# Lesson Plan Title: Non-Linear Functions & Equations
# Teacher's Name: Julie Webster
# Subject/Course: AG2
# Unit: 1
# Grade Level: 9,10,11

| **Stage 1-Desired Results** |
|---|
| Aim/Essential Question:<br>● How do we read and understand functions |
| Understanding(s):<br>Students will understand<br>● That f(x) = y<br>● The "x" and "y" variables can be anything letter.<br>● That the "x" is the independent variable and the "y" is the dependant variable |
| Content Objectives:<br>Students will be able to . . .<br>● Describe a function in words and an equation<br>● Plot a point on a graph from a function<br>○ i.e. plot f(4)=8 (4,8) |
| Key Vocabulary<br>● function |
| **Stage 2-Assessment Evidence** |
| **Performance Task or Key Evidence**<br>● Woot Math<br>● Homework Paper |
| **Stage 3- Learning Plan** |
| **Learning Activities:**<br><br>Do Now/Bell Ringer/Opener: (5 minutes)<br>https://www.wootmath.com/p/108o9h4wuvh0hz6h<br>wmpoll.com<br>693912<br><br>Put on Board and ask which one doesn't belong (10 minutes) |

https://docs.google.com/document/d/1bqxGfCKND-f8xc_qOqOVU-aeCiCqq-RyMevG2IwvE4A/edit

**Learning Activity 1:** (>10 Minutes)

- Function Notation 2.0 Toolkit Card

**Learning Activity 2:** (10-15 minutes) they really need to get this

- Homework Questions?
    - Problem 1and 2 from page 328
        - Notes in blue notebook

**Summary/Closing**

- https://www.wootmath.com/p/8vevujciyiex0ejj

**Multiple Intelligences Addressed:**

**Student Grouping**
Whole Class
Small Groups
Pairs
Individual

**Instructional Delivery Methods**
Teacher Modeling/Demonstration
Discussion
Cooperative Learning
Problem Solving

**Homework/Extension Activities:**
https://docs.google.com/document/d/1DiCk1bjMZvcVixrHh5CKp_uqids5yi7DfU87O-eRqJE/edit

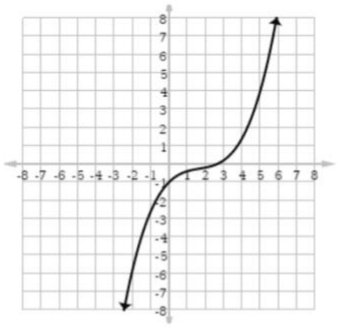
**Materials and Equipment Needed:**

- iPad

Bell Ringer:

f(5)=x. What is x?

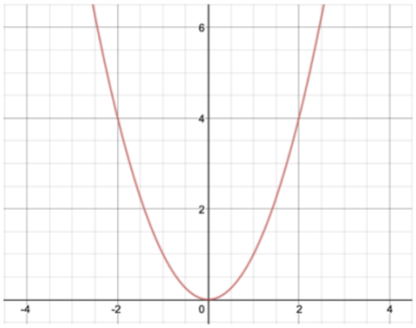
example) f(4)=1



Enter answer here

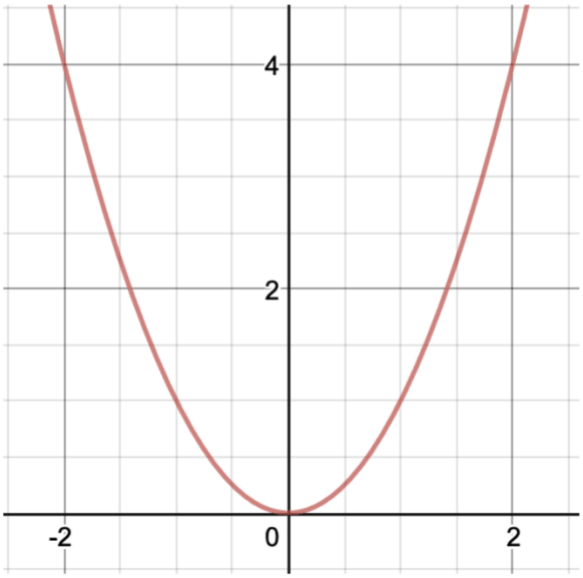
What is x if f(x)=4?

