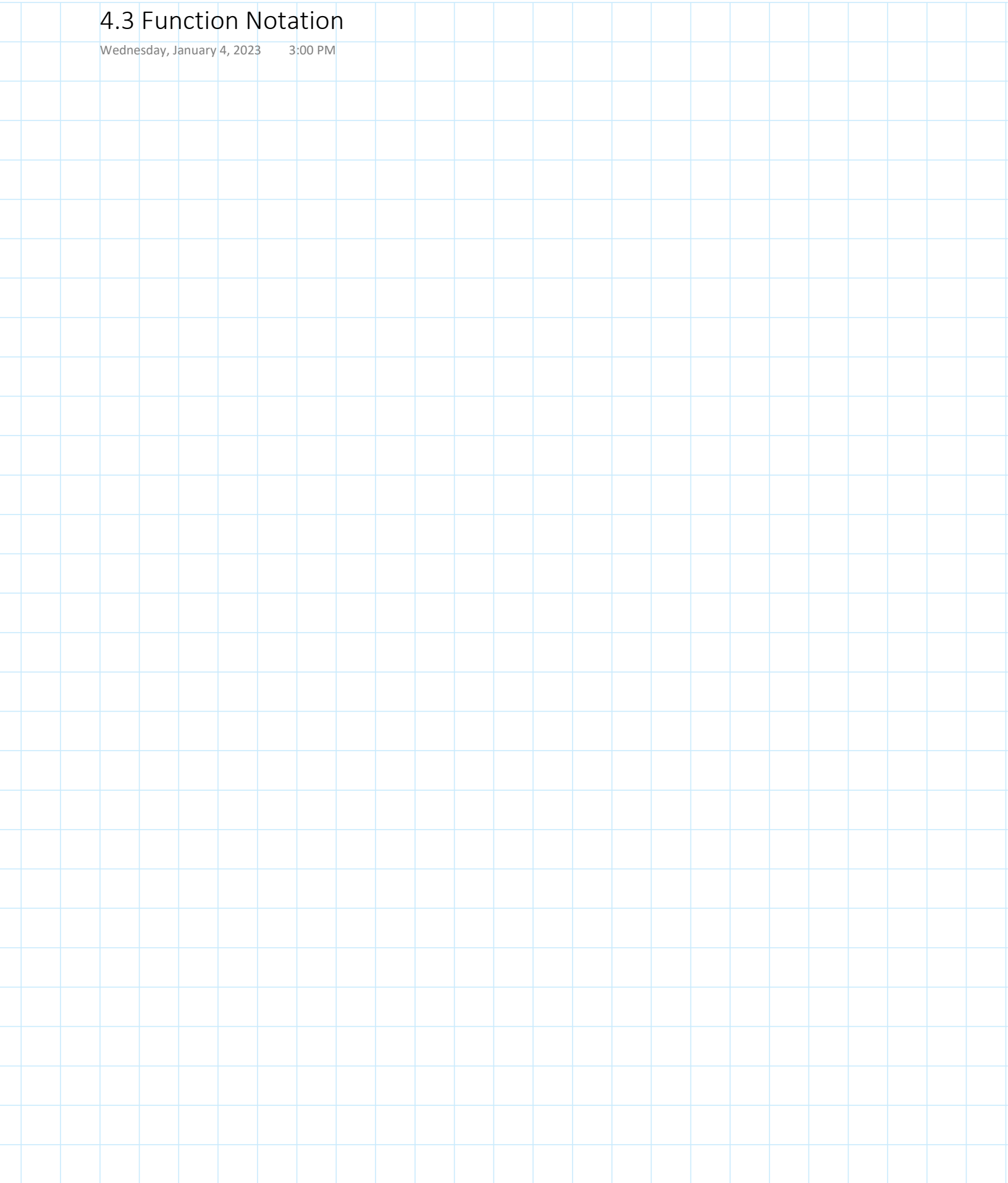


4.3 Function Notation

Wednesday, January 4, 2023 3:00 PM



4.3 Function Notation

A. Function Notation

- This is a way of noting a function by indicating the independent variable only.
- Any function that can be defined using a two-variable equation can be expressed in functional notation.
- If y represents the dependent variable and x represents the independent variable, then:

$$y = f(x)$$

f of x $f(x)$ replaces the y

- The notation $f(x)$ represents the y . The expression $f(x)$ means that there is a formula, called f , with x as the independent variable.
- The $()$ does **not mean multiplication**.
- The use of the letter f designating the function is a mathematical tradition and is absolutely not a necessity.

Sometimes $g(x)$ or $h(x)$ are used

Example 1 : Write each function using function notation.

