

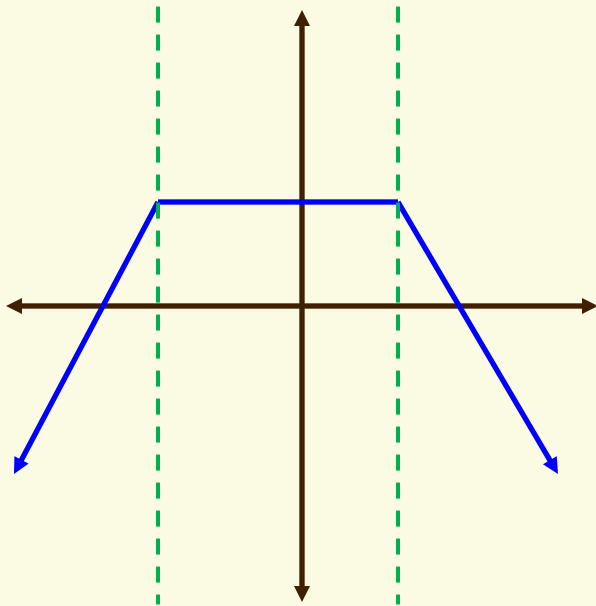
A spiral-bound notebook with a light brown, textured cover. The spiral binding is on the left side. The text is centered on the cover.

Algebra II

Section 5.5

Piecewise Functions

Piecewise Functions



The relation on the left is a function, but it is not linear.

However, parts of it are linear.

If we break this up into 3 pieces, each piece is a linear function.

We call this kind of function a **Piecewise function**. We can break it up into different functions, depending on the domain. Each individual function is easy to work with

Piecewise Functions

A Piecewise Function is defined with an equation for each piece and the domain for which it applies.

$$f(x) = \begin{cases} x + 5, & x < -2 & \text{if } x < -2, \text{ then } f(x) = x + 5 \\ 3, & -2 \leq x < 3 & \text{if } -2 \leq x < 3, \text{ then } f(x) = 3 \\ -x + 6, & x \geq 3 & \text{if } x \geq 3, \text{ then } f(x) = -x + 6 \end{cases}$$

Which equation you use depends on what your input is.

Piecewise Functions

$$f(x) = \begin{cases} x + 5, & x < -2 \\ 3, & -2 \leq x < 3 \\ -x + 6, & x \geq 3 \end{cases}$$

$$f(-5) = -5 + 5 = 0$$

$$f(1) = 3$$

$$f(7) = -7 + 6 = -1$$

Give it a Try

$$f(x) = \begin{cases} 2x - 5, & \text{if } x < 2 \\ x^2, & \text{if } x \geq 2 \end{cases}$$

$$g(x) = \begin{cases} 2, & \text{if } x < -5 \\ 6, & \text{if } -5 \leq x < 2 \\ 10, & \text{if } x \geq 2 \end{cases}$$

$$h(x) = \begin{cases} x + 2, & \text{if } x < 2 \\ 3x - 3, & \text{if } 2 \leq x < 25 \\ 2x + 7, & \text{if } x \geq 25 \end{cases}$$

1) $f(10) = 100$

2) $f(0) = -5$

3) $f(2) = 4$

4) $g(10) = 10$

5) $g(-10) = 2$

6) $g(0) = 6$

7) $h(-5) = -3$

8) $h(10) = 27$

9) $h(50) = 107$

10) $h(2) = 3$

Give it a Try

$$f(x) = \begin{cases} 2x - 5, & \text{if } x < 2 \\ x^2, & \text{if } x \geq 2 \end{cases}$$

$$g(x) = \begin{cases} 2, & \text{if } x < -5 \\ 6, & \text{if } -5 \leq x < 2 \\ 10, & \text{if } x \geq 2 \end{cases}$$

$$h(x) = \begin{cases} x + 2, & \text{if } x < 2 \\ 3x - 3, & \text{if } 2 \leq x < 25 \\ 2x + 7, & \text{if } x \geq 25 \end{cases}$$

1) $f(10) =$

2) $f(0) =$

3) $f(2) =$

4) $g(10) =$

5) $g(-10) =$

6) $g(0) =$

7) $h(-5) =$

8) $h(10) =$

9) $h(50) =$

10) $h(2) =$