Just In Time Quick Check

Standard of Learning (SOL) A.7b

Strand: Functions

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The student will investigate and analyze linear and quadratic function families and their characteristics both algebraically and graphically, including domain and range.

Grade Level Skills:

- Identify the domain, range, zeros, and intercepts of a function presented algebraically or graphically.
- Investigate and analyze characteristics and multiple representations of functions with a graphing utility.

Just in Time Quick Check

Just in Time Quick Check Teacher Notes

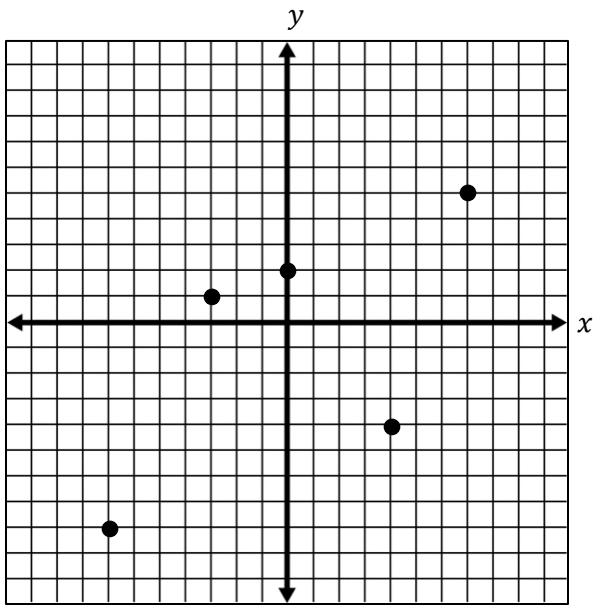
Supporting Resources:

- VDOE Mathematics Instructional Plans (MIPS)
  - A.7abef - Functions 1: Investigating Relations and Functions (Word) / PDF Version
  - A.7bcd - Functions 2: Exploring Quadratic Functions (Word) / PDF Version
- VDOE Algebra Readiness Formative Assessments
  - A.7a,b,e (Word) / PDF
- VDOE Word Wall Cards: Algebra I (Word) | (PDF)
  - Domain
  - Range
- VDOE Rich Mathematical Tasks: The Soccer Competition
  - A.7 The Soccer Competition Task Template (Word) / PDF Version
- Desmos Activities
  - Transforming Lines
  - Two Truths and a Lie: Quadratics
  - What's my Transformation?
  - Free-Range Functions
  - Function Representation Card Sort
  - Polygraph: Parabolas
  - Polygraph: Parabolas Part 2
  - Polygraph: Quadratics
  - Will It Hit the Hoop?

Supporting and Prerequisite SOL: 8.15b

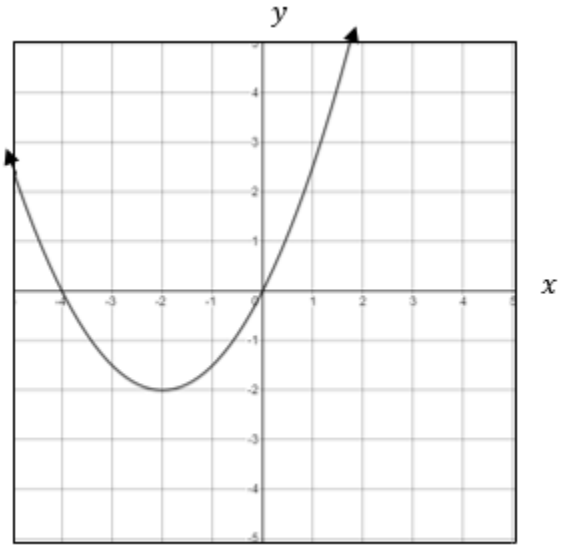
SOL A.7b - Just in Time Quick Check

1) What appears to be the domain of the relation shown?



A. $\{y| -8 \leq y \leq 5\}$
B. $\{x| -7 \leq x \leq 7\}$
C. $\{y|y = -8, -4, 1, 2, 5\}$
D. $\{x|x = -7, -3, 0, 4, 7\}$

2) What is the domain of the function shown?



