

Algebra II

Lesson 2: Domain and Range of Parent Functions

Mrs. Snow, Instructor

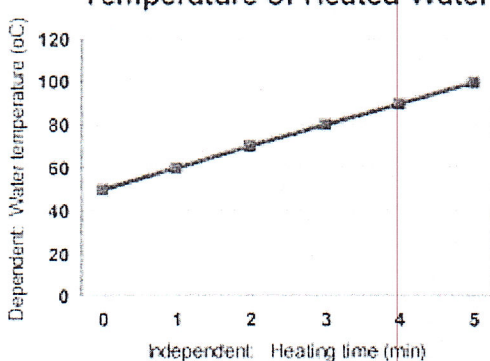
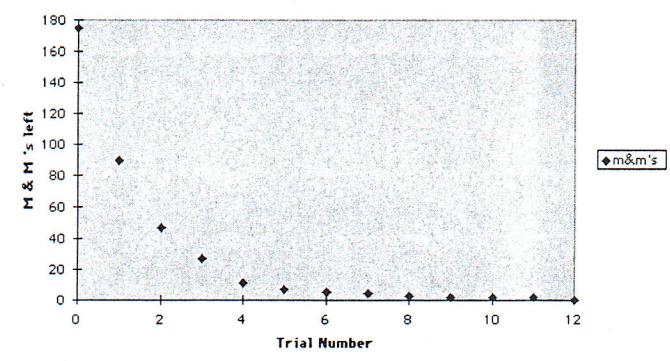
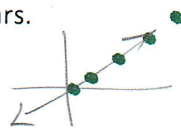
Data may be represented in two different ways: discrete or continuous. In order to decide if a function is continuous or discrete, think about the reasonable domain for the function. Does the domain include all values, or just specific values?

Vocabulary

discrete – data is **discrete** if there are only a finite number of values possible or if there is a space on the graph between possible values. Discrete data usually occurs in a case where there are only a certain number of values, or when we are counting something (using whole numbers).

continuous – **Continuous** data makes up the rest of numerical data. This is a type of data that is usually associated with some sort of physical measurement.

EXAMPLE: Decide whether the following functions are continuous or discrete.

<p style="text-align: center;">Temperature of Heated Water</p>  <p style="font-size: small;">Dependent: Water temperature (°C) Independent: Heating time (min)</p>	<p style="text-align: center;">M & M Activity</p>  <p style="font-size: small;">M & M's left Trial Number</p>
<p>A student group is selling chocolate bars for \$2 each. The function $f(x)$ gives the amount of money collected after selling x chocolate bars.</p> <p style="text-align: center;"><i>discrete</i> D: $x \geq 0$ R: $y \geq 0$</p> 	<p>Amber accidentally drops a vase out of her 36th floor apartment window. The function $h(t)$ represents the height of the vase after t seconds.</p> <p style="text-align: center;"><i>continuous</i> D: $t \geq 0$ R: $0 \leq h \leq 500$</p>
<p>Joe starts walking from one end zone on a football field. The function $d(z)$ gives the marked yard line, with z representing Joe's distance from the original end zone.</p> <p style="text-align: center;"><i>continuous</i></p>	<p>Sally puts \$100 of her birthday money into an investment account which gets 2% interest, compounded monthly. The function $A(m)$ gives the total amount of money in her account after m months.</p> <p style="text-align: center;"><i>discrete</i></p>

INTEVAL NOTATION

An interval is the set of all numbers between two endpoints such as 3 and 5. To describe an interval, we have used inequalities. Another way to describe an interval is using interval notation. In interval notation the symbols [and] are used to include an endpoint in the interval and the symbols (and) are used to exclude an endpoint from an interval.

