

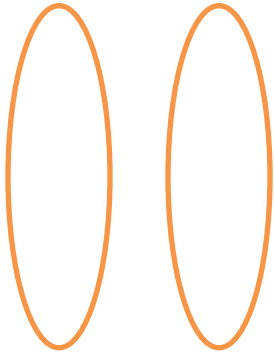
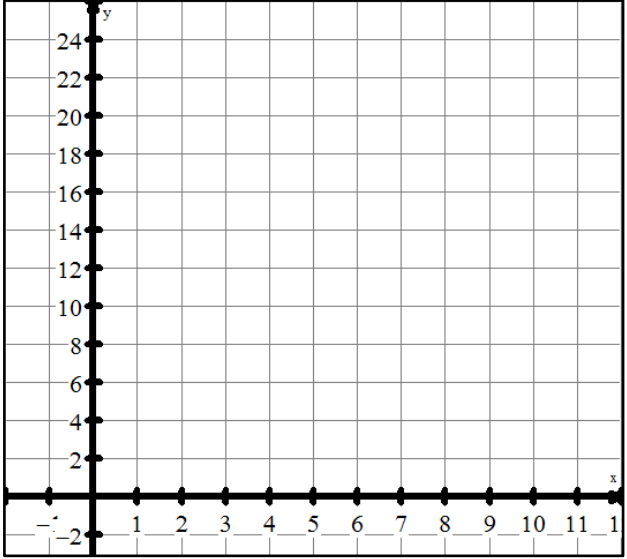
Lesson 3 – Basics of Functions – Day 1

A. Lesson Objectives

- a. Work with number patterns to introduce the “rule of four” or multiple representations
- b. Introduce fundamental concepts related to Functions → relations, functions, domain, range, notations

B. Working with Number Patterns

- a. We will work with something “familiar” (linear relations) in order to create some new understandings (multiple representations) and explore/introduce some new concepts (functions).

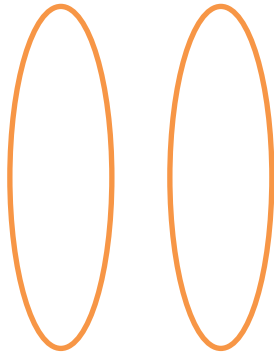
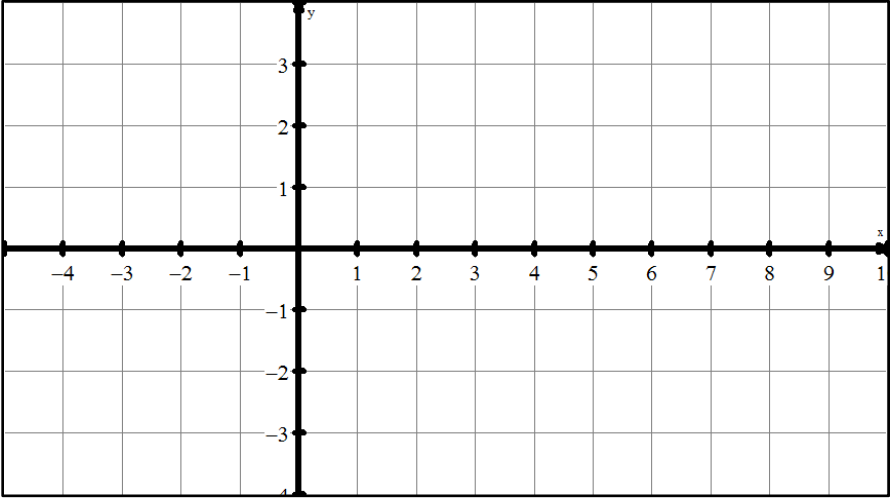
<u>VERBAL (V)</u>	<u>NUMERIC (N)</u>																						
<p>To “create/generate” a new value, a number is doubled and then increased by four.</p> <p>The CONDITION on the number is that it must be a real number between and including 0 and 10.</p>	Table of Values	Mapping Diagram	Ordered Pairs																				
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b. REVIEW from Integrated Math 9

- i. What is the SLOPE of this line?
- ii. What does slope MEAN?
- iii. What are the x- and y-intercepts of this line?

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C. Further Examples

<p style="text-align: center;"><u>VERBAL (V)</u></p> <p>To “create/generate” a new value, a number is reduced by 2 and then this result is halved.</p> <p>The CONDITION on the number is that it must be a real number between but excluding -4 and 8.</p>	<p style="text-align: center;"><u>NUMERIC (N)</u></p>																						
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C. NEW CONCEPT: Function Basics

a. Relations:

- i. A "relation" is just a relationship between sets of information;
- ii. A relation refers to a set of input and output values, usually represented in ordered pairs
- iii. A relation is simply a set of ordered pairs.

b. Functions:

- i. A function is a "well-behaved" relation → When we say that a function is "a well-behaved relation", we mean that, given a starting point, we know exactly where to go; given an x , we get only and exactly one y .
- ii. Function is a relation in which each element of the domain is paired with exactly one element of the range.
- iii. A function is a set of ordered pairs in which each x -element has only ONE y -element associated with it.
- iv. A function is a rule that takes an input, does something to it, and gives a unique corresponding output.

c. Notations:

