Composition Function and Inverse Function

Mathematics

Name :

For XI Grade

COMPOSITION FUNCTION

Definition of Function

A function is a relation that connects one member of a set to exactly one member of another set. Functions are more specific relations. Functions are usually expressed in the form f(x)=y, where f is the function, x is the input variable and y is the output variable.

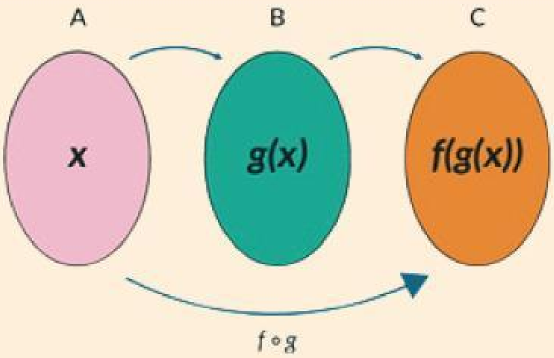
Watch the following video

What information do you get from the video?

COMPOSITION FUNCTION

Composition Function

If g A → B and f B → C are two functions then their composition f(g(x)) expressed with the notation (f o g)(x) is a function from domain A to codomain C. The composition of two functions can be understood via the following arrow diagram:



To better understand composition functions watch the following video

EXERCISE

If $f(x) = x^2 + 1$ and $g(x) = 2x - 1$, then $(f \circ g)(x)$ is ...

$(f \circ g)(x) = f(g(x)$

$= (g(x))^2 + 1$

$= (\quad)^2 + 1$

$= \quad + 1$

$=$

Known f = {(1,1) , (2,3) , (3,5) , (5,7) , (7,9)} and g = {(1,3) , (3,5) , (5,7)}. The ordered pair of compositions (f o g) are ...

A. {(1,3) , (3,5)}

B. {(1,5) , (3,7) , (5,7)}

C. {(1,5) , (3,7)}

D. {(1,5) , (3,7) , (5,9)}

E. {(1,3) , (3,7)}

EXERCISE

If known $f(x) = 2x + 3$ and $(f \circ g)(x) = 6x^2 - 4x + 13$, then $g(x)$ is ...

$(f \circ g)(x) = 6x^2 - 4x + 13$

..... $= 6x^2 - 4x + 13$

$2\,g(x) + 3 =$

$=$

$=$

Match them with the correct answer

Known $f(x) = 3x - 4$ and $g(x) = x + 7$, determine

$(f \circ g)(x)$	$3x + 3$
$(g \circ f)(x)$	$x + 14$
$(f \circ f)(x)$	$9x - 16$
$(g \circ g)(x)$	$3x + 17$

INVERSE FUNCTION

Definition of Inverse

The inverse is simply the opposite of something. For example, in everyday life, if you walk forward, then the inverse is to walk backward. Or if you turn on a light, the inverse is to turn off the light. So, an inverse is an action or condition that is opposite to the original.

Example

open the inverse door close the door

up the stairs its inverse down the stairs

Inverse Function

An inverse function is the opposite of a function. Think of a function like a machine that turns something into something else

So, the inverse function restores what was previously changed by the original function, like reversing the process.

is usually given a negative power of 1 to indicate the inverse.

Exercise 1

complete the blanks below

$f(x)$= up >< $f^{-1}(x)$ = ...

y = ... >< y^{-1}=true

$g(x)$= small >< $g^{-1}(x)$ = ...

to better understand inverses in functions

watch the following video

Exercise 2

complete the blanks below

Problem 1:

Given the function $f(x) = 2x + 3$,

find the inverse function of $f(x)$, denoted as $f^{-1}(x)$.

Here's the solution

$$y = 2x + 3$$

$$y - \dots = 2x$$

$$x = \frac{y-3}{\dots}$$

$$f^{-1}(x) = \frac{\dots - 3}{2}$$

Problem 2:

The function is given as $f(x) = 3x - 4$.

Find $f^{-1}(x)$ and calculate $f^{-1}(11)$.

Here's the solution

$$y = 3x - 4$$

$$y + \dots = 3x$$

$$x = \frac{y+4}{\dots}$$

$$f^{-1}(x) = \frac{\dots + 4}{3}$$

To calculate $f^{-1}(11)$:

$$f^{-1}(11) = \frac{\dots + 4}{3} = \frac{\dots}{3} = \dots$$