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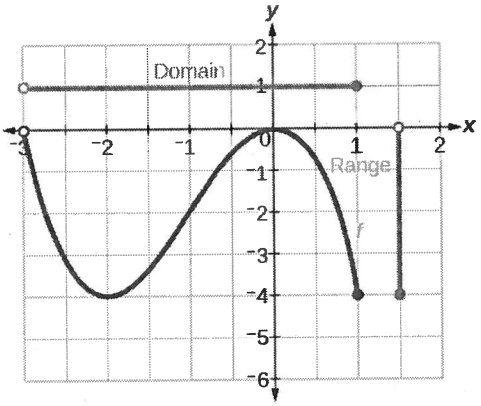
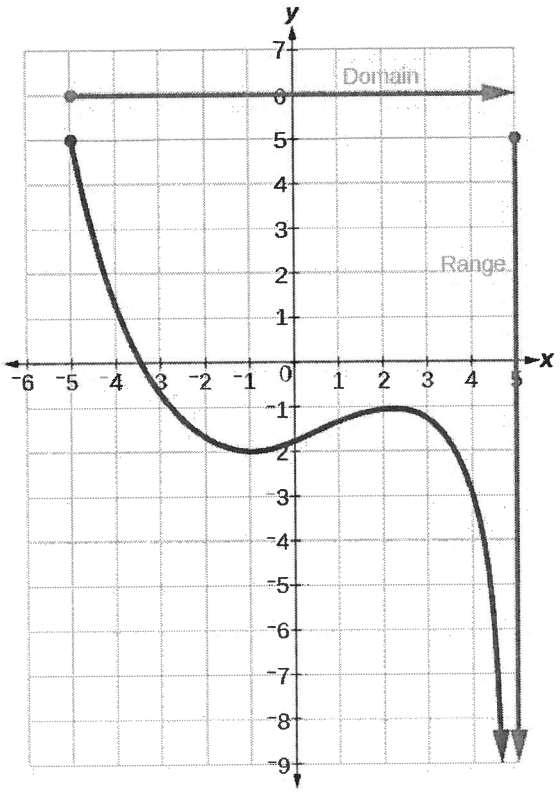
L27 – 6.3 Domain and Range

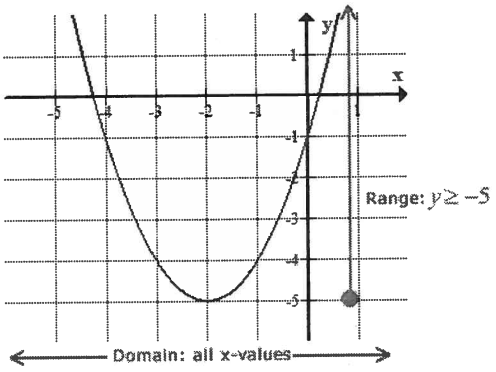
Part 1 – Definitions

Domain is the set of all possible values for the independent variable in a relation. Most commonly the x-values.

Range is the set of all possible values for the dependent variable in a relation. Most commonly y-values.







Part 2 – Examining Linear Relations using a Variety of Methods

Domain and Range can be written using the following methods:

- Words
- Set Notation
- Interval Notation
- Number Line
- List

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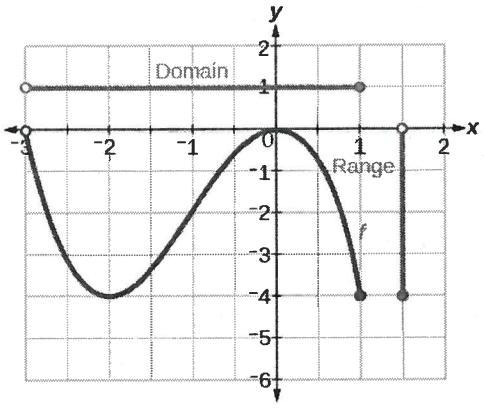
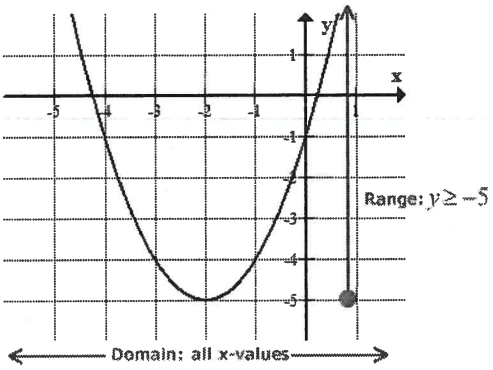
Part 3 – Words

Words – Domain and Range can be expressed using sentences.