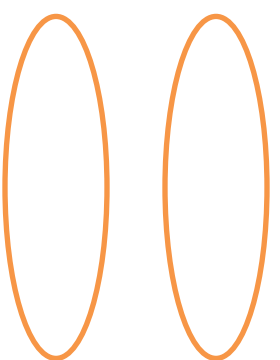
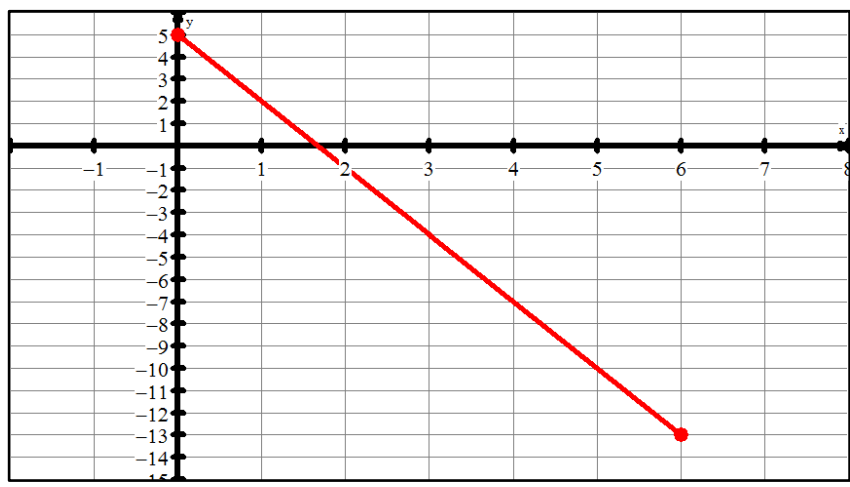
- i. Rather than writing linear equations in the typical $y = mx + b$ format, we will now write them in function notation → as $f(x) = mx + b$ where " f " simply refers to the function name and the x refers to the input
- ii. Evaluate → if $f(x) = 2x + 4$, then we can evaluate $f(3)$ as
- iii. Solve → if $f(x) = 2x + 4$, then we can solve $12 = f(x)$ as

d. Understanding Domain and Range:

- i. The set of all the starting points is called "the domain" and the set of all the ending points is called "the range."
- ii. The domain is what you start with; the range is what you end up with.
- iii. The domain is the x 's; the range is the y 's

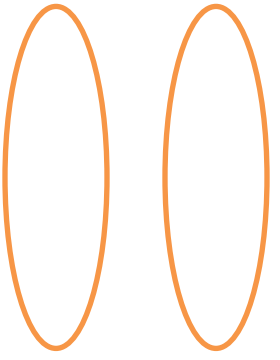
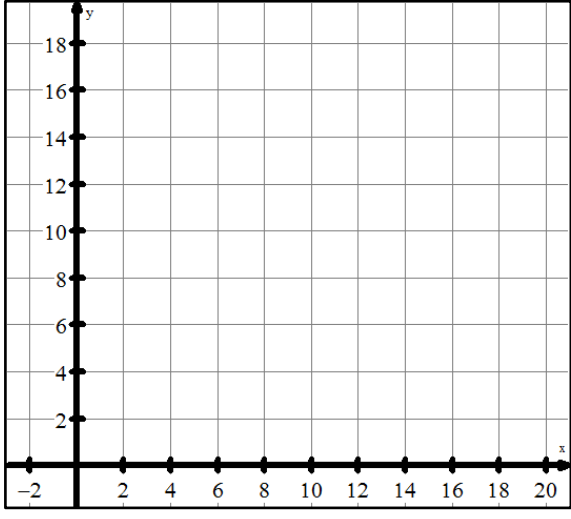
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D. Further Examples

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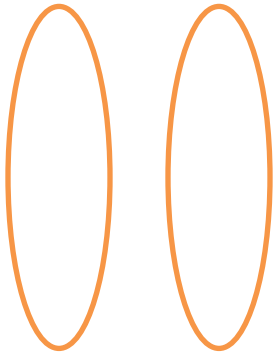
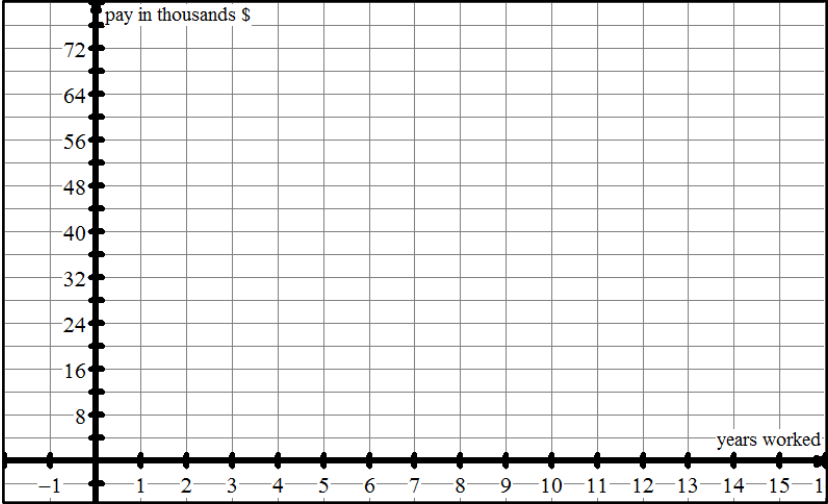
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C. Further Examples

<p style="text-align: center;"><u>VERBAL (V)</u></p> <p>Mr. S works at ISM and first earned \$40,000 per year plus he receives an annual bonus of \$2,000 for each year he works here.</p>	<p style="text-align: center;"><u>NUMERIC (N)</u></p>																						
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