Brackets $[] =$
 $() \neq$

$3 < x \leq 5$
 $(3, 5]$

Minimum, Maximum

EXAMPLE



dot equal
 $\circ \neq$ circle not part of sol

$-5 < x \leq 3$ $(-5, 3]$ equal	
$x > 6$ $(6, \infty)$	

Use interval notation to represent each set of numbers:

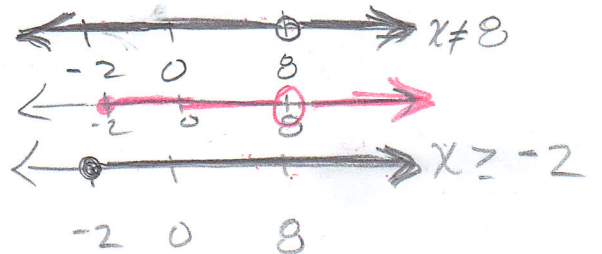
<p>A</p> <p>$[-3, 5)$</p>	<p>B</p> <p>$(-\infty, -2)$</p>
<p>C</p> <p>\cup - union - combine both intervals</p> <p>$(-\infty, 1) \cup (4, \infty)$</p>	<p>D</p> <p>$(-\infty, -5) \cup (-5, \infty)$</p>

For each set of numbers, (a) graph the set on a number line, and (b) write the set in interval notation.

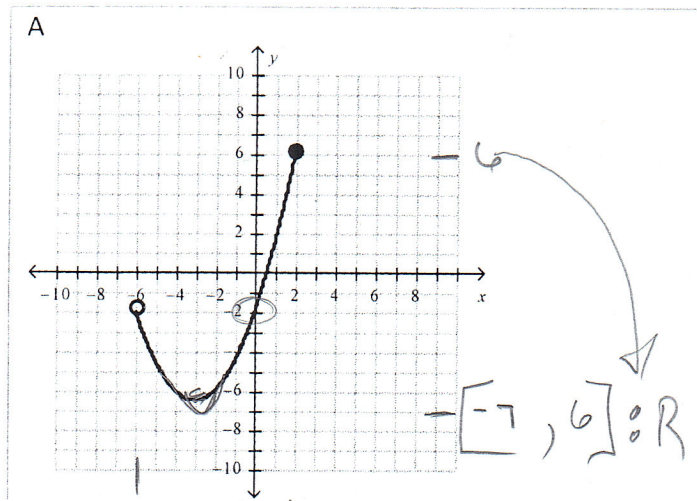
<p>A</p> <p>$x < 6$</p>	<p>B</p> <p>$-11 < x \leq 23$</p>
<p>C</p> <p>$-9 \leq x \leq -2$, or $x \geq 0$</p> <p>$[-9, -2] \cup [0, \infty)$</p>	<p>D</p> <p>$x < 5$ or $x \geq 17$</p>
<p>E</p> <p>$x \neq -3$</p> <p>$(-\infty, -3) \cup (-3, \infty)$</p>	<p>F</p> <p>$[-2, 8) \cup (8, \infty)$</p> <p>$x \neq 8$ and $x \geq -2$</p>

and - both - intersection \cap

And



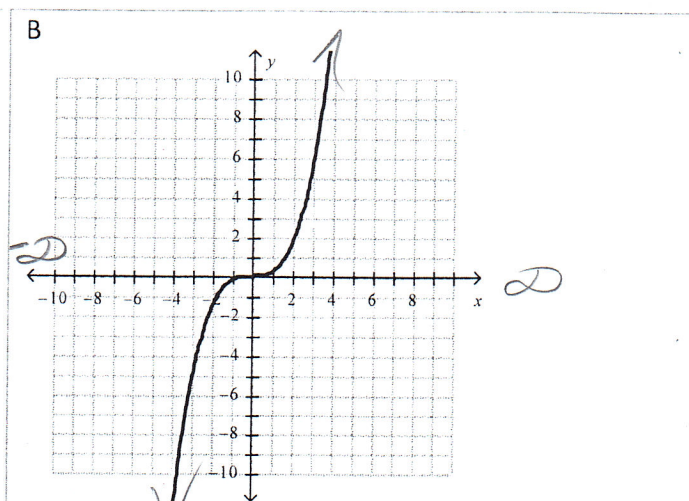
Name the domain and range of each relation using interval notation.



$$D = (-6, 2]$$

$$R = [-7, 6]$$

Min, max



$$D: \text{All Real } (-\infty, \infty)$$

$$R: (-\infty, \infty)$$