled) circle means the point is on the graph: it goes with a condition that has an equal part. An open circle means the point is not on the graph: it goes with < or > alone.
- **Arrows.** An arrow means a piece keeps going past the edge of the grid.
- **The answer box.** A bordered box for the answer. Click it to type, or print and write in it.
- **The grids.** Every graph is drawn by the program from the function itself. The blank grids are for students to draw on by hand.

Page type	What it looks like	What the student does
Guided Notes and Worked	Blanks, then guided copies	Blanks to fill in, then worked examples with a guided copy.
Evaluate f(x)	18 problems	Pick the rule that fits the x-value, then work it out.
Read the Graph, Graph It	42 items	Read values off a graph, then table and draw a graph.
Write the Rule	10 pieces	Write the rule and the condition for each piece.
Domain and Range	16 items	Read the x-values and y-values off each graph.
Word Problems	18 items	Made-up fees: parking, shipping, bike rental.
Mistakes, Quizzes, Sorts	8 + 18 items, 18 pieces	Find the mistake, two quizzes, exit tickets, three sorts.

Untimed, unscored on the page

No student page has a timer or a score on it. The keys and the tracker are for you. The answer keys are on pages 37 to 42.

Checked by program

Every answer in the keys was computed from the same function that prints the rule and draws the graph. Every domain and range was checked against a long list of sample points. Print at 100 percent.

Printing and the type-in fields

Every page prints clean in black and white. The name line, every answer box, every ruled box and every check box are type-in fields in any PDF reader: click one, type, then save. This is a fillable PDF, not a slideshow or a word-processor file.

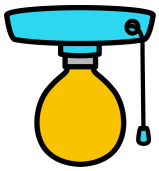
Room to work

Work boxes hold two or three lines of steps. If a student needs more room, hand over one page a day, or let students work on scrap paper and copy the answer into the box.

PREVIEW

Preview - Bright Path Sped

My name _____ Date _____



Guided Notes: The Parts

Read each sentence. Fill in the blanks.

condition	domain	input	output	range	rule

1. A piecewise function uses a different _____ for different parts of the number line.
2. The _____ tells which x-values go with each rule.
3. All the x-values you can put in are called the _____.
4. All the y-values that come out are called the _____.
5. In f(3), the number 3 is the _____.
6. The answer you get from the rule is the _____.

Here is one piecewise function.

$$f(x) = \begin{cases} x + 3 & \text{if } x < 2 \\ 2x - 1 & \text{if } x \geq 2 \end{cases}$$

Teal is the rule. **Purple** is the condition. Read it: "Use x + 3 when x is less than 2. Use 2x - 1 when x is 2 or more."

7. How many pieces does f have? _____
8. Write the rule that goes with $x \geq 2$. _____
9. For x = 5, which condition is true? _____

PREVIEW

Preview - Bright Path Sped

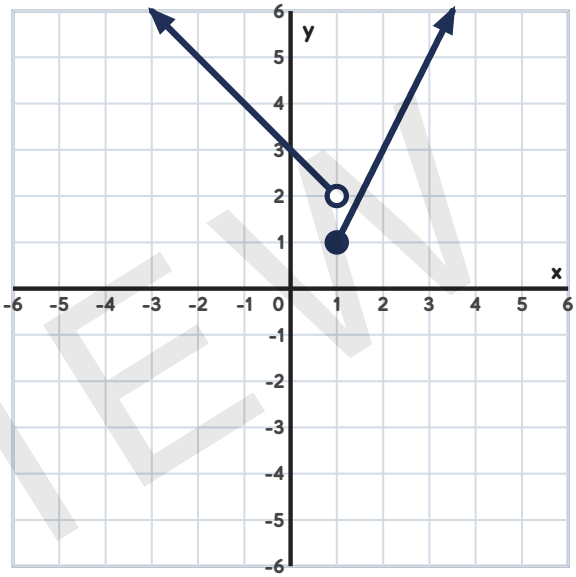
My name _____ Date _____

Worked Examples: Graph It

Read the example. Then fill in the blanks.

Example: Graph f(x).

$$f(x) = \begin{cases} -x + 3 & \text{if } x < 1 \\ 2x - 1 & \text{if } x \geq 1 \end{cases}$$



Piece 1

(1, 2): open circle

It ends at x = 1: -(1) + 3 = -1 + 3 = 2. The condition x < 1 leaves out 1.

Piece 2

(1, 1): closed circle

It starts at x = 1: 2(1) - 1 = 2 - 1 = 1. The condition x ≥ 1 keeps 1.

