

Evaluating Piecewise Functions

Evaluating a function simply means finding its y value for some x value. In general there are two ways to do this:

1. Use the graph to find the y value that corresponds to the x value.
2. Use the function itself.

We are going to use the second method.

Example 1

Evaluate

$$f(x) = \begin{cases} -x+2 & x < 1 \\ 3x-4 & x \geq 1 \end{cases}$$

at $x = 3$.

Step 1: Determine which expression to use

For this piecewise function, when $x \geq 1$, we must use the second expression $y = 3x - 4$ to obtain the value of the function. Since $3 \geq 1$, we must use $y = 3x - 4$ for $x = 3$. If you are uncertain why, check out the graph of this function in the previous notes.

Step 2: Substitute and Solve

$$\begin{aligned} y &= 3x - 4 \\ y &= 3(3) - 4 \\ y &= 9 - 4 \\ y &= 5 \end{aligned}$$

That's it: $f(3) = 5$

Example 2

Evaluate

$$f(x) = \begin{cases} -x+2 & x < 1 \\ 3x-4 & x \geq 1 \end{cases}$$

at $x = 1$; that is, evaluate $f(1)$.

Step 1: Determine which expression to use

For this piecewise function, when $x \geq 1$, we must use the second expression $y = 3x - 4$ to obtain the value of the function. Since $1 \geq 1$, we must use $y = 3x - 4$ for $x = 1$. If you are uncertain why, check out the graph of this function in the previous notes.

Step 2: Substitute and Solve

$$\begin{aligned} y &= 3x - 4 \\ y &= 3(1) - 4 \\ y &= 3 - 4 \\ y &= -1 \end{aligned}$$

That's it: $f(1) = -1$

Example 2

Evaluate

$$f(x) = \begin{cases} x+1 & x < -2 \\ 3 & -2 \leq x < 1 \\ -2x+4 & x \geq 1 \end{cases}$$

at $x = 0$; that is, evaluate $f(0)$.

Step 1: Determine which expression to use

For this piecewise function, when $-2 \leq x < 1$, we must use the second expression $y = 3$ to obtain the value of the function. Since $-2 \leq 0 < 1$, we must use $y = 3$ for $x = 0$. If you are uncertain why, check out the graph of this function in the previous notes.

Step 2: Substitute and Solve

$$y = 3$$

Not much to do here: $f(0) = 3$