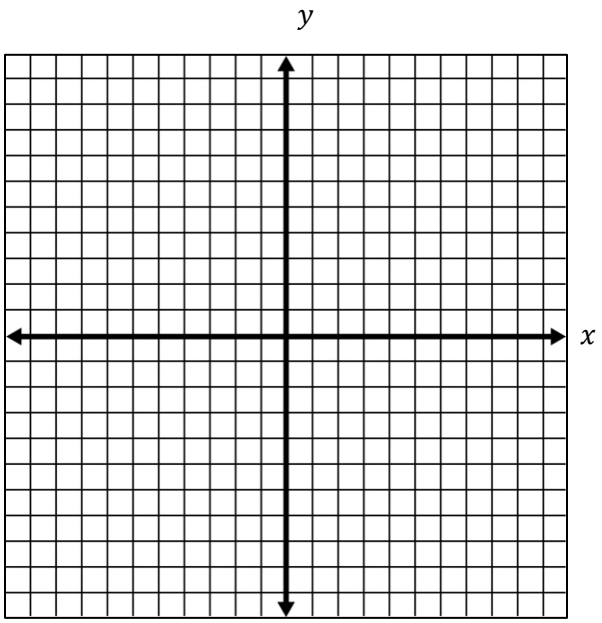
3) Write the range of the function $f(x) = -(x+4)^2 - 3$ using set notation below.

The range of $f(x)$ is $\{y|y$_____$\}$.

4) Draw a line segment that represents a relation with:

Domain: the set of all real numbers greater than or equal to -3 and less than or equal to 2

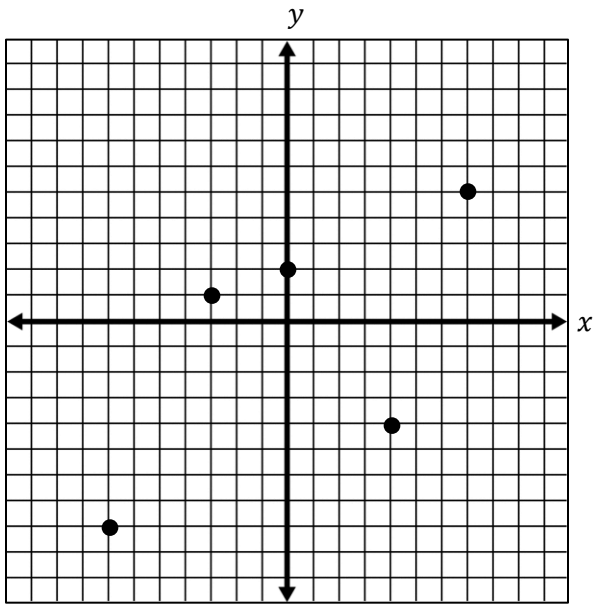
Range: the set of all real numbers greater than or equal to -4 and less than or equal to 1



SOL A.7b - Just in Time Quick Check Teacher Notes

Common Errors/Misconceptions and their Possible Indications

1) What appears to be the domain of the relation shown?



A. $\{y| -8 \leq y \leq 5\}$
B. $\{x| -7 \leq x \leq 7\}$
C. $\{y|y = -8, -4, 1, 2, 5\}$
D. $\{x|x = -7, -3, 0, 4, 7\}$

A common error a student may make is to list the domain as $-7 \leq x \geq 7$ instead of as discrete values. This indicates the student does not recognize the difference between a list of discrete values and a range of values. A strategy that could be used is to review inequalities on a number line to indicate how they cover a range of values. Desmos could be used as a visual representation of how the range of values covers more than just the discrete list would.

2) What is the domain of the function shown?

A common error would be for a student to list the domain as -4 and 0 or between -4 and 0. This indicates a misunderstanding of domain for x-intercepts. The teacher should review with the student that while x-intercepts are part of the domain, the domain is the set of all possible values of the independent variable. Listing additional ordered pairs from the graph in a set or table may help visualize this.

3) Write the range of the function $f(x) = -(x + 4)^2 - 3$ in set notation below.

The range of $f(x)$ is $\{y|y$_____$\}$.

A common error a student may make is to say the range is less than or equal to -4, the x-coordinate of the vertex. This indicates the student has a misconception in associating domain and range with the independent and dependent variables respectively. A strategy that could be used is to have the student practice with discrete points in identifying the domain and range and then continue practice with continuous graphs.

4) Draw a line segment that represents a relation with:

Domain: the set of all real numbers greater than or equal to -3 and less than or equal to 2

Range: the set of all real numbers greater than or equal to -4 and less than or equal to 1

A common error a student may make is to use the restricted domain and range intervals as coordinates and plot (-3, 2) and (-4, 1) as the endpoints of the line segment. This indicates the student understands the association of the domain with the x-coordinate and range with the y-coordinate, but does not understand how to apply domain and range restrictions to a line segment. A strategy that could be used is to use graph paper and post-its or graphing technology to visualize restricting the domain and range one interval at a time to show how the line segment endpoints need to be where the restrictions coincide.