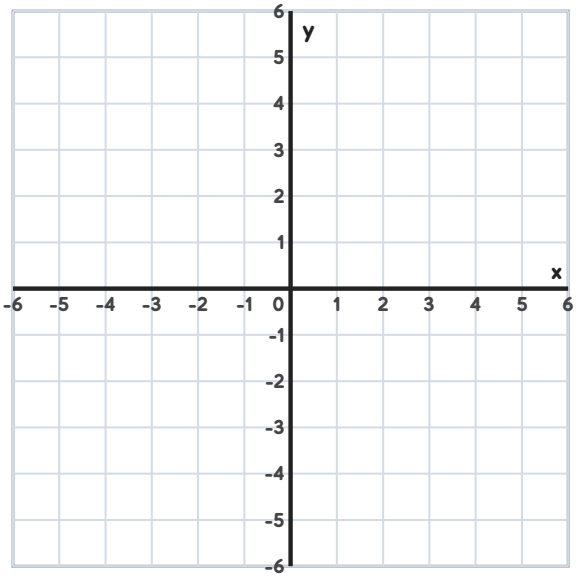
Draw it

(-1, 4) and (3, 5)

One more point on each piece: x = -1 gives 4, and x = 3 gives 5. Add arrows.

Now it is your turn. Graph g(x).

$$g(x) = \begin{cases} x + 3 & \text{if } x \leq -1 \\ -x & \text{if } x > -1 \end{cases}$$



Piece 1

It ends at x = -1. **y =** _____ **circle**

_____

Piece 2

It starts at x = -1. **y =** _____ **circle**

_____

Draw it

Graph both pieces on the grid. Add arrows.

PREVIEW

Preview - Bright Path Sped

My name _____ Date _____

Evaluate f(x) A

Pick the rule. Then work it out.

$$f(x) = \begin{cases} x + 4 & \text{if } x < 0 \\ 2x - 1 & \text{if } x \geq 0 \end{cases}$$

Find which condition is true for x. Use that rule. Write the rule number.

