USING INTERVAL NOTATION*

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Abstract

An introductory explanation on how to use interval notation (versus set notation)

Interval notation is another method for writing domain and range.

In set builder notation braces (curly parentheses {}) and variables are used to express the domain and range. Interval notation is often considered more efficient.

In interval notation, there are only 5 symbols to know:

- Open parentheses ()
- Closed parentheses []
- Infinity ∞
- Negative Infinity $-\infty$
- Union Sign ∪

To use interval notation:

Use the open parentheses () if the value is not included in the graph. (i.e. the graph is undefined at that point... there's a hole or asymptote, or a jump)

If the graph goes on forever to the left, the domain will start with ($-\infty$. If the graph travels downward forever, the range will start with ($-\infty$. Similarly, if the graph goes on forever at the right or up, end with ∞)

Use the brackets [] if the value is part of the graph.

Whenever there is a break in the graph, write the interval up to the point. Then write another interval for the section of the graph after that part. Put a union sign between each interval to "join" them together. Now for some practice so you can see if any of this makes sense.

Write the following using interval notation:

Exercise 1 (Solution on p. 17.)

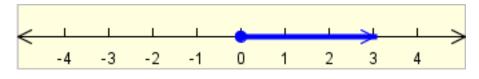


Figure 1

^{*}Version 1.2: May 1, 2006 2:26 pm -0500

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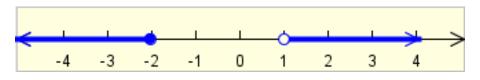


Figure 2

Exercise 3 (Solution on p. 17.)

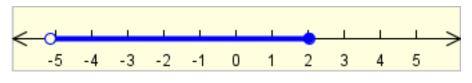


Figure 3

Exercise 4 (Solution on p. 17.)

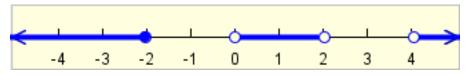


Figure 4

Exercise 5 (Solution on p. 17.)

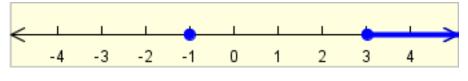


Figure 5

Exercise 6 (Solution on p. 17.)

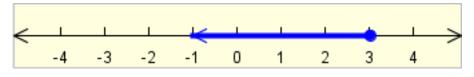


Figure 6

Write the domain and range of the following in interval notation:

Exercise 7 (Solution on p. 17.)

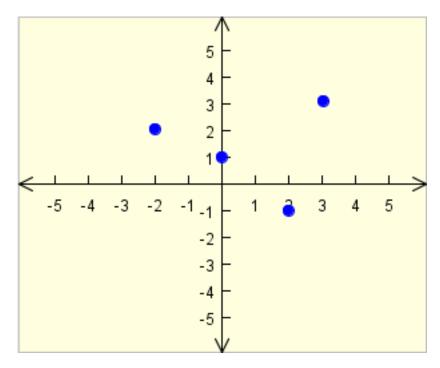


Figure 7

Exercise 8 (Solution on p. 17.)

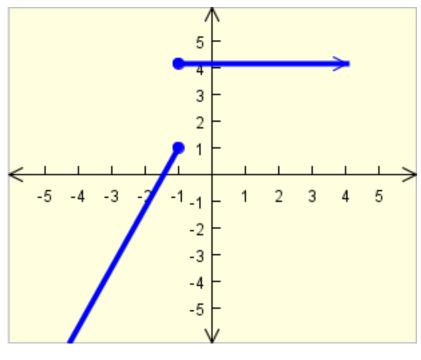


Figure 8

Exercise 9 (Solution on p. 17.)

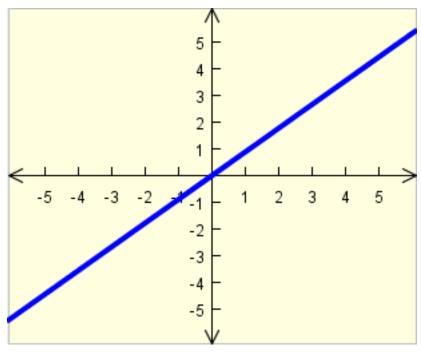


Figure 9

Exercise 10 (Solution on p. 17.)

