

# Old MacDonald Had a Farm

Directions: (for single-headed animals)

Let the number of legs be  $x$  and  $y$   
with  $x > y$

Let the given number of total legs  
be  $L$  and the number of heads  
be  $H$

WLOG, assume that you are asked to  
find the number of animals with  
 $x$  legs

$L - yH$  is the number of extra legs  
if each animal had only the lesser  
number of legs.

$\frac{L - yH}{x - y}$  is therefore the answer  
you are seeking.

Think About It:

- Are there any restrictions on the number of legs or heads total (in terms of  $x, y, H, L$ )
- What if you had a third type of animal and another form of data (i.e. # of tails)? Could you generalize this method.
- Think of this problem as a set of linear equations. Using this method, what are we actually doing with those equations?

Replacing  $\infty$  with  $\rightarrow$

The main concept of dealing with infinite sums and series is to replace it by a variable.