Replace the y with $f(x)$

a) $y = 2x - 3$

b) $y = 2x^2 - 3x + 7$

$$f(x) = 2x - 3$$

$$f(x) = 2x^2 - 3x + 7$$

Example 2 : The function $C = 2.54p$ converts a measurement of p inches to a measurement of C centimeters. Expresses the function in function notation.

$$C = 2.54p$$

$$f(p) = 2.54p \quad \text{or} \quad C(p) = 2.54p$$

B. Using function notation

This notation is used to find a value of the given function.

- What is the value of the function, (the dependent variable / the range) when there is a specific value of x (independent value / domain)?
or
given x find y
- What is the value of x when there is a specific value of the function?
given y find x

Example 3 : The function $C(p) = 2.54p$ converts a measurement of p inches to a measurement of C centimeters.

a) Determine the value of $C(12)$. What does this number represent?

$$\begin{aligned}C(p) &= 2.54p \\C(12) &= 2.54(12) \\C(12) &= 30.48 \text{ cm}\end{aligned}$$

$$\begin{aligned}C(12) &= ? \\ \text{given } p &= 12 \\ \text{find } C &= ?\end{aligned}$$

$p = 12$
independent
(x)

b) Determine the value of p when $C(p) = 100$. What does the number represent?

$$\begin{aligned}C &= 100 \\ \text{find } p &\end{aligned}$$

$$\begin{aligned}C(p) &= 100 \\ \frac{100}{2.54} &= \frac{2.54p}{2.54}\end{aligned}$$

$C = 100$
dependent
(y)

$$39.37 \text{ inches} = p$$

Example 4 : Determines the value of the function given the value of the independent variable,

a) Given the function $f(x) = 3x - 5$; determine $f(3)$.

find the
dependent
(y)

$$\begin{aligned}f(3) &= 3(3) - 5 \\ f(3) &= 9 - 5 \\ f(3) &= 4\end{aligned}$$

given the x

b) Given the function $h(n) = n^2 - 4n$; determine $h(3)$.

$$\begin{aligned}\text{find } h(3) &= (3)^2 - 4(3) \\ h(3) &= 9 - 12 \\ h(3) &= -3\end{aligned}$$

$n = 3$ independent variable

Find the independent (find x)

Example 5 : Determines the value of the independent variable when there is a value of the function.

a) Given the function $f(x) = 4x - 2$; determine the value of x when $f(x) = 10$.

$f(x) = 10$
dependent (y)

$$\begin{aligned} f(x) &= 10 \\ 10 &= 4x - 2 \\ +2 & \quad +2 \\ \hline 12 &= 4x \\ \frac{12}{4} &= \frac{4x}{4} \\ x &= 3 \end{aligned}$$

Solution
 $f(3) = 10$

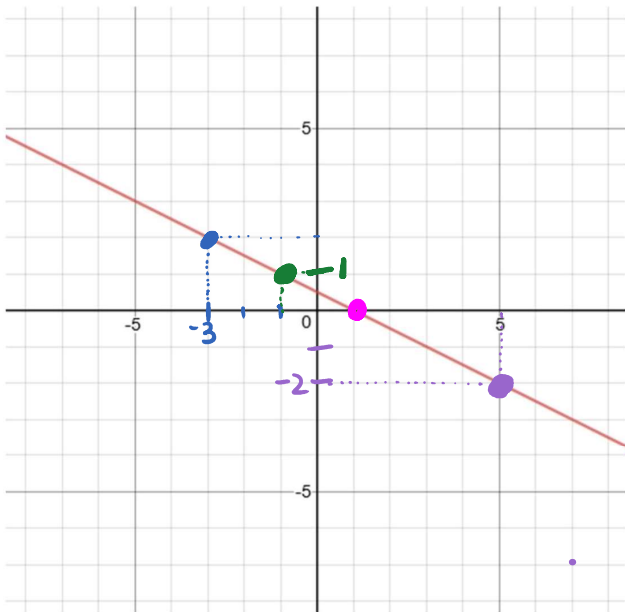
b) Given the function $g(n) = 2 - 3n$; determine the value of n when $g(n) = 8$.

$$\begin{aligned} 8 &= 2 - 3n \\ -2 & \quad -2 \\ \hline 6 &= -3n \\ \frac{6}{-3} &= \frac{-3n}{-3} \\ -2 &= n \end{aligned}$$

Solution
 $g(-2) = 8$

↑ y-value = 8
find the x-value (n)

Example 6 : Given the graph of the function $f(x)$. Determine :



a) $f(-3) = 2$ $x = -3$
find y

b) $f(1) = 0$ $x = 1$
find y

c) $f(x) = -2$ when $x = 5$
 $y = -2$
find x

d) $f(x) = 1$ when $x = -1$
 $y = 1$
find x