1. $f(-5) =$

   Rule # ____ Answer ____

2. $f(-2) =$

   Rule # ____ Answer ____

3. $f(-1) =$

   Rule # ____ Answer ____

4. $f(0) =$

   Rule # ____ Answer ____

5. $f(1) =$

   Rule # ____ Answer ____

6. $f(3) =$

   Rule # ____ Answer ____

PREVIEW

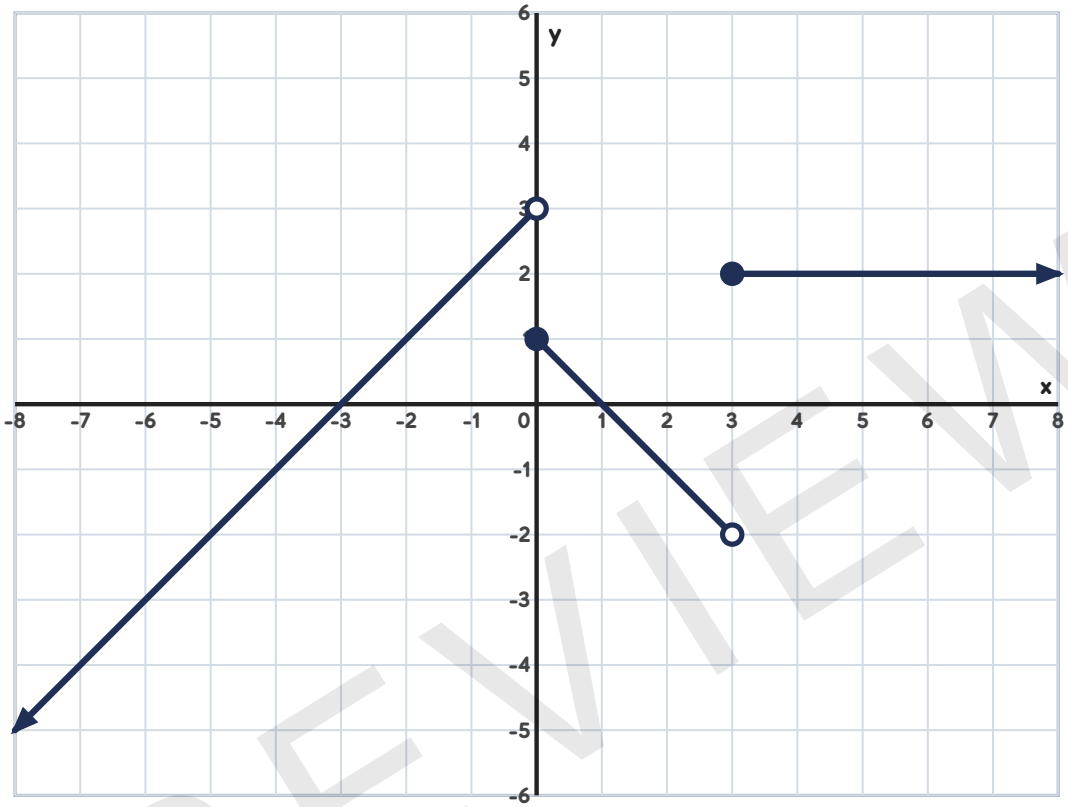
Preview - Bright Path Study

My name _____ Date _____

Read the Graph A

Look at the graph. Write each answer.

A closed circle is on the graph. An open circle is not. An arrow means it keeps going.



1. $f(-4) =$

Answer _____

2. $f(0) =$

Answer _____

3. $f(2) =$

Answer _____

4. $f(3) =$

Answer _____

5. How many pieces?

Answer _____

6. First jump: x =

Answer _____

PREVIEW

Preview - Bright Path Sped

My name _____ Date _____

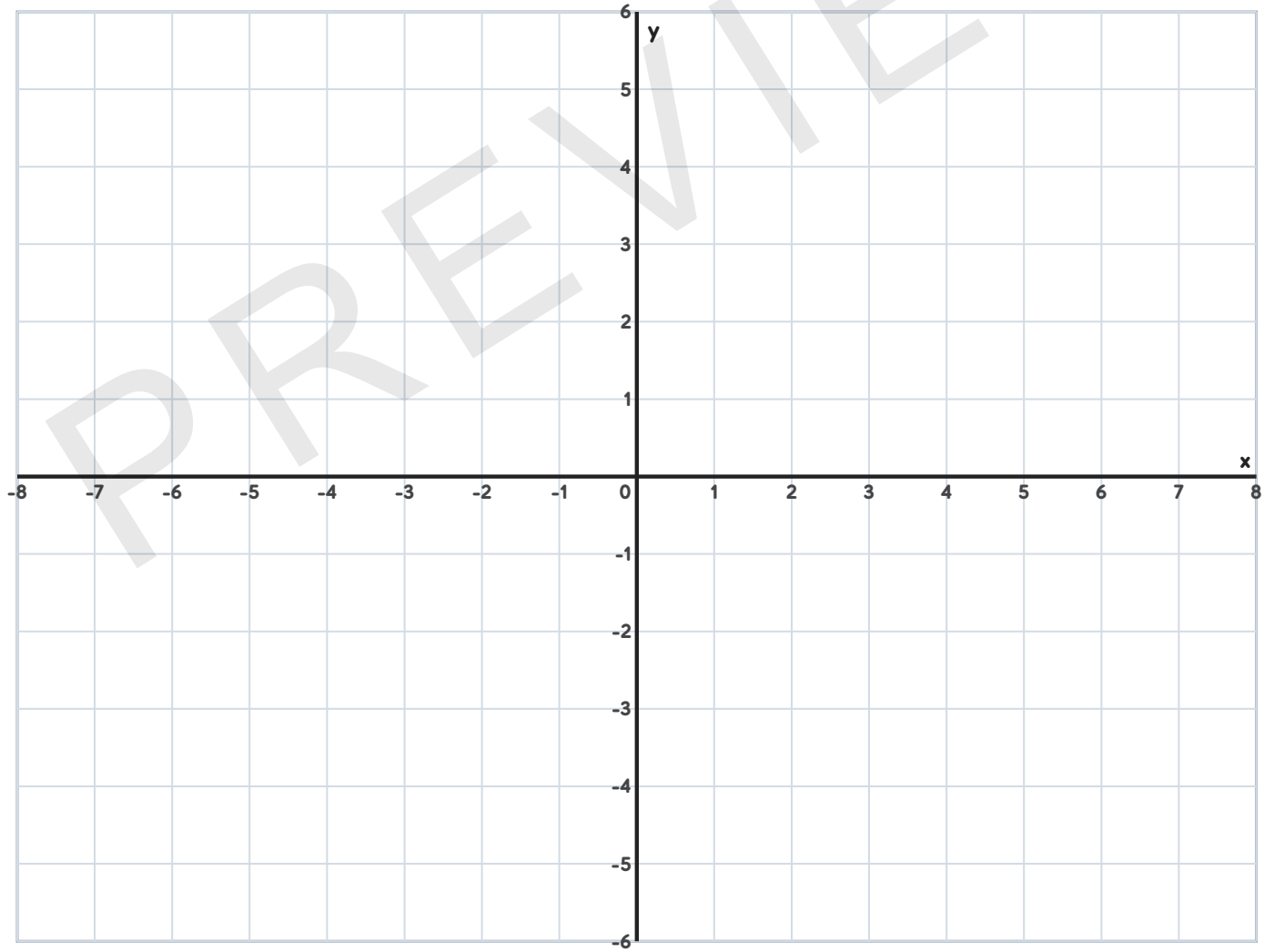
Graph It A

Fill in the table. Then draw the graph.

