8. [13 points] Phoebe, Joey and Chandler are out shopping for their Thanksgiving dinner. They need to buy potatoes and cranberries and have 50 dollars in total. Phoebe will make mashed potatoes with peas and onions, Joey will make tater tots and Chandler will make his famous cranberry sauce. Let:

   - $P(a)$ be the cost, in dollars, of buying a **pounds** of potatoes and
   - $C(b)$ be the cost in dollars, of buying b **kg** of cranberries.

Also, assume P^{-1} and C^{-1} exist. Each answer for this problem may involve the functions P, C, and/or their inverses.

Write a mathematical expression for the following:

   a. [3 points] The amount of cranberries in **kg** that costs 3 dollars.

   > *Solution:* $C^{-1}(3)$

   b. [4 points] The amount of money, in dollars, that Chandler, Phoebe and Joey have left after buying m **pounds** of potatoes and r **pounds** of cranberries.
   Note: 1 **kg** = 2.2 **pounds**.

   > *Solution:* $50 - P(m) - C(\frac{r}{2.2})$

Write an equation for the following sentence:

   c. [3 points] Buying 1.8 **pounds** of potatoes is 4 dollars more expensive than buying 0.5 **kg** of cranberries.

   > *Solution:* $P(1.8) = C(0.5) + 4$

Phoebe, Joey and Chandler end up buying 10 **pounds** of potatoes. Phoebe uses k **pounds** for her mashed potatoes recipe and Joey uses the rest to make tater tots. Answer the following question using a mathematical expression:

   d. [3 points] What fraction of the total number of potatoes does Joey use?

   > *Solution:* $\dfrac{10 - k}{10}$