

January 14, 2008

Applied Solutions  
237 Pasteur Hall  
Winona, MN

Milligander Geese Company  
1400 Corporate Blvd  
St. Paul, MN

Dear Mr. Milligan,

Thank you for requesting our services. I hope you are pleased with our analysis below.

Since the price of the ground corn oscillates regularly over the course of the year, the price,  $P(t)$ , can be modeled using a cosine function, where  $t$  is the day of the year (1 for Jan 1, 2 for Jan 2, ... 365 for Dec 31). Since the prices are between \$5/lbs and \$12/lbs, the center value is \$8.50/lbs and the amplitude of the fluctuation is \$3.50/lbs. In addition, since the period is one year and from the two prices you've supplied, we have been able to determine that

$$P(t) = 8.5 + 3.5 \cos(0.0172142 t - 5.56)$$

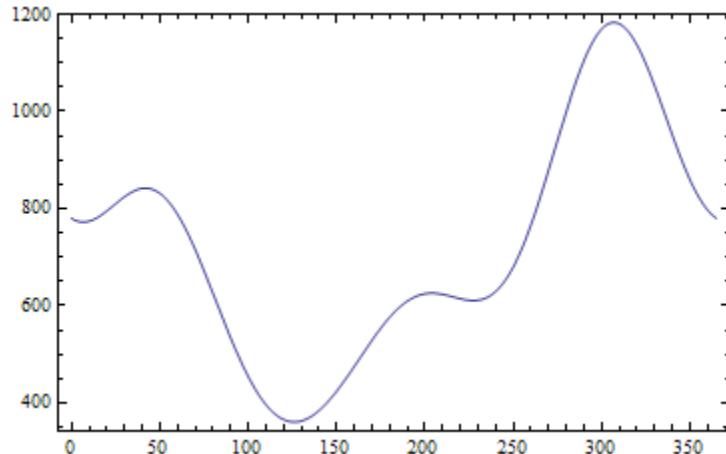
The amount of specially ground corn that you need to purchase can also be modeled using a cosine function. Again, since the fluctuation is between 70 and 100lbs and the period is a third of a year with a peak on March 1<sup>st</sup>, then the demand  $D(t)$  on day  $t$  as above is given by

$$D(t) = 85 + 15 \cos(0.0516426 t - 3.1)$$

Then, since the total cost (in dollars) of buying ground corn is given by the price (in dollars/lbs) multiplied by the quantity (in lbs), the total cost  $C(t)$  of specially ground corn on day  $t$  is determined by

$$C(t) = P(t) * D(t)$$

which is graphed below over the course of the year:



By analyzing this graph, we can see that the lowest expenses for ground corn occur around the 126<sup>th</sup> day of the year (i.e. May 7<sup>th</sup>) and will be about \$360/day. The highest expenses will occur around the 307<sup>th</sup> day (i.e. November 3<sup>rd</sup>) and will be about \$1183/day.

Good luck with your business and let me know if you have any further questions.

Sincerely,

A handwritten signature in blue ink that reads "Sally Student". The signature is fluid and cursive, with "Sally" on top and "Student" below it.

Sally Student  
Applied Solutions