$$f(x) = \begin{cases} x + 2 & \text{if } x < 1 \\ -x + 1 & \text{if } x \geq 1 \end{cases}$$

Write y for each x. For a circle, write open or closed. Then graph each piece.

Point	1	2	3	4	5	6
x	-2	-1	1	1	3	4
y						
Circle	-	-			-	-



PREVIEW

Preview - Bright Path Shed

My name _____ Date _____

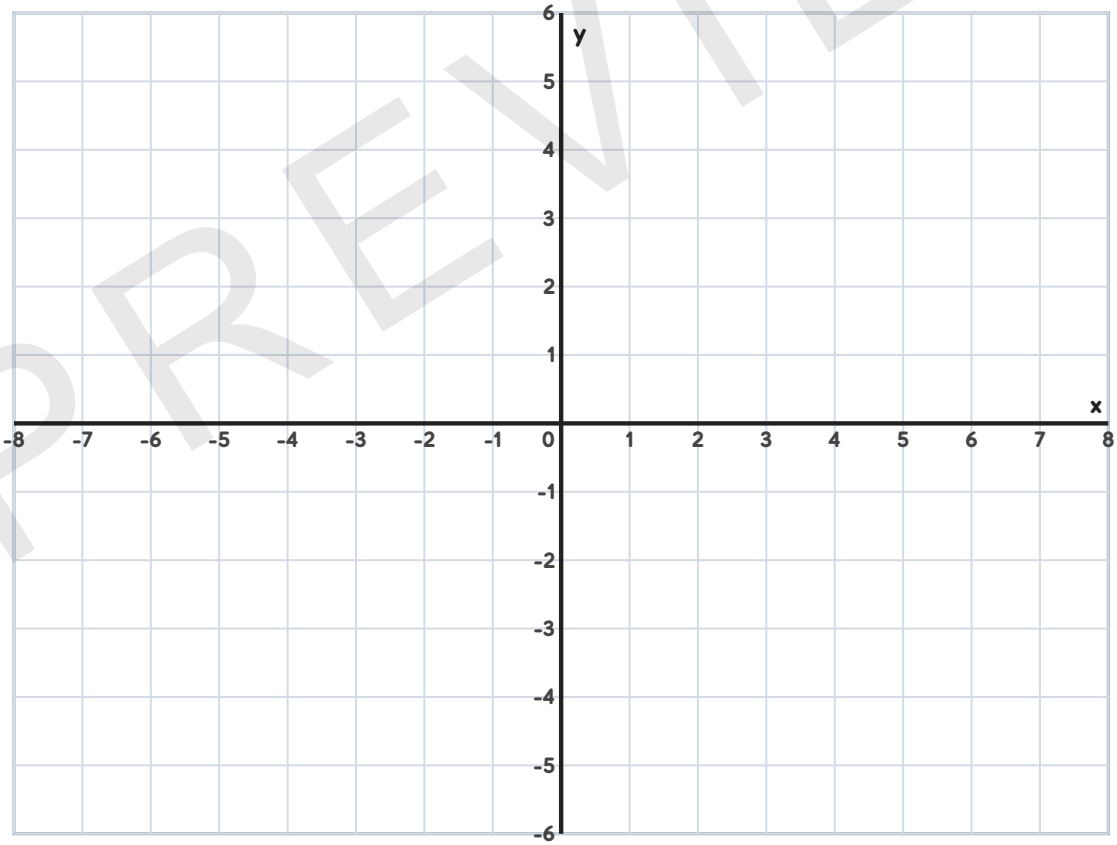
Graph It C

Fill in the table. Then draw the graph.

$$h(x) = \begin{cases} x^2 - 3 & \text{if } -2 \leq x < 1 \\ 2x - 4 & \text{if } 1 \leq x \leq 4 \\ 4 & \text{if } x > 4 \end{cases}$$

Write y for each x. For a circle, write open or closed. Then graph each piece.

