Section 3 – Topic 3
Graphing and Writing
Piecewise–Defined Functions – Part 1

To graph piecewise-defined functions, graph each "piece" of the function on the same graph.

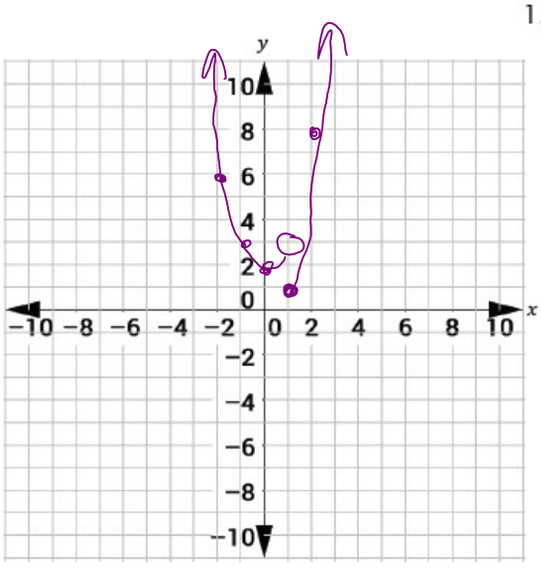
Domain restrictions must be considered when graphing each piece.

Domain - x-values

Let's Practice!

1. Graph the following piecewise-defined function.

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



$x^2 + 2$

x	y
1	3
0	2
-1	3
-2	6

x^3

x	y
1	1
2	8
3	27

a. What is the domain of the function?

$(-\infty, \infty)$

b. What is the range of the function?

$[1, \infty)$

c. What, if any, are the x –intercepts of the function?

none

d. What, if any, is the y –intercept of the function?

$y = 2$ $(0,2)$

e. Over what interval(s) is the function increasing? Decreasing?

Increasing $(0,1), (1,\infty)$ Decreasing $(-\infty, 0)$

f. What, if any, are the relative maximums of the graph?

none

g. What, if any, are the relative minimums of the graph?

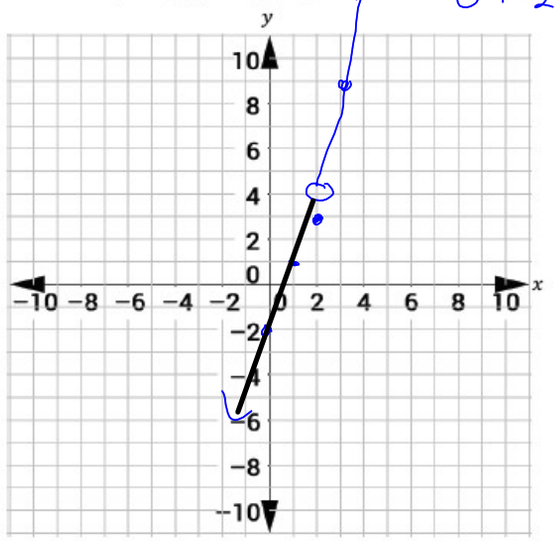
$(0,2)$

h. Is this function considered to be continuous? Why or why not?

no, because there is a gap at $x=1$

Try it!

2. Graph $f(x) = \begin{cases} 3x-2, & x < 2 \\ 3, & x = 2 \\ x^2, & x > 2 \end{cases}$



3x-2

x	y
2	4
1	1
0	-2

x^2

x	y
2	4
3	9
4	16

a. What is the domain of the function?

$(-\infty, \infty)$

b. What is the range of the function?

$(-\infty, 4) \cup (4, \infty)$

c. Is the function continuous?

no

$\cup$ = Union - break in the graph