

1. [11 points] An animal shelter takes care of abandoned cats and dogs. Consider the following functions and constants:
- The function $F(c)$ gives the amount of pounds of cat food consumed by c cats in one day at the animal shelter.
 - The function $S(p)$ gives the cost (in dollars) of p pounds of cat food.
 - There were k cats in the animal shelter on December 17.
 - On December 17, the animal shelter spent d dollars on dog food.

- a. [4 points] Find a practical interpretation for each of the following mathematical expressions.

Solution:

i) $S^{-1}(13)$: The number of pounds of cat food that cost 13 dollars.

ii) $S(F(15))$: The cost in dollars of feeding 15 cats in one day at the animal shelter.

- b. [7 points] Write a mathematical expression for each of the following quantities.

- i) The average amount of cat food needed per cat in one day if there are c cats in the animal shelter.

Solution: $\frac{F(c)}{c}$

- ii) The cost (in **hundreds** of dollars) of z **ounces** of cat food (recall that 1 pound equals 16 ounces).

Solution: $\frac{1}{100}S\left(\frac{z}{16}\right)$

- iii) The amount of dollars the animal shelter spent on dog **and** cat food on December 17.

Solution: $d + S(F(k))$