The Inverse of a Function

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Inverse of a Function: Theory

- Inverse Function refers to the “ reverse ” of a function. It is exactly as it sounds, where you find the opposite of a function. This is typically denoted by f^-1(y).
- There are several ways to find an inverse function and this is due to how many things can be considered a function.

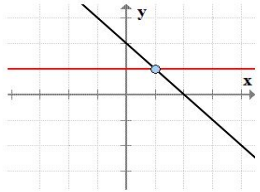
When the function f turns the apple into a banana,

Then the **inverse** function f^{-1} turns the banana back to the apple

Inverse of a Function: Theory

- For example in the function f(x)=y, then f^-1(x) is an inverse function of f if f^-1(y)=x. In one you are looking for y, and in the other you are looking for x.
- The same can be done for the opposite, where if you start with f^-1(6)=2, then find the original value which would be f(2)=6
- A function has an inverse only if it passes the horizontal line test from a graph. A graph represents a one-to-one function only if it passes both the horizontal and vertical line test.

$$f(x) = -x + 2.$$



Real Life Application

The inverse of a function is very useful and can be applied within multiple scenarios of our everyday life. Inverse functions can be applied to temperature regarding the conversion between Celsius and Fahrenheit. Recently, there has been a horrific disease that's been spreading throughout the world. One of the common symptoms associated with this virus is a fever.

Real Life Application Cont.

In order to prevent the spread of this disease currently happening in the world, everyone should take their temperature in case of a fever. However, not all countries use Fahrenheit as their official temperature scale, some use Celsius. For this reason, an inverse function between Fahrenheit and Celsius would be necessary.

The function to convert Fahrenheit to Celsius would be: $\mathbf{f(F) = (F - 32) \times 5/9}$

The Inverse of the function (Celsius back to Fahrenheit): $\mathbf{f^{-1}(C) = (C \times 9/5) + 32}$

Location	Cases	...per 100K people	Deaths	...per 100K people
USA	14,756,998	4,511	282,310	86
India	9,677,203	715	140,573	10
Brazil	6,603,540	3,153	176,941	84
Russia	2,439,163	1,688	42,675	30
France	2,290,891	3,420	54,804	82
Italy	1,728,878	2,861	60,078	99
United Kingdom	1,723,242	2,592	61,245	92
Spain	1,684,647	3,606	46,252	99
Argentina	1,463,110	3,288	39,770	89
Colombia	1,371,103	2,762	37,808	76
Germany	1,194,550	1,440	18,989	23
Mexico	1,175,850	932	109,717	87
Poland	1,063,449	2,800	20,089	53
Iran	1,040,547	1,272	50,310	62
Peru	972,688	3,041	36,231	113
Ukraine	834,913	1,871	14,054	31
Turkey	828,295	1,006	14,900	18
S. Africa	814,565	1,410	22,206	38
Belgium	591,756	5,181	17,320	152
Indonesia	575,796	215	17,740	7

If you check your temperature and it's above 98°F, or the inverse (98-32) x 5/9= 36.6°C , check in with your doctor. The pandemic has affected many of us however, any decrease in the spread of this disease would help a lot and potentially save someone.

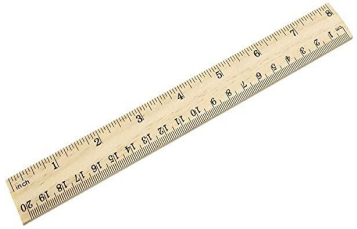
Another Real Life Application

The inverse of a function exists where one variable increases, other variable decreases. If you increase a value by x amount and output a y value, you can inverse it by doing the opposite.

One real life application would be figuring out the cost per item. A bag of 10 oranges costs $8.99. You can find the cost of each orange by multiplying its inverse

Take the inverse of 10 = 1/10 = 0.1 * total (8.99) = 89c ea

Everyday example:

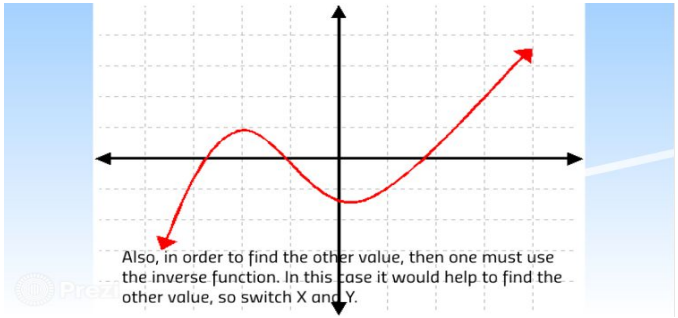


There are many small other examples we can relate to such as;
Converting measurement units to other measurement units.
For ex. Meters to Feet,
You can use the formula of Y=X*3.3
Y is equal to the amount of feet equivalent to the amount of meters inputted on the X value.

So since an inverse helps you get your original value back, we can also use the inverse to calculate currency,

In this case, the inverse function is: Y=X/3490.50. Where Y is the amount of dollars, and X is the pesos.

Conclusion



The formulas are so vital and commonly used because some people aren't accustomed to using feet and inches or some who struggle using the metric system. With the inverse, you can choose whichever is preferred because it should give back the original value.

In conclusion, inverse functions used in real life situations and are more common than what we think. f(x)=p(x)/q(x)

Bibliography

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