Point	1	2	3	4	5	6	7	8	9
x	-2	-1	0	1	1	4	4	6	7
y									
Circle		-	-					-	-



PREVIEW

Preview - Bright Ezee Shop

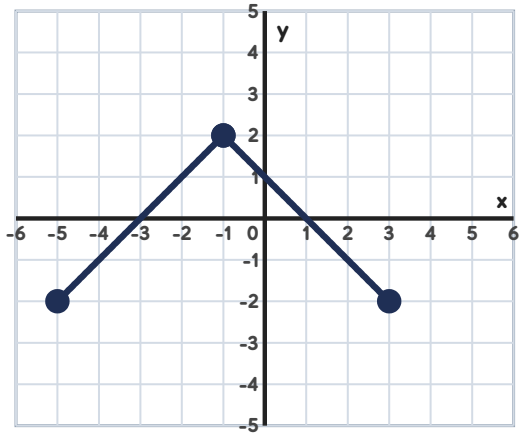
My name _____ Date _____

Domain and Range A

Look at each graph. Write the domain and range.

Domain: the x-values that go in. Range: the y-values that come out.

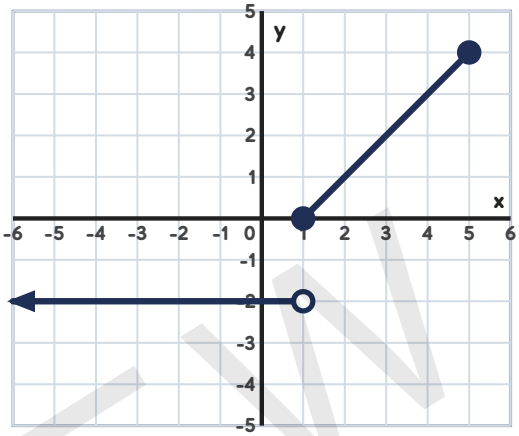
1



Domain _____

Range _____

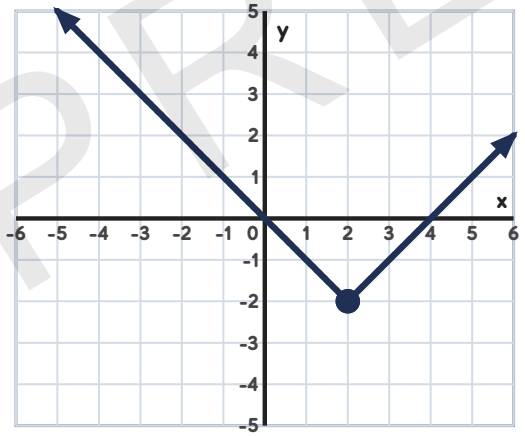
2



Domain _____

Range _____

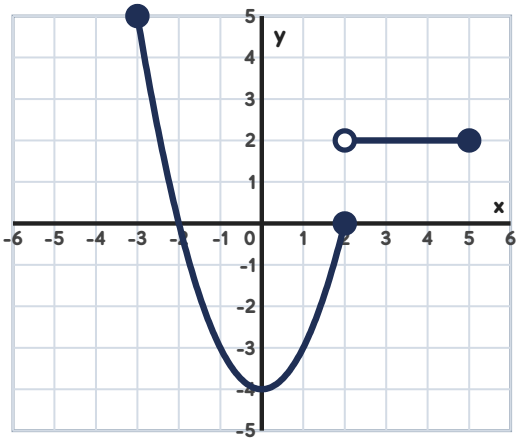
3



Domain _____

Range _____

4



Domain _____

Range _____

PREVIEW

Preview - Bright Path Sped

My name _____ Date _____

Word Problems: Parking

Read the story. Then solve.

Parking. A parking garage in town charges by the hour. It closes after 12 hours. The garage is made up for this page.
Up to and including 1 hour: a flat 4 dollars.
More than 1 hour, up to and including 4 hours: 3 dollars for each hour, plus 1 dollar.
More than 4 hours, up to and including 12 hours: a flat 13 dollars.

$$C(h) = \begin{cases} 4 & \text{if } 0 < h \leq 1 \\ 3h + 1 & \text{if } 1 < h \leq 4 \\ 13 & \text{if } 4 < h \leq 12 \end{cases}$$

1 $C(1) =$

dollars

2 $C(3) =$

dollars

3 $C(6) =$

dollars

4 For how many hours is $C(h) = 10$?

h =

5 What is the most you can pay?

dollars

PREVIEW

Preview - Bright Path Sped

My name _____ Date _____

Find the Mistake A

Find the mistake. Then fix it.

