

Equations as Relations

Topic:

4.4: Domain and range.

Focus:

Using an equation to determine the range for a given domain and graphing the solution set for a given domain.

NJCCS:

4.3.12B.2. Analyze and explain the general properties and behavior of functions of one variable, using appropriate graphing technologies; domain and range

4.3.12C.1. Use functions to model real-world phenomena and solve problems that involve varying quantities.

4.5B.1. Use communication to organize and clarify their mathematical thinking. Reading and writing. Discussion, listening, and questioning.

Learning Objectives:

1. The student will be able to define the domain and range of a function.
2. The student will be able to apply the definitions of the domain and range to determine the range using the domain with at least 70% proficiency.
3. The student will be able to argue the domain and range of certain higher level functions such as $y=1/x$.

Materials:

Blackboard, chalk, worksheets (one for each student), variety of currencies, overhead projector, homework answers on overhead, hand-out with currency exchanges, three blank transparencies of worksheet, dry-erase markers.

Motivation:

Students will check their answers for their homework and ask any questions that they have. When students come into class they will also be asked to complete (in their journals), the following question:

What can x and y be in this equation: $y = 2x + 5$

Students have been previously introduced to domain and range, so this will serve to activate student's prior knowledge. Teacher will ask students what x and y can not be to provoke discussion.

Procedure:

1. Students will be given direct instruction on domain and range of equations and relations vs. equations and how they are related.
2. Teacher will give students the scenario of travelling and converting money and ask students the following questions using Canadian dollars:
 - a. If you brought \$350.00 with me, how much in Canadian dollars will you have?
 - b. If you had 100.00 of the foreign currency, how much in American dollars will you have?
 - c. If x = American dollars and y =Canadian dollars what would an equation be relating the 2?
 - d. What would the domain and range of the two equations be?
3. Students will be put into their groups, assigned the previous day. The groups will be given different currencies.
4. Groups will complete worksheets together, given their assigned currency.
5. Teacher will be going around the room answering questions and checking answers.
 - a. Possible questions to incite thought and discussion:
 - i. Is it possible to have negative money in your pocket?
 - ii. When you are stating the domain and range of the currency equation, what are you saying about the amount of American dollars you can have and the foreign currency you can have?
 - iii. If you placed a point somewhere in the third quadrant such as $(-3,-2)$ what would that mean in relation to the amount of dollars and the foreign currency that you have?
6. Using direct instruction give some additional key terms to students if needed.

Closure:

Two to three of the first groups completed with the task will be asked to transfer their answers onto a blank transparency of the worksheet to share with their peers. Class will discuss the questions and agree or disagree with their classmates answers.

Assessment:

Worksheet will be collected and checked for student's understanding. Homework will also be checked the following day.

Homework:

Complete pg. 215 # 15-18, 20-24, 32, 33

Name _____

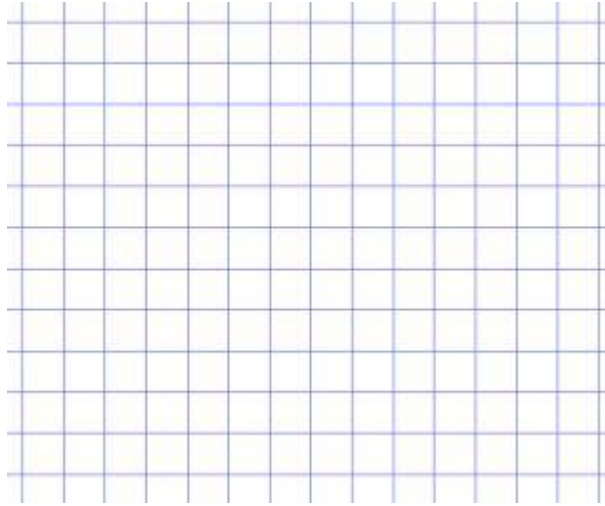
Date _____

Period _____

Directions: Each group will get a different currency to complete the following assignment with. Use the attached currency exchange worksheet as well. Complete the problems in order.

1. Develop an equation with 2 variables to exchange your currency to American dollars. Let y = American dollars and x = your particular currency.

2. Graph the equation (in first quadrant only).



3. Why does it make sense to graph the function in the first quadrant only? How does this limit the values that x and y can be?

4. State the domain and range of the equation.

5. If you could bring with you between \$200 and \$500, how much could you possibly have in the foreign currency? If this is the case state the domain and range.

Base Currency: US Dollar, USD on Sunday, November 11, 2007

Currency	Code	USD/1 Unit	Units/1 USD
Afghanistan Afghani	AFN	0.02008	50
Argentine Peso	ARS	0.3208	3.1429
Austrian Schilling	ATS	1.4683	0.6815
Australian Dollar	AUD	0.9123	1.0973
Azerbaijan New Manat	AZN	1.1787	0.8484
Belgian Franc	BEF	1.4683	0.6815
Bermudian Dollar	BMD	1	1
Brazilian Real	BRL	0.5718	1.755
Bahamian Dollar	BSD	1.0125	1.0178
Belize Dollar	BZD	0.5216	1.9855
Canadian Dollar	CAD	1.0592	0.9451
Swiss Franc	CHF	0.8913	1.1229
Costa Rican Colon	CRC	0.001961	529.053
Cuban Peso	CUP	0.045	23.1481
Cyprus Pound	CYP	2.5387	0.4019
Ecuador Sucre	ECS	4e-05	25000
Egyptian Pound	EGP	0.1849	5.5873
Ethiopian Birr	ETB	0.1117	9.2497
Euro	EUR	1.4683	0.6815
British Pound	GBP	2.0908	0.4785
Croatian Kuna	HRK	0.2004	4.9997
Indian Rupee	INR	0.02544	39.315
Japanese Yen	JPY	0.009037	110.748
Sri Lanka Rupee	LKR	0.009145	111.695
Moroccan Dirham	MAD	0.1306	7.817
Mexican Peso	MXN	0.091986	10.91009
Mozambique Metical	MZM	3.967e-05	25410
Nicaraguan Cordoba Oro	NIO	0.05419	19.1349
New Zealand Dollar	NZD	0.765	1.3089
Russian Rouble	RUB	0.04086	24.484
Slovak Koruna	SKK	0.04462	22.5819
Turkish Lira	TRL	8.39e-07	1206300
Taiwan Dollar	TWD	0.03103	32.237
Tanzanian Shilling	TZS	0.0009051	1145.77
South African Rand	ZAR	0.152	6.6767
Zimbabwe Dollar	ZWD	3.408e-05	30703.4

Example of Currency Handed Out to Students:

