piecewise function-- A piecewise function is one which is defined not by a single equation, but by two or more. Each equation is valid for some interval.
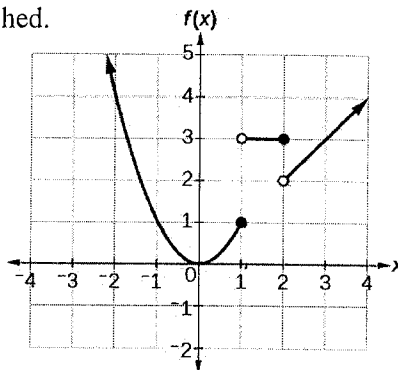
Evaluating a piecewise function

- Be sure to use the piece of the graph that contains the appropriate domain value.

Example 1   Evaluate using the piecewise function graphed.

$f(-1) =$ ___1___

$f(1) =$ ___1___

$f(2) =$ ___3___

Example 2   Evaluate using the given piecewise function.

$f(2) =$ ___−6___ $f(3) =$ ___2___
$-(2)-4$ $(3)^2-7$

$f(10) =$ ___93___ $f(12) =$ ___15___
$(10)^2-7$ $\dfrac{120}{12}+5$

$$f(x) = \begin{cases} -x-4 & , \quad x < 3 \\ x^2-7 & , \quad 3 \le x \le 10 \\ \dfrac{120}{x}+5 & , \quad x > 10 \end{cases}$$

Hints for graphing a piecewise function

- Draw boundary lines at the "breaks".
- Make a t-chart for each piece and graph the points.
- Use your knowledge of parent functions.
- When you have ‹ or ›, you will use an open circle at that point.
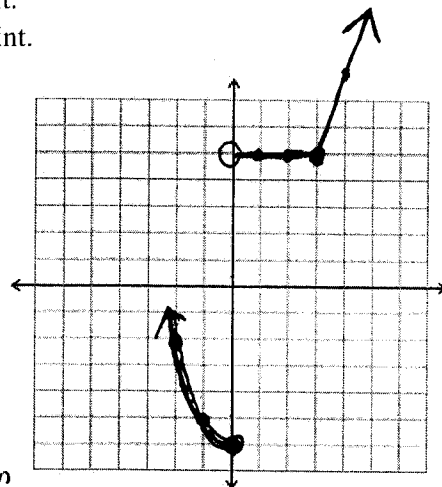- When you have $\le$ or $\ge$, you will use a closed circle at that point.

Example 3   Graph $f(x) = \begin{cases} x^2-6, & x \le 0 \\ 5, & 0 < x \le 3 \\ 3x-4, & x > 3 \end{cases}$

x	y
0	-6
-1	-5
-2	-2

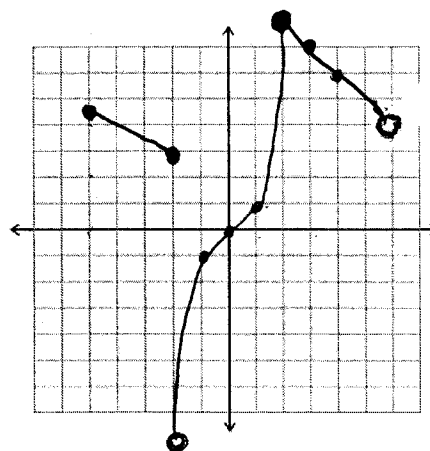| x	y
0	5 open
1	5
2	5
3	5

x	y
3	5 open
4	8

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Example 4   Graph $g(x) = \begin{cases} -\dfrac{1}{2}x + 2, & -5 \le x \le -2 \\ x^3, & -2 < x < 2 \\ -x + 10, & 2 \le x < 6 \end{cases}$

x	y
-5	4.5
-2	3

x	y	
-2	-8	open
-1	-1	
0	0	
1	1	
2	8	open

x	y	
2	8	
3	7	
4	6	
6	4	open

Example 5   Graph $h(x) = \begin{cases} 5, & x < -4 \\ 1 + |x|, & -4 \le x \le 3 \\ -\dfrac{2}{3}x + 6, & x > 3 \end{cases}$

x	y
-4	5
3	4

x	y	
3	4	open
6	2	
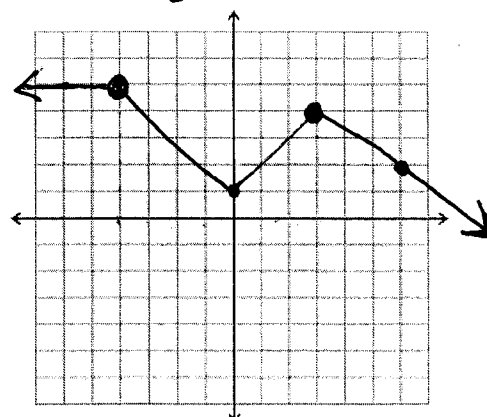
Example 6   Graph and evaluate:

$f(x) = [\![x]\!] - 3$

$f(0) = \underline{\quad -3 \quad}$
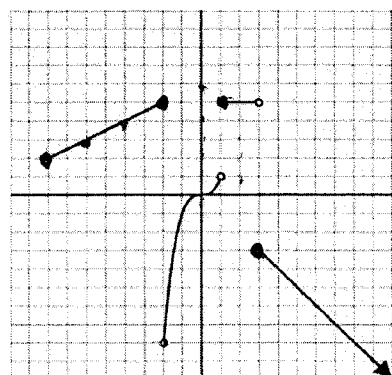
$f(1) = \underline{\quad -2 \quad}$

$f(6.1) = \underline{\quad 3 \quad}$
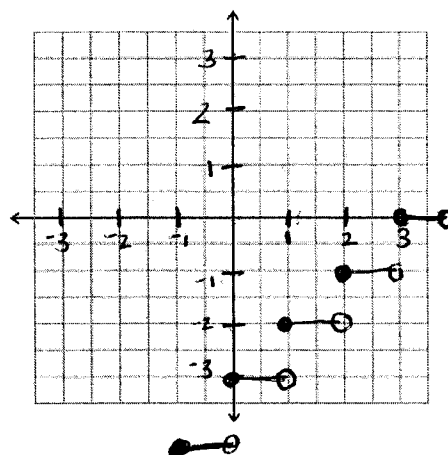
Example 7   Write an equation for the piecewise function graphed.

$f(x) = \begin{cases} \dfrac{1}{2}x + 6, & -8 \le x \le -2 \\ x^3, & -2 < x < 1 \\ 5, & 1 \le x < 3 \\ -x, & x \ge 3 \end{cases}$

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