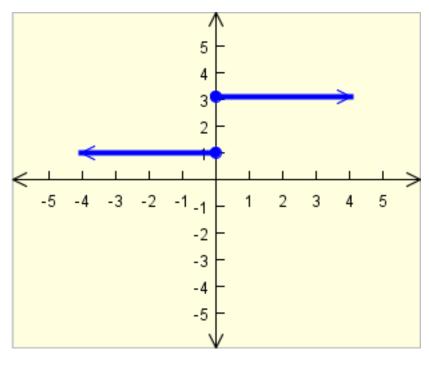


Figure 10

Exercise 11 (Solution on p. 17.)

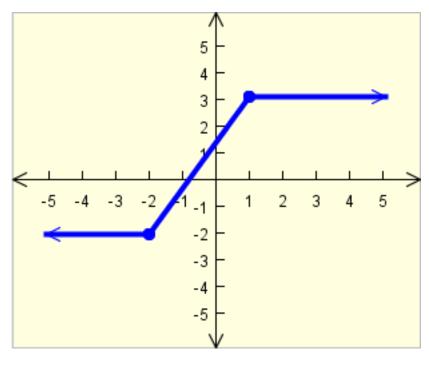


Figure 11

Exercise 12 (Solution on p. 17.)

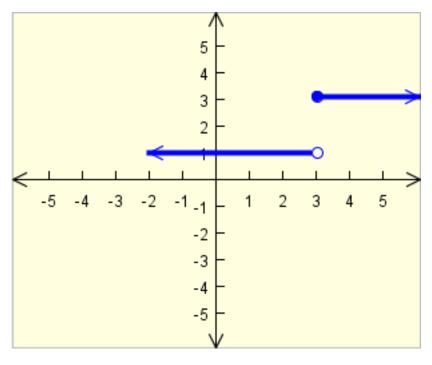


Figure 12

Exercise 13 (Solution on p. 17.)

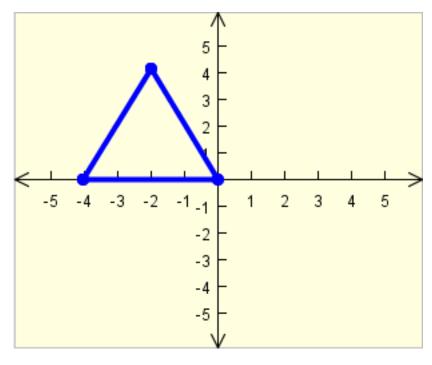


Figure 13

Exercise 14 (Solution on p. 17.)

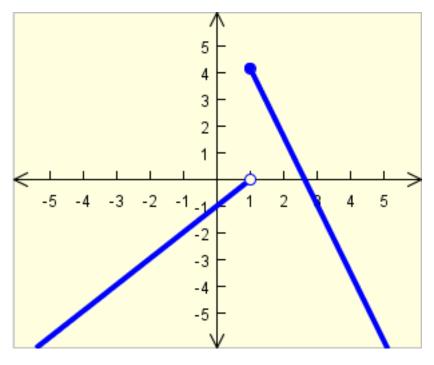


Figure 14

Exercise 15 (Solution on p. 17.)

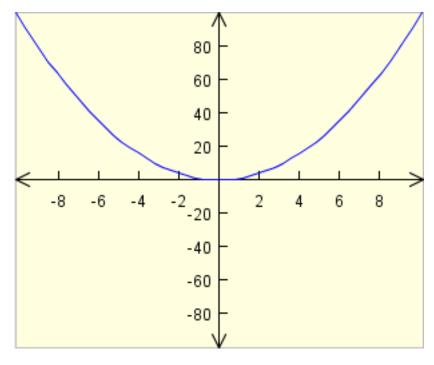


Figure 15

Exercise 16 (Solution on p. 17.)

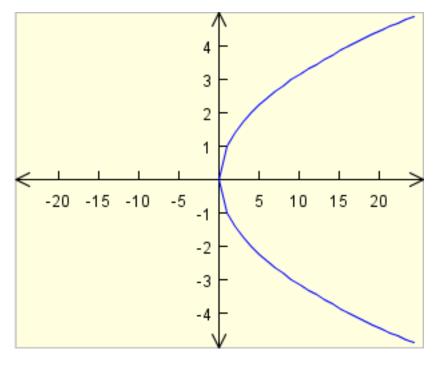


Figure 16

Exercise 17 (Solution on p. 17.)

