Euros Conversion and Inverse Functions

Goals: Finding an inverse function of a linear function and interpreting inputs and outputs.

TASKS

Given at the current time, 1 euro is equivalent to 1.18 U.S. dollars.

1. Write a function f that inputs a number of euros and outputs the number of U. S. dollars.
   x = number of euros $f(x) = 1.18x$ gives corresponding numbers of dollars

2. Tell the meaning $f(42)$ in terms of converting euros to U. S. dollars.
   When you convert 42 euros, you get 49.56 dollars.

3. Solve the question that $f(x) = 49.56$ for x and describe the meaning of your answer.
   $49.56 = 1.18x$ and $x = 42$. We have \$49.56 corresponds to 42 euros.

4. Write a function g that determines the number of euros as a function of U. S. dollars.
   with y being number of dollars, $g(y) = \frac{y}{1.18}$ gives corresponding number of euros.

5. Compare the values of $f(42)$ and $g(49.56)$.
   Then determine $g(f(42))$ and $f(g(49.56))$.

   $f(42) = 48.56$ and $g(49.56) = 42$.
   $g(f(42) = 42$ and $f(g(49.56)) = 49.56$.

6. Change the function to consider including that you would be charged 1% of your euros amount, before the remaining amount is converted to U. S. dollars.
   $h(x) = 1.18(.99x)$

7. If you are exchanging less than 100 euros, you would be charged 2 euros as a service fee. Write a function to represent this case for exchanging under 100 euros for U. S. dollars.
   $k(x) = 1.18(x - 2)$

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Reference D. Teuscher, K. Palsky, and C. Y. Palfreyman, Inverse Functions: Why switch the variable?, NCTM Mathematics Teacher 2018, March, 374-381.