Jo is made up for practice. Each problem has one mistake.

1 **Jo's job: Find f(2).**

$$f(x) = \begin{cases} x + 3 & \text{if } x < 2 \\ 2x - 1 & \text{if } x \geq 2 \end{cases}$$

1. $x = 2$ is on the edge. I will use the first rule.
2. $2 + 3 = 5$
3. $f(2) = 5$

The mistake is on line

☐ 1 ☐ 2 ☐ 3

Fix it. Write the right answer.

2 **Jo's job: Find g(-3).**

$$g(x) = \begin{cases} -2x + 1 & \text{if } x < 0 \\ 3x & \text{if } x \geq 0 \end{cases}$$

1. -3 is less than 0, so I use $-2x + 1$.
2. $-2(-3) + 1 = -6 + 1$
3. $g(-3) = -5$

The mistake is on line

☐ 1 ☐ 2 ☐ 3

Fix it. Write the right answer.

3 **Jo's job: Find f(5).**

$$f(x) = \begin{cases} x + 1 & \text{if } x \leq 3 \\ -x + 10 & \text{if } x > 3 \end{cases}$$

1. The first rule is listed first, so I use it.
2. $5 + 1 = 6$
3. $f(5) = 6$

The mistake is on line

☐ 1 ☐ 2 ☐ 3

Fix it. Write the right answer.

4 **Jo's job: Find h(-2).**

$$h(x) = \begin{cases} x^2 - 3 & \text{if } x < 1 \\ 2x & \text{if } x \geq 1 \end{cases}$$

1. -2 is less than 1, so I use $x^2 - 3$.
2. $-2^2 - 3 = -4 - 3$
3. $h(-2) = -7$

The mistake is on line

☐ 1 ☐ 2 ☐ 3

Fix it. Write the right answer.

PREVIEW

My name _____ Date _____

Quiz A

Work each one. Show your work.

$$q(x) = \begin{cases} -x - 1 & \text{if } x < -2 \\ -2 & \text{if } -2 \leq x < 1 \\ 3x - 5 & \text{if } x \geq 1 \end{cases}$$

Work each one. Show your work in the box.

1 $q(-4) =$

Answer

2 $q(-2) =$

Answer

3 $q(1) =$

Answer

4 $q(3) =$

Answer

5 In the first rule, the circle at $x = -2$ is

☐ **open** ☐ **closed**

6 Find every x where $q(x) = 7$.

x =

PREVIEW

My name _____ Date _____

Exit Tickets 1

Work it out. Tell how sure you are.

Exit ticket 1 $f(x) = \begin{cases} 2x & \text{if } x < 3 \\ x + 3 & \text{if } x \geq 3 \end{cases}$ $f(3) =$

Answer

How sure am I? ☐ **sure** ☐ **kind of sure** ☐ **not sure**

Exit ticket 2 $g(x) = \begin{cases} -x + 2 & \text{if } x \leq 0 \\ x^2 & \text{if } x > 0 \end{cases}$ $g(-4) =$

Answer

How sure am I? ☐ **sure** ☐ **kind of sure** ☐ **not sure**

Exit ticket 3 $h(x) = \begin{cases} 5 & \text{if } x < 1 \\ 3x - 2 & \text{if } x \geq 1 \end{cases}$ $h(4) =$

Answer

How sure am I? ☐ **sure** ☐ **kind of sure** ☐ **not sure**

PREVIEW

Preview - Bright Path Sped

My name _____ Date _____

Cut and Paste 2

Cut out the six pieces. Paste each one in the right box.

$$z(x) = \begin{cases} x^2 & \text{if } x < 2 \\ 2x & \text{if } 2 \leq x < 5 \\ -2x + 18 & \text{if } x \geq 5 \end{cases}$$

Find each output. Paste each piece in the box with its answer.

$z(x) = 1$	$z(x) = 4$	$z(x) = 6$

Cut on the dashed lines: six pieces, one cut across and two cuts down.

$z(2)$	$z(6)$	$z(-1)$
$z(-2)$	$z(3)$	$z(1)$

Pick one piece. Show how you found its output.

PREVIEW

My name _____ Date _____

Check My Own Work

Check your own work. Mark yes or not yet.

