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

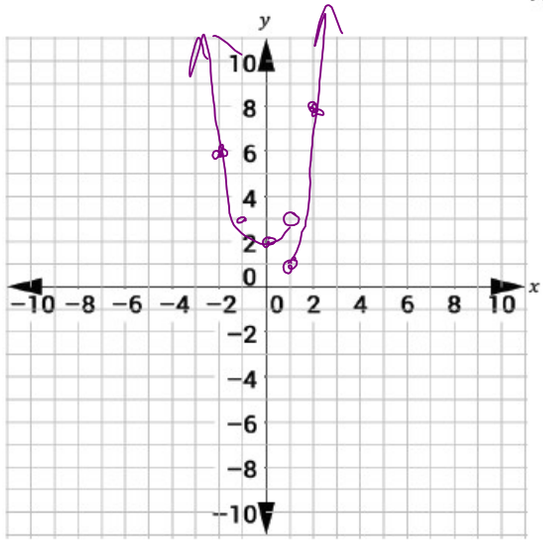
To graph piecewise-defined functions, graph each "piece" of the function on the same graph.

Domain restrictions must be considered when graphing each piece.

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

$>, <$ = open

$\leq, \geq$ = closed

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?

$(0, 2)$

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

$(0, \infty)$

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

None

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

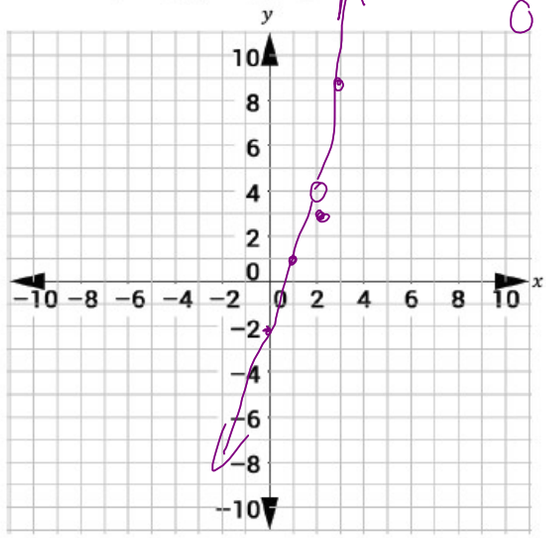
$(0, 2)$

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

No, there is a gap in the y-values.

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

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 - gap or break in the graph