

6. [9 points] Zunari wants to bake bread to sell in his store. However, he is not a baker, and despite knowing individual conversions, forgets how to put them all together. Here is what he knows:

- The weight of f cups of flour is $K(f)$ kilograms.
- From q kilograms of flour, he can make $D(q)$ kilograms of dough.
- x kilograms of dough weigh $P(x)$ pounds.
- From x kilograms of dough, he can make $L(x)$ loaves of bread.
- Selling ℓ loaves of bread, he collects a total of $C(\ell)$ dollars.

Formulas for each of the functions above are given in the following table. Assume the inputs for all functions in the table must be at least one.

$K(f)$	$0.14f$
$D(q)$	$3.5q - 1$
$P(x)$	$2.2x$
$L(x)$	$2x - 0.5$
$C(\ell)$	$4\ell + 2$

a. [2 points] Suppose Zunari can make $H(f)$ loaves of bread from f cups of flour, where $H(f)$ is a composition of the above functions. Express $H(f)$ as a composition of functions.

Solution:

$$H(f) = L(D(K(f)))$$

b. [3 points]
 Find an explicit formula for $H(f)$.
 (i.e. Your answer should not involve any of the letters K, D, P, L, C).

Solution:

$$\begin{aligned}
 H(f) &= 2(3.5(.14f) - 1) - .5 \\
 &= .98f - 2.5
 \end{aligned}$$

c. [4 points]
 If $M = C(\ell)$, find an explicit formula for $C^{-1}(M)$.

Solution: To solve for the inverse, we solve for the output variable in terms of the input variable.

$$\begin{aligned}
 M &= 4\ell + 2 \\
 M - 2 &= 4\ell \\
 \frac{M - 2}{4} &= \ell = C^{-1}(M)
 \end{aligned}$$