

### A Linear Equation in a Mixture Problem

A horse trainer wishes to make a grain supplement of corn and oats, in order to add 100 grams of protein to the diet of a mare with a new foal. The trainer knows from the information on the packages that using corn alone, 3.50 quarts would be needed, while using oats alone, 2.58 quarts (really,  $10 \frac{1}{3}$  cups) would be needed. What mixtures of corn and oats meet the requirements?

1. Let us construct a table showing possible mixtures.

$x$ (quarts of corn)	3.5				
$y$ (quarts of oats)	0				

From the given information, we know that  $(x, y) = (3.5, 0)$  is one possible mixture that delivers 100 grams of protein. Use the information about using oats alone to fill in another column of the table.

2. Explain why a mixture with  $x = 3.5/2$  and  $y = 2.58/2$  would still deliver 100 grams of protein, and fill in another column of the table.
3. Explain why a mixture with  $x = 3.5(1/3)$  and  $y = 2.58(2/3)$  would still deliver 100 grams of protein, and fill in another column of the table.
4. As the prior 2 items suggest, proportional reasoning is valid for our table. That means the variables  $x$  and  $y$  are related by a linear equation. What are the  $x$  and  $y$  intercepts of the graph of the equation? Use these values to formulate an equation for the line relating  $x$  and  $y$