Domain: x is greater than -3, and less than or equal to 1. x is a real number.

Range: y is greater than or equal to -4, and less than 0. y is a real number.



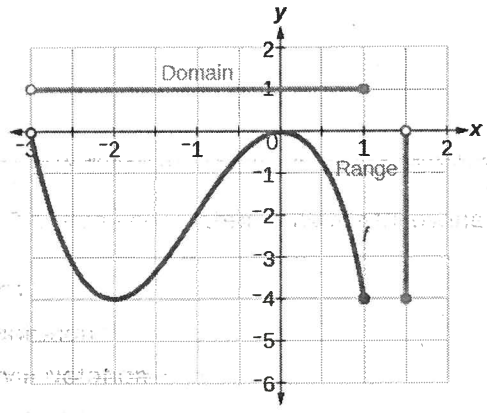
Domain: x can be any value.

Range: y is greater than or equal to -5.

Part 4 – Set Notation

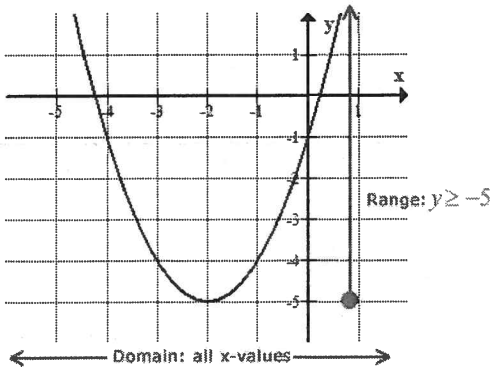
Set Notation – The most common of the methods. Set notation is a formal mathematical way to give the values of domain and range. When using this method it is important to remember the letters we use to describe NUMBER SETS.

{ } – Bird brackets – always used to describe a set
$\in$ – means "belongs to" or "is an element of"
| - means "such that"



Domain: $\{x \mid -3 < x \leq 1, x \in \mathbb{R}\}$

Range: $\{y \mid -4 \leq y < 0, y \in \mathbb{R}\}$



Domain: $\{x \mid -\infty < x < \infty, x \in \mathbb{R}\}$ or $\{x \in \mathbb{R}\}$

Range: $\{y \mid -5 \leq y < \infty, y \in \mathbb{R}\}$ or $\{y \mid y \geq -5, y \in \mathbb{R}\}$

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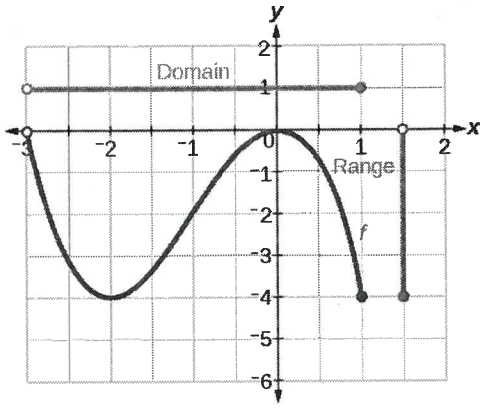
Part 5 – Interval Notation

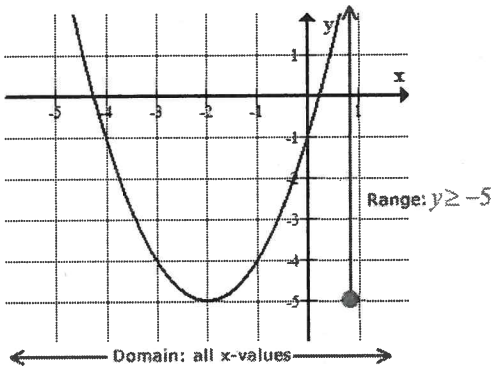
Interval Notation – Uses different brackets to indicate an interval

a. Square brackets, [ ] – are used if the number ***can be*** equal to.
b. Round brackets, ( ) – are used if the number is ***close to***, but not equal.
c. The infinity symbol, ∞ - is used if there is no limit.



