

Title: Identifying Domain, Range, and Intercepts
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Course Description:

Name: Algebra 1
Grade Level: 9th
Honors or Regular: Regular

Lesson Source:

N/A

Concept Statement:

The domain of a function is the set of all possible values of the independent variable, which x is often associated with. The range of a function is the set of all possible values of the dependent variable, which y and $f(x)$ are often associated with. For each x in the domain of f , x is a member of the input of the function f , $f(x)$ is a member of the output of f , and the ordered pair $(x, f(x))$ is a member of f . When an ordered pair contains 0's in their X or Y value, then it is an intercept and will touch the X or Y axis. An X intercept is when the Y value of the ordered pair contains a 0. A Y intercept is when the X value of an ordered pair contains a 0. The origin is when both X and Y values of an ordered pair have 0's. This information will help the student in later courses of math, such as Geometry and Trigonometry.

Lesson Objectives:

Students will be able to:

Identify the domain, range, and intercepts of ordered pairs and lines (slanted and horizontal) presented graphically.

Virginia Standards of Learning:

A.7 The student will investigate and analyze linear and quadratic function families and their characteristics both algebraically and graphically, including

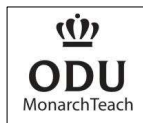
- b) domain and range;
- c) zeros;
- d) intercepts;

Materials List and Advanced Preparations:

Green and Red Construction Paper.
Domain, Range, Zeros and Intercepts Note
Domain, Range, Zeros and Intercepts Practice Sheet
Identifying Domain and Range, Zeros, and Intercepts Exit Ticket

Safety Concerns:

N/A



ENGAGEMENT		Time: ____15____
What the Teacher & Students Will Do	Probing/Eliciting Questions	Student Responses & Misconceptions
Teacher will hand out a paddle to each student and display the Function / Not a Function Powerpoint.		
Teacher will go through each slide of the powerpoint and ask the students to raise the green side of the paddle if the screen displays a function and the red side if the screen displays not a function.	"Why is this a function[not a function]?"	"A set of ordered pairs, a table, an equation, or a graph are only functions if and only if every X value has only 1 Y value.
Evaluation/Decision Point Assessment		Student Outcomes
After going through the slides and refreshing about what a function is, the teacher will hand out the Domain, Range, Zeros and Intercepts Notes.		Students will have reviewed how to identify functions.

EXPLORATION		Time: ____15____
What the Teacher & Students Will Do	Probing/Eliciting Questions	Student Responses & Misconceptions
Teacher will pass out the Note Worksheet. Teacher will instruct students to work on the first page of the handout for 10 minutes		
Students will work individually identifying the X values and the corresponding Y values. Students will write these answers on the table provided. Students will then identify if the relation presented is a function of not a function		

EXPLORATION		Time: <u>15</u>
What the Teacher & Students Will Do	Probing/Eliciting Questions	Student Responses & Misconceptions
Teacher will draw a 2 by 2 table on the board and label one column as X - Values and the other column as Y - Values. Teacher will ask students to call out the X and Y values. Teacher will ask students if the relation on the board is a function. Teacher will repeat this for the last two graphs.	What Y value is related to this X value?	Answer Varies between graphs
Evaluation/Decision Point Assessment		Student Outcomes
After going over each of the tables, the teacher will ask students to flip to the next page.		Students will have reviewed identifying X values and Y values from a graph and how to tell which relations are functions.

EXPLANATION		Time: <u>25</u>
What the Teacher & Students Will Do	Probing/Eliciting Questions	Student Responses & Misconceptions
Teacher will go over the definition of Domain and Range and go over the proper way to write domain and range.		Students may forget to include { } when writing domain and range. Students may add in repeated values, instead of adding only one
Teacher will connect the terms to X and Y values by writing the first example on the board. Teacher will write the second example on the board, while keeping the first example on the board. Teacher will ask for	"Which values are we going to use for our domain [or range]?"	"You use X values for your domain and Y values for your range" "You have to use { } around the set of X or Y values. Then write