1	I can tell which condition is true for an x-value.	☐ yes	☐ not yet
2	I can find f(x) from a piecewise rule.	☐ yes	☐ not yet
3	I know when a circle is open and when it is closed.	☐ yes	☐ not yet
4	I can graph each piece of a piecewise function.	☐ yes	☐ not yet
5	I can read f(x) from a graph.	☐ yes	☐ not yet
6	I can write the rule for a piece from its graph.	☐ yes	☐ not yet
7	I can write the domain and the range.	☐ yes	☐ not yet
8	I can find and fix a mistake in someone else's work.	☐ yes	☐ not yet

The kind of piecewise problem I can do now is...

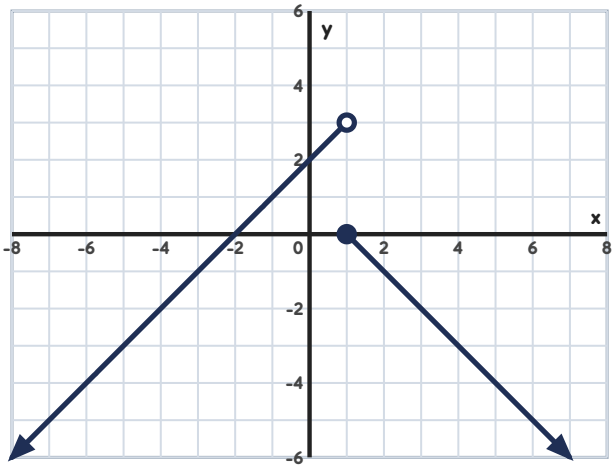
The kind I still need help with is...

PREVIEW

Answer Key: Graph It

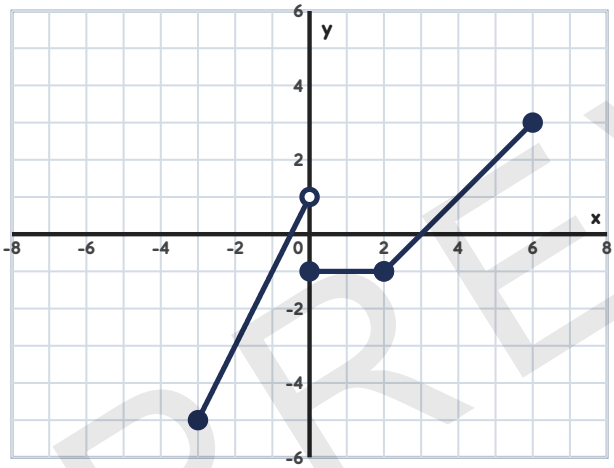
Drawn by the program from the same functions as student pages 16 to 18. Accept the same table points, the same open and closed circles, and an arrow on any piece that goes on forever. A squared piece should curve through its points.

Page 16, Graph It A



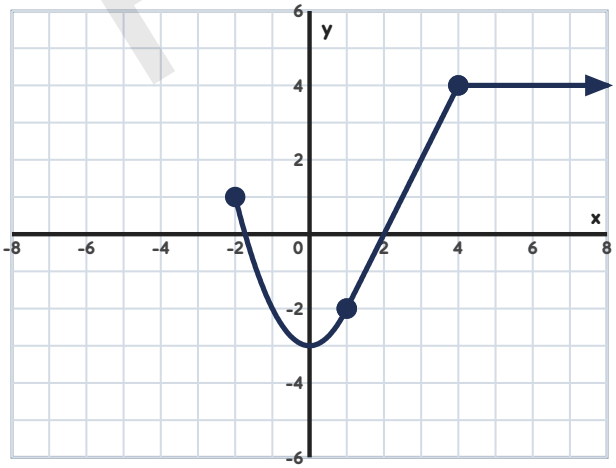
x	y	Circle
-2	0	-
-1	1	-
1	3	open
1	0	closed
3	-2	-
4	-3	-

Page 17, Graph It B



x	y	Circle
-3	-5	closed
0	1	open
0	-1	closed
2	-1	open
2	-1	closed
6	3	closed

Page 18, Graph It C



x	y	Circle
-2	1	closed
-1	-2	-
0	-3	-
1	-2	open
1	-2	closed
4	4	closed
4	4	open
6	4	-
7	4	-

PREVIEW

Answer Key: Quizzes, Exit Tickets and Sorts

Pages 29 to 35. Sort pieces are named by their row and column in the cutting grid, left to right and top to bottom. Accept any correct method on the quizzes.

