Test 3: Thursday, October 30
Sections 2.2–2.6
A practice test will be available on WebCT by the weekend.

Section 2.6
Piecewise-defined Functions

Objectives
1. Evaluate a piecewise-defined function
2. Graph a piecewise-defined function
3. Evaluate and graph the greatest integer function

Piecewise-defined functions—functions that are defined using different expressions corresponding to different conditions satisfied by the input variable.

Example: The function f is defined as

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

If you're plugging in a value of x that's less than −1, use this expression.
If you're plugging in a value of x that's −1 or greater, use this expression.

Evaluate the following:

$f(-3) = (-3) + 3 = 0$

Use first expression

$f(0) = -2(0) - 3 = -3$

Use second expression

$f(3) = -2(3) - 3 = -9$

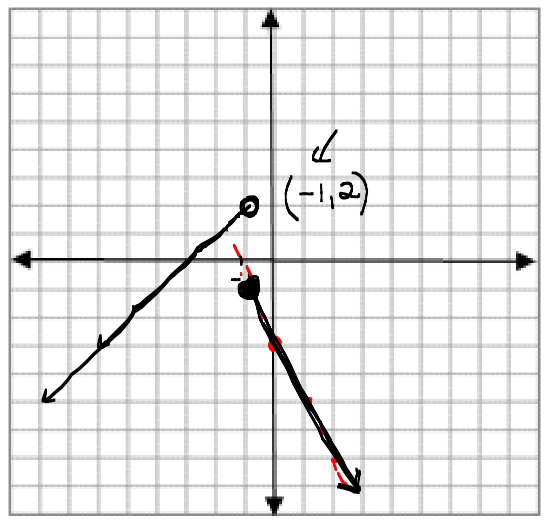
Example: Graph the following piecewise-defined function:

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

Make an open circle on the graph because −1 is not included in the interval

Closed circle because −1 is included in the interval.

$f(-1.00001) = 1.99999$

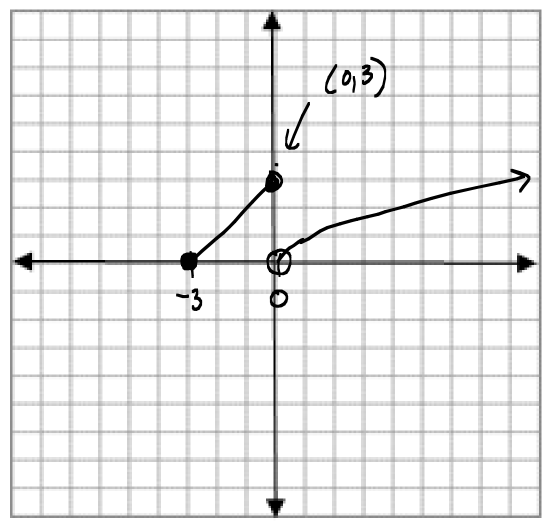


Example: Graph the following piecewise-defined function:

$$f(x) = \begin{cases} x+3 & \text{if } -3 \leq x < 0 \\ 3 & \text{if } x = 0 \\ \sqrt{x} & \text{if } x > 0 \end{cases}$$

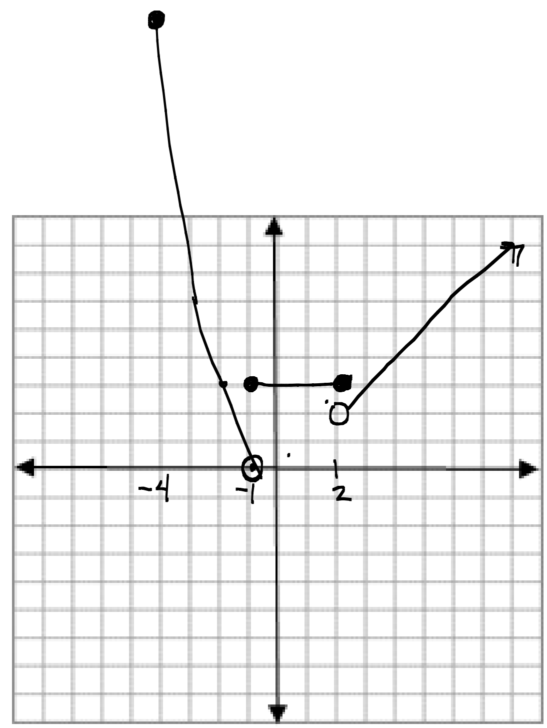
When $x = 0$, $y = 3$ $f(x)$

open



Example: Graph the following piecewise-defined function:

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

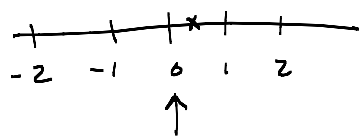


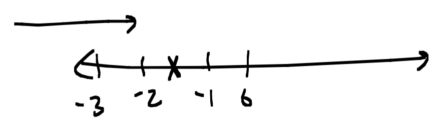
Greatest Integer Function ... $-3, -2, -1, 0, 1, 2, 3$ ...

$f(x) = [\![x]\!] = int(x)$ = greatest integer less than or equal to x

Example: Find $f(1)$ = 1

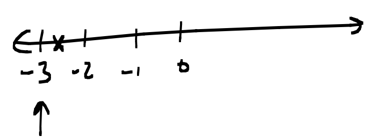
Example: Find $f(0.3)$ = 0



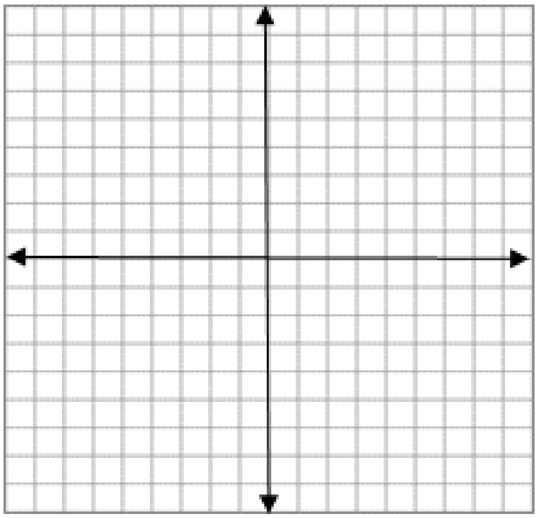


Example: Find $f(-1.4)$ = -2

$f(-2.6) = -3$



Take a look at the graph of $f(x) = [\![x]\!] = int(x)$



Homework: Section 2.6: 1-29 (odd)