example) f(2)=1.75



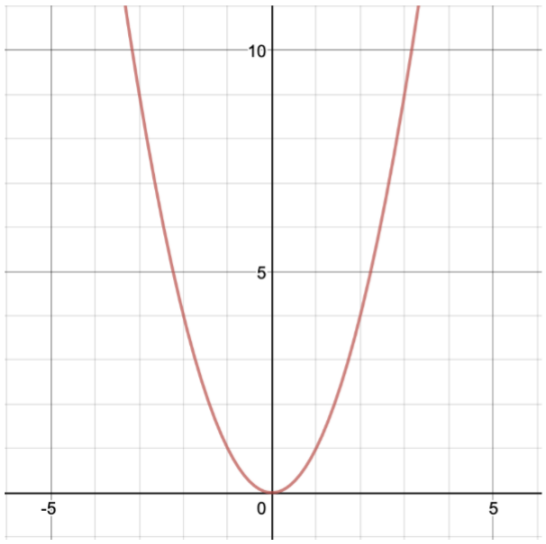
Plot the point f(2)=4.
Make a dot with your finger on the graph where the point f(2)=4 is.

example) f(1)=1 is done for you



Warm Up:

A



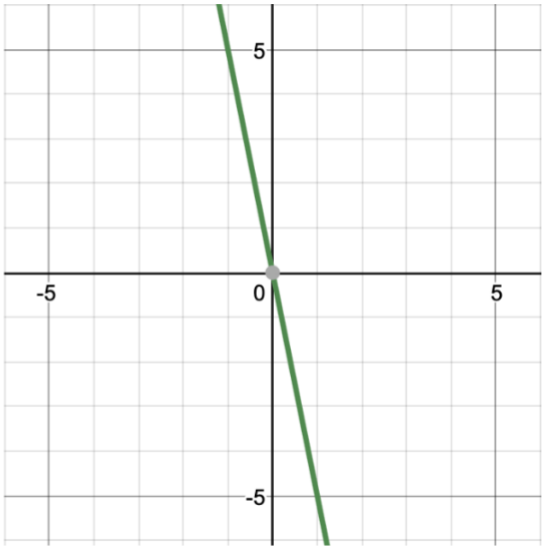

B

| X | Y |
|---|---|
| -3 | 0 |
| -2 | 1 |
| -1 | 2 |
| -1 | 3 |
| 1 | 4 |
| 2 | 5 |
| 3 | 6 |

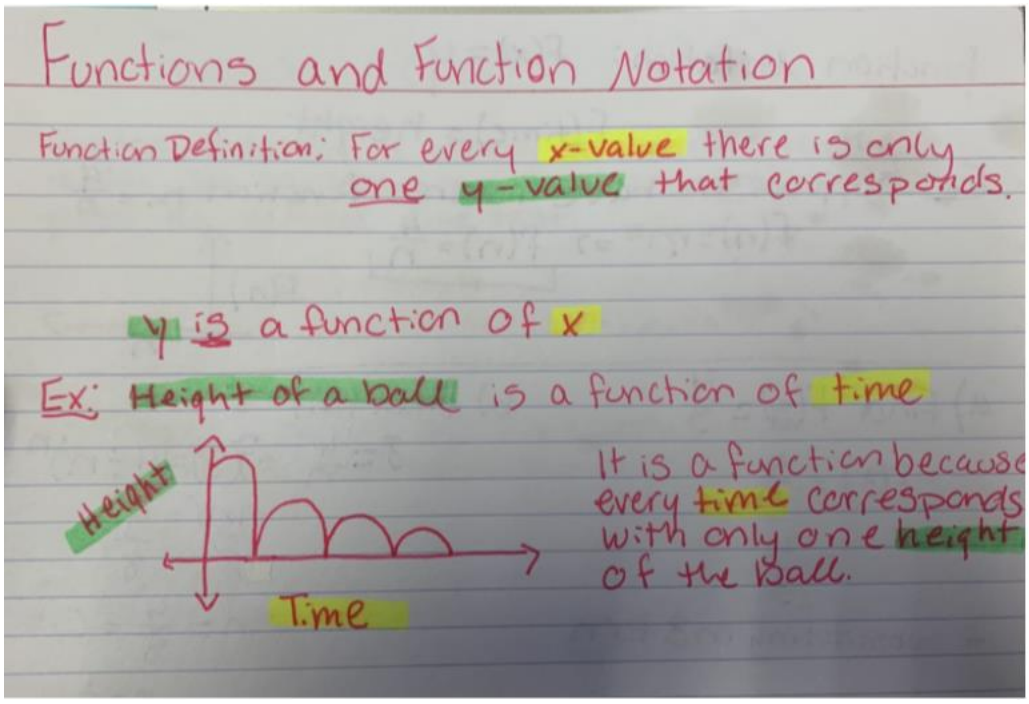
C

$$f(x) = 5(-x^2)$$

D

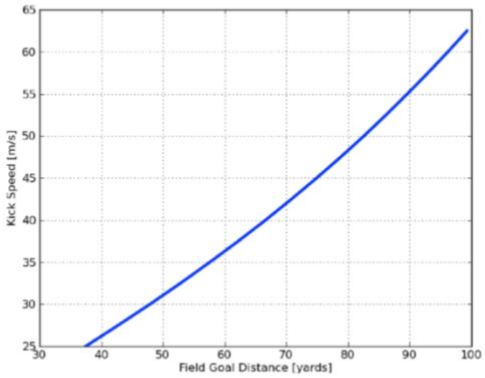


Function Notation Toolkit Card:



Summary: https://www.wootmath.com/p/8vevujciyiex0ejj

Jennifer kicked a field goal. The graph above shows the relationship of how fast she had to kick the ball to make it and how far the field goal posts were from her. Is this a function?




Enter answer here

consider f(x)=45. What would the input value be?

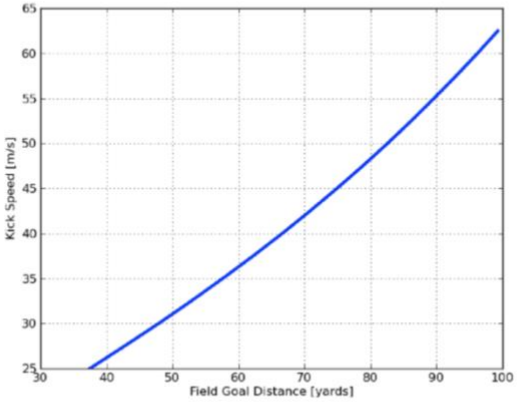
| A | B | C | D |
|---|---|---|---|
| 28 | 55 | 75 | 82 |

Consider f(60)=h. What would the output value be?

| A | B | C | D |
|---|---|---|---|
| 37 | 96 | 45 | 60 |

What information does f(70)=42?

example) When the field goal is _____, Jennifer kicked the football _____

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Homework:

Functions Practice

Name: _____

Date: _____ Period:

___

On this worksheet please complete all problems, and show all of your work.

Example

Evaluate $f(g) = 11g + 2$

$f(9)$

$f(9) = 11(9) + 2$

$f(9) = 99 + 2$

$f(9) = 101$

1. Evaluate $f(x) = -x^2 + 2x$ given the following. SHOW ALL STEPS CORRECTLY.

a. $f(4)$

b. $f(-5)$

2. Evaluate $m(n) = 4 - x^2 + x$ given the following. SHOW ALL STEPS CORRECTLY.

a. $m(3)$

b. $m(-1)$

3. Name the function type for each function given. (Function Families Toolkit Card)

a. $f(x) = -4 + x$
example: linear

b. $g(x) = 2^x$

c. $h(x) = -9x^2 + 2x + 6$

d. $f(x) = -3|x|$

e. $k(x) = 9$

f. $l(x) = 0.8^x$

g. $g(x) = |x| + 10$

h. $r(x) = 10 + 2x$

i. $f(x) = 5x^2 - 4x$

j. $k(x) = -5^x$

4. State whether each function in #3 has an absolute maximum, absolute minimum or neither.

a. Example
neither

b. _____

c._____

d. _____

e._____

f._____

g._____

h. _____

i._____

j._____

5. State whether the given function is decreasing, increasing, or constant.

a. $l(x) = 0.8^x$

Example:

decreasing

b. $r(x) = 10 + 2x$

c. $g(x) = 2^x$

d. $f(x) = -4 + x$

e. $k(x) = 9$

f. $k(x) = -5^x$