# 2.6 Functional Function: F of x it is! NOTES

Functional **notation** is a way of representing functions algebraically. Function notation makes it easier to recognize the independent and dependent variables in an equation.

The function $f(x)$ is read as "$f$ of $x$" and indicates that $x$ is the independent variable. Consider the equation $c = 8s + 15$, where the independent variable $s$ represents the number of shirts ordered and the dependent variable $c$ represents the cost of the order. The equation can be written using functional notation as $f(s) = 8s + 15$. The cost, defined by $f$, is a function of $s$, the number of shirts ordered.

The process of calculating the value of a function for a specific value of the independent variable is called **evaluating a function.**
For example, the cost of ordering 4 shirts can be calculated by evaluating the function at $s = 4$.

This is written as $f(4)$ and read as "$f$ of 4."

$f(x) = y \Leftrightarrow (x, y)$

To evaluate, substitute 4 for $s$ in the rule $f(s) = 8s + 15$.
$f(4) = 8(4) + 15 = 32 + 15 = 47$
$f(4) = 47$

$f(4) = 47 \Leftrightarrow (4, 47)$ is on the graph

## Problem 1 Functions as Equations

1. The function $f(s) = 8s + 15$ represents the cost of ordering $s$ shirts. What are the domain and range of the function?

2. Use the equation $f(s) = 8s + 15$ to evaluate the function at each value. Explain what each means in terms of the problem.

Given an input, find the output!

a. $f(7) = 8(7) + 15$
$= 56 + 15$
$f(7) = 71$

b. $f(100) = 8(100) + 15$
$= 800 + 15$
$f(100) = 815$

c. $f(11) = 103$
(calc. table)

d. $f(0) = 15$
(calc. table)

e. $f(2.5) = 35$

ALPHA
TRACE
ENTER

3. Calculate the value of $x$ that makes each equation true. Explain what each means in terms of the problem.

Given an output, find the input!

a. $f(x) = 55$
$55 = 8x + 15$
$-15 \quad -15$
$\frac{40}{8} = \frac{8x}{8}$
$\boxed{5 = x}$

b. $f(x) = 175$
$175 = 8x + 15$
$-15 \quad -15$
$\frac{160}{8} = \frac{8x}{8}$
$20 = x$

c. $f(x) = 151$
$151 = 8x + 15$
$x = 17$
(num. solver)

REMEMBER***
f(-3) means -3 is your input and you plug it in for x

f(x) = -3 means that your whole function is = to -3 and you plug into the y.

## Problem 2 Functions as Tables

The function $h(a)$ represents the average height of boys that are $a$ years old.

| Boy's Age | Average Height in Inches |
|---|---|
| 6 months | 26 |
| 12 months | 30 |
| 18 months | 34 |
| 2 years | 36 |
| 3 years | 39 |
| 4 years | 42 |
| 5 years | 44 |
| 6 years | 47 |
| 7 years | 49 |
| 8 years | 51 |
| 9 years | 53 |
| 10 years | 55 |
| 11 years | 57 |
| 12 years | 59 |
| 13 years | 61 |

1. Use the table to evaluate the function at each value. Explain what each means in terms of the problem.

a. $h(7)$ = 49

b. $h(1.5)$ = 34

c. $h(11)$ = 57

d. $h(12.5)$ ≈ 60

2. Calculate the value of $a$ that makes each equation true. Explain what each means in terms of the problem.

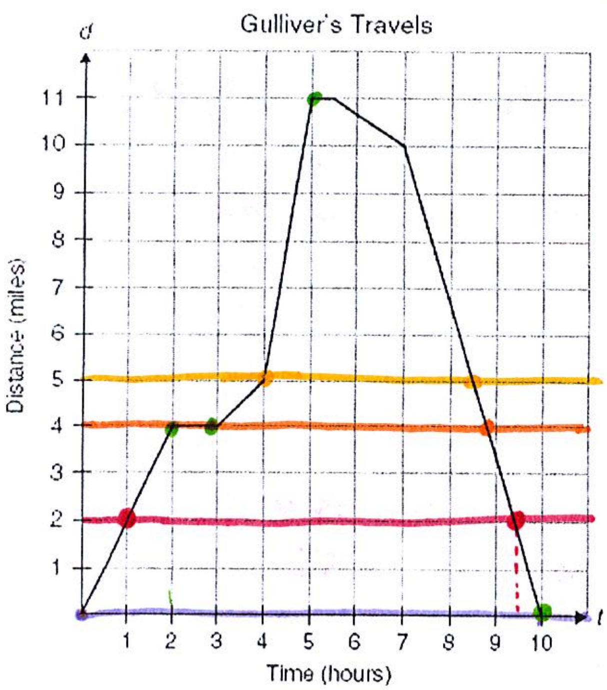
**a.** $h(a) = 61$ a=13

**b.** $h(a) = 36$ a=2

**c.** $h(a) = 53$ a=9

**d.** $h(a) = 45$ a≈5.3

## Problem 3 Functions as Graphs




The function $d(t)$ represents Gulliver's distance from home after $t$ hours.

1. Use the graph to evaluate the function at each value. Explain what each means in terms of the problem.

**a.** $d(2)$ = 4

**b.** $d(5)$ = 11

**c.** $d(2.9)$ = 4

**d.** $d(10)$ = 0

2. Calculate the value of $t$ that makes each equation true. Explain what each means in terms of the problem.

**a.** $d(t) = 2$ t=1, t≈9.5

**b.** $d(t) = 5$ t=4, t≈8.5

**c.** $d(t) = 4$ t≈8.75 and $2 \leq t \leq 3$

**d.** $d(t) = 0$ t=0, t=10