Item	Prompt	Answer
p29 #1	q(-4)	3
p29 #2	q(-2)	-2
p29 #3	q(1)	-2
p29 #4	q(3)	4
p29 #5	Circle at x = -2 on the first rule	open
p29 #6	Every x where q(x) = 7	x = -8 or x = 4
p30 #1	p(-3)	1
p30 #2	p(2)	-1
p30 #3	p(4)	2
p30 #4	Domain	$-5 \leq x \leq 5$
p30 #5	Range	$-2 < y \leq 4$
p30 #6	Every x where p(x) = 2	x = -2 or x = 4
p31 #1	f'(3)	6
p31 #2	g(-4)	6
p31 #3	h(4)	10
p32 #1	f'(-1)	-1
p32 #2	g(5)	-1
p32 #3	h(2)	5

Item	Prompt	Answer
p33 #1	r1 c1: x = 2	rule 2: -2
p33 #2	r1 c2: x = 5	rule 3: 2x - 8
p33 #3	r1 c3: x = -2	rule 1: x + 5
p33 #4	r2 c1: x = -1	rule 2: -2
p33 #5	r2 c2: x = 3	rule 3: 2x - 8
p33 #6	r2 c3: x = -4	rule 1: x + 5
p34 #1	r1 c1: z(2)	box 4
p34 #2	r1 c2: z(6)	box 6
p34 #3	r1 c3: z(-1)	box 1
p34 #4	r2 c1: z(-2)	box 4
p34 #5	r2 c2: z(3)	box 6
p34 #6	r2 c3: z(1)	box 1
p35 #1	r1 c1: 2, $x \leq 0$	graph 2
p35 #2	r1 c2: x - 4, $x \geq 2$	graph 3
p35 #3	r1 c3: x + 2, $x < 1$	graph 1
p35 #4	r2 c1: x + 3, $x > 0$	graph 2
p35 #5	r2 c2: -x, $x < 2$	graph 3
p35 #6	r2 c3: -x + 4, $x \geq 1$	graph 1

PREVIEW

Class Progress Grid

Every student on one grid: items right by page type.

Class or group _____ Month _____

Student	Worked (of 7)	Evaluate (of 18)	Read the graph (of 18)	Graph it (of 24)	Write the rule (of 10)	Domain, range (of 16)	Word problems (of 18)	Mistakes (of 8)	Quizzes, sorts (of 36)

PREVIEW

How to fill this in

For each column, add up how many items that student has right with no prompt (the tracker rows). One glance across a row shows which skill is easiest and which is next.

Grouping for small-group time

Students low in Evaluate need the notes and the first worked page (pages 5 to 7). Students low in the graph columns need the graph worked page (page 8) first. Students near full marks can move to the mistakes and the quizzes (pages 26 to 30).

Maya's Tracker (Invented Student)

Maya R. is invented; nothing on this page describes a real student. The blank tracker is on page 43.

Student: Maya R. (an invented student)

Teacher: Mr. Okafor (invented)

Month: October

Page	Page type and set	Items	Right	Date	Notes
7	Worked Examples: Evaluate f(x)	2	2	10/6	-
8	Worked Examples: Graph It	3	-	-	-
9	Worked Examples: Domain and Range	2	-	-	-
10	Evaluate f(x) A	6	5	10/7	Used the first rule at x = 0
11	Evaluate f(x) B	6	6	10/8	-
12	Evaluate f(x) C	6	-	-	-
13	Read the Graph A	6	4	10/9	Read an open circle as part of the graph
14	Read the Graph B	6	6	10/10	-
15	Read the Graph C	6	-	-	-
16	Graph It A	7	7	10/13	-
17	Graph It B	7	-	-	-
18	Graph It C	10	-	-	-
19	Write the Rule A	5	-	-	-
20	Write the Rule B	5	-	-	-
21	Domain and Range A	8	6	10/14	Left out a closed end of the range
22	Domain and Range B	8	-	-	-
23	Word Problems: Parking	5	5	10/15	-
24	Word Problems: Shipping	7	-	-	-
25	Word Problems: Bike Rental	6	-	-	-
26	Find the Mistake A	4	3	10/16	One fix not finished
27	Find the Mistake B	4	-	-	-
29	Quiz A	6	-	-	-
30	Quiz B	6	-	-	-
31	Exit Tickets 1	3	-	-	-
32	Exit Tickets 2	3	-	-	-
33	Cut and Paste 1	6	-	-	-
34	Cut and Paste 2	6	-	-	-
35	Cut and Paste 3	6	-	-	-

How to read it

Maya R. has done **9 of 28** scored pages and got **44 of 50** items right with no prompt. **5** pages were all right and **4** carry a note. Every number comes from the table.

What the table points to

The lowest page is Read the Graph A (4 of 6). That is where the next practice goes. The 19 pages left blank are not tried yet, never wrong.

PREVIEW