Domain: $(-3, 1]$

Range: $[-4, 0)$

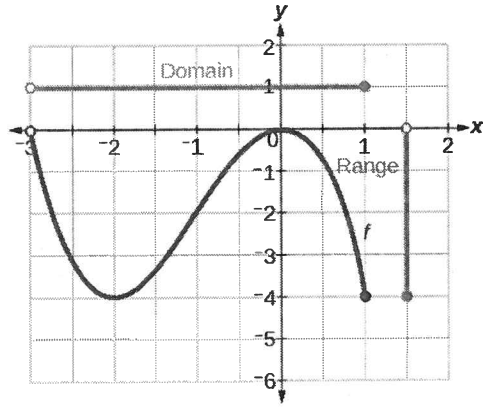


Domain: $[-5, \infty)$

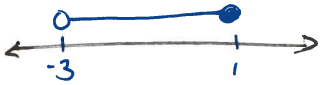
Range: $(-\infty, \infty)$

Part 6 – Number Line

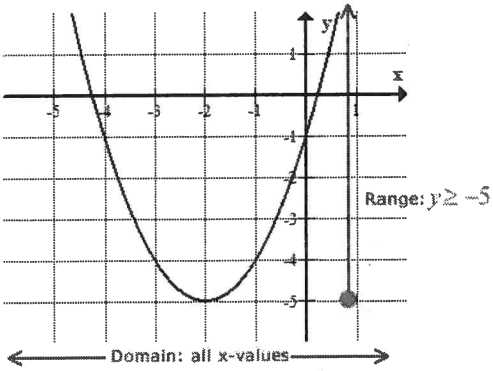
Number Lines – Uses horizontal lines to convey both Domain and Range.



Domain:



Range:



Domain:

Range:

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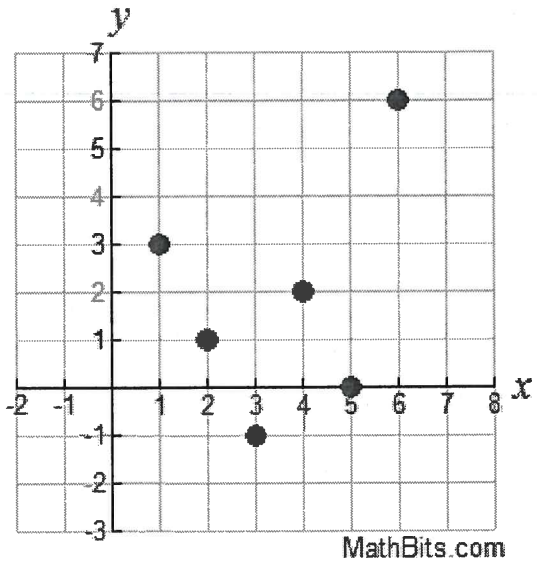
Part 7 – List

Lists - A list is useful for conveying Domain and Range for ***Discrete Values*** only. Lists don't reference the number of repeated values, if any. Always in ascending order!



Domain: $\{1, 2, 3, 4, 5, 6\}$

Range: $\{-1, 0, 1, 2, 3, 6\}$

Part 8 – Discrete versus Continuous

Which of the following formats works to convey Domain and Range?

	Discrete (Dots)	Continuous (Line)
Words	✓	✓
Set Notation	✓	✓
Interval Notation	✓	✓
Number Line	✓	✓
List	✓	Doesn't work.

Part 9 – Textbook Practice

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