



Math 8 Unit 4

More Functional Relationships

Volume 1 Issue 4

References Dear Parents

**Holt Mathematics
Course 3 Text
Connection:** Chapter 3
Lessons 4-6;
Chapter 13, Lessons:
1, 3-4

**Holt Mathematics
Course 3 Text
Online:**

http://go.hrw.com/resources/go_mt/hm3/so/c3ch13aso.pdf

http://go.hrw.com/resources/go_mt/hm3/so/c3ch13bso.pdf

Challenges:

www.figurethis.org

<http://www.regentsprep.org/Regents/math/algebra/ATP5/EvaluatingFunctions.htm>

<http://www.purplemath.com/modules/fcnot.htm>

Below you will find a list of concepts that your child will use and understand while completing Unit 4: More Functional Relationships. Also included are references, vocabulary and examples that will help you assist your child at home.

Concepts Students will Use and Understand

- Recognize a relation as a correspondence between varying quantities.
- Recognize a function as a correspondence between inputs and outputs where the output for each input must be unique.
- Distinguish between relations that are functions and those that are not functions.
- Recognize functions in a variety of representations and a variety of contexts.
- Identify relations and functions as linear or nonlinear.
- Translate among verbal, tabular, graphic, and algebraic representations of functions.
- Use tables to describe sequences recursively and with a formula in closed form.
- Understand and recognize arithmetic sequences as linear functions with whole number input values.
- Represent functions using function notation.

Vocabulary

Arithmetic sequence: Are sequences with a constant difference between terms.

Explicit/Closed Form of a sequence: How to determine the n^{th} term of a sequence directly

Function: A rule of matching elements of two sets of numbers in which an input value from the first set has only one output value in the second set

Function Notation: the variable y in a function is replaced with $f(x)$ read as "f of x" where f names the function

Input: The set of possible values for the first coordinate of a function (domain.)

Output: The set of possible values for the second coordinate of a function (range.)

Recursive Definition: Gives the 1^{st} term and a formula for how a specific term (n^{th} term) relates to a previous term [$(n-1)^{\text{th}}$ term.]

Relation: A rule that gives an output number for every valid input number

Sequence: an ordered set of numbers or items

For additional vocabulary help:

<http://intermath.coe.uga.edu/>



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Recursive Rules:

Arithmetic Rule:

$$a_n = a_1 + (n - 1)d$$

$$a_n = n^{\text{th}} \text{ term}$$

$$a_1 = 1^{\text{st}} \text{ term}$$

n = term position

d = constant difference

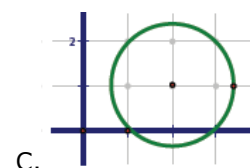
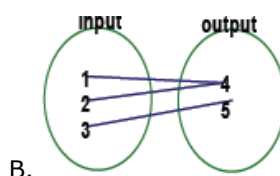
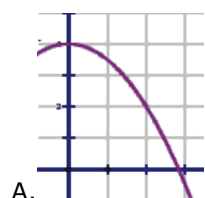
Recursive Rule:

$$t_n = t_{n-1} + d$$

(the variable t or a could be used)

Examples:

- Graph the sequence on a coordinate plane: 2, 5, 8, 11, ... (hint: the domain is the position of the term) Is the graph a function and is it linear or nonlinear?
- What makes a relation a function?
- For $f(x) = 1/2x - 3$, find $f(x)$ when $x = 16$ and $x = -12$.
- Are all arithmetic sequences linear functions? Why or why not?
- What would be the 35th term of the following sequence: -2, 1, 4, 7, ...?
- Identify which of the following are functions:



A.

B.

C.

D. $y = 3x + 5$

E. $\{\text{senators, states}\}$

F. $\{\text{states, senators}\}$

G. $\{(1,2), (2,3), (1,4), (4,1)\}$

Links:

- <http://www.purplemath.com/modules/fcns.htm>
- <http://www.purplemath.com/modules/fcns2.htm>
- <http://www.shodor.org/interactivate1.0/lessons/fm2.html>
- <http://www.shodor.org/interactivate/lessons/IntroArithmetic/>
- http://hotmath.com/hotmath_help/algebra1/arithmetic_sequences.html
- http://www.mathgoodies.com/lessons/vol6/independent_events.html
- <http://regentsprep.org/Regents/math/tree/Ltree.htm>

Key

- $(1, 2), (2, 5), (3, 8), (4, 11)$; yes, a linear function.
- A relation is a function when every input has one unique output.
- $f(16) = 5$ and $f(-12) = -9$.
- All arithmetic sequences are linear functions because every input has one unique output (this makes it a function) and there is a constant difference between the domains and ranges (this makes it linear.)
- The constant difference is 3 and the 1st term is -2. $a_n = a_1 + (n - 1)d$;
 $a_{35} = -2 + (35 - 1)3$; 35th term = 100
- A, B, D, E