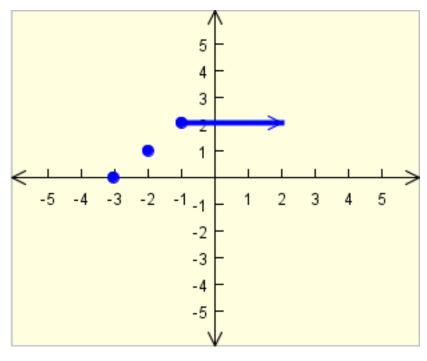


Figure 17

Exercise 18 (Solution on p. 17.)

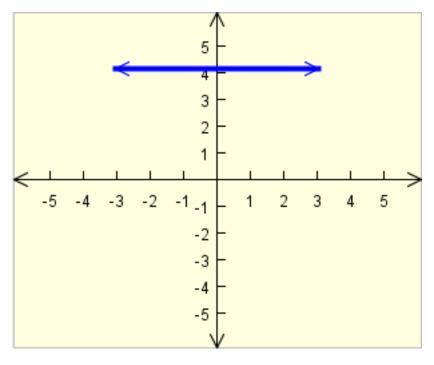


Figure 18

Exercise 19 (Solution on p. 17.)

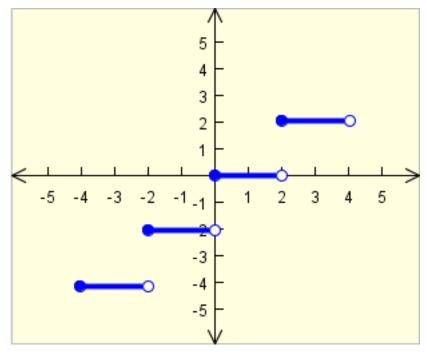


Figure 19

Exercise 20 (Solution on p. 18.)

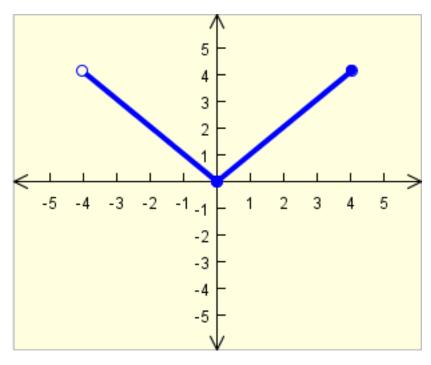


Figure 20

Solutions to Exercises in this Module

```
Solution to Exercise (p. 1)
[0,\infty)
Solution to Exercise (p. 2)
(-\infty, -2] \cup (1, \infty)
Solution to Exercise (p. 2)
(-5, 2]
Solution to Exercise (p. 2)
(-\infty, -2] \cup (0, 2) \cup (4, \infty)
Solution to Exercise (p. 2)
[-1] \cup [3,\infty)
Solution to Exercise (p. 2)
(-\infty,3]
Solution to Exercise (p. 3)
Domain: [-2] \cup [0] \cup [2] \cup [3]
   Range: [-1] \cup [1] \cup [2] \cup [3]
Solution to Exercise (p. 3)
Domain: (-\infty, \infty)
   Range: (\infty, 1] \cup [4]
Solution to Exercise (p. 4)
Domain: (-\infty, \infty)
   Range: (-\infty, \infty)
Solution to Exercise (p. 5)
Domain: (-\infty, \infty)
   Range: [1] \cup [3]
Solution to Exercise (p. 6)
Domain: (-\infty, \infty)
   Range: [-2,3]
Solution to Exercise (p. 7)
Domain: (-\infty, \infty)
   Range: [1] \cup [3]
Solution to Exercise (p. 8)
Domain: [-4,0]
   Range: [0,4]
Solution to Exercise (p. 9)
Domain: (-\infty, \infty)
   Range: (-\infty, 4]
Solution to Exercise (p. 10)
Domain: (-\infty, \infty)
   Range: [0, \infty)
Solution to Exercise (p. 11)
Domain: [0, \infty)
   Range: (-\infty, \infty)
Solution to Exercise (p. 12)
Domain: [-3] \cup [-2] \cup [-1, \infty)
   Range: [0] \cup [1] \cup [2]
Solution to Exercise (p. 13)
Domain: (-\infty, \infty)
   Range: [4]
```

Solution to Exercise (p. 14)

Domain: [-4,4)

Range: $[-4] \cup [-2] \cup [0] \cup [2]$ Solution to Exercise (p. 15)

Domain: (-4, 4]Range: [0, 4]