EXPLANATION		Time: <u>25</u>
What the Teacher & Students Will Do	Probing/Eliciting Questions	Student Responses & Misconceptions
volunteers to identify the domain and range for the second example. Teacher will draw the 3rd example on the board and go over how to identify the domain and range from a graph. Teacher will draw the 4th example and have the students identify the points, domain and range.	<p>“How do we write the domain [or range]”</p> <p>“What do we do if the value repeats in either our X or Y values?”</p>	<p>out each value, placing a comma in between.”</p> <p>“You write only one of those numbers down</p>
Teacher will write on the board 2 points that are on the X and Y axis, (4,0) and (0,1). Teacher will talk about why Zeros are special on a graph. Teacher will go over the definitions of X and Y intercepts and label the two points appropriately.	<p>“What do you think makes these 2 coordinates special?”</p> <p>“On a graph what happens to our Y value if we go above the X-axis? What happens to our Y value if we go below the X - axis?”</p>	<p>“They both contain a zero and are on the axis”</p> <p>“The Y value becomes positive if it goes above the X axis and negative if it is below the X axis”</p>
Teacher will draw example 5 on the board and ask students for the domain and ranges of the graph. Teacher will ask the students to identify the coordinates that have zeros and then identify which ordered pair are the X and Y intercepts. Teacher will draw example 6 on the board and ask the students to identify the domain and range	<p>“Are there any points on this graph that have zeros in either their X or Y coordinate?”</p> <p>“How can we tell between the X and Y intercepts?”</p>	<p>“(5, 0) and (0, 4)”</p> <p>“If the 0 is in the X value, then it is a Y intercept, and if the 0 is in the Y value, then it is a X intercept.”</p>
Teacher will draw example 7 on the board and go over the domain and range. Teacher will ask the class to identify the zeros on the graph and then ask to identify which is the X intercept and which is the Y intercept. Teacher will draw example 8 next to	<p>“What values can we have in the domain of this line? What about the range?”</p>	<p>“A slanted line can have any real number in its domain and range. A horizontal will have a domain of all real number but</p>

EXPLANATION		Time: <u>25</u>
What the Teacher & Students Will Do	Probing/Eliciting Questions	Student Responses & Misconceptions
example 7. Teacher will ask questions about what makes the two examples different. Teacher will go over the domain and range for the line. Teacher will ask the students for the X and Y intercepts	<p>“Why can a slanted line be all real numbers for Domain?”</p> <p>“Which points do the line go through our X and Y axis? Would these points be our intercepts, and why?”</p> <p>Which of these points are our X intercept? Which of these points is our Y intercept?</p> <p>“What makes the range different in example 8?”</p> <p>“How does this affect our intercepts?”</p>	<p>the range will be the Y value of the line”</p> <p>“No matter what value of X is used, there will be an output for Y that exists on the line.”</p> <p>“(-3, 0) and (0, 2). Yes, they would because they both have a 0 in their coordinates.”</p> <p>“(-3, 0) is our X intercept and (0, 2) is our Y intercept”</p> <p>“The range does not change. No matter which X value we put in, the Y value will be the same.”</p> <p>“The line will not have an X intercept since it does not cross the X axis, but it will have a Y intercept”</p>
Evaluation/Decision Point Assessment		Student Outcomes
Once the students answer the last example, the teacher will pass out the Domain, Range, Zeros and Intercepts Practice Sheet.		Students will have examples and a foundation in identifying Domain, Range, Zeros, and Intercepts graphically.

ELABORATION		Time: <u>25</u>
What the Teacher & Students Will Do	Probing/Eliciting Questions	Student Responses & Misconceptions
Teacher will hand out the practice sheet and give the		

ELABORATION		Time: ____25____
What the Teacher & Students Will Do	Probing/Eliciting Questions	Student Responses & Misconceptions
students 15 minutes to work individually on the worksheet. Should the students need more time, the teacher will allot students to work on the practice for 5 more minutes.		
Teacher will go through the first 4 problems and ask the students to identify the domain, range, and intercepts of each problem. If the students seem to struggle, the teacher will go over 2 more problems with the students.		
Evaluation/Decision Point Assessment		Student Outcomes
If the students finish the practice and go over the first 4 problems or there is 10 minutes left in class, the Teacher will hand out the Exit Ticket.		Students will have practice in identifying Domain, Range, Zeros, and Intercepts graphically.

EVALUATION		Time: ____10____
What the Teacher & Students Will Do	Probing/Eliciting Questions	Student Responses & Misconceptions
Teacher will hand out the Exit Ticket and instruct students to turn it in at the end of class.		
Evaluation/Decision Point Assessment		Student Outcomes
Teacher will collect exit ticket and grade the tickets at a later date		Students will have an understanding

Attach any SUPPLEMENTARY MATERIALS (handouts, worksheets, data collection tables, assessments, etc.) as part of your lesson plan.