Name: ____________KEY______________________

Econ 337 Agricultural Marketing, Spring 2020

Homework Assignment 3; Due March 27, 2020.

1. Your company sells steaks into the retail market. Your costs have gone up and your marketing department has decided to raise prices. Currently, you sell strip steaks for $9.00 per lb and you are going to raise the price to $9.50 per lb. At $9, you typically sell 24,000 lbs of strip steak per month. You know from research that the own-price elasticity for strip steaks is -0.73.

a. (4 points) How many pounds do you expect to sell per month at the new, higher price of $9.50 per lb?

$$\text{Price Elasticity of Demand} = \frac{\%\ \text{Change in Quantity Demanded}}{\%\ \text{Change in Price}}$$

$$\%\ \text{Change in Quantity Demanded} = \text{Price Elasticity of Demand} * \%\ \text{Change in Price}$$
$$\%\ \text{Change in Quantity Demanded} = -0.73 * 0.0556$$
$$\%\ \text{Change in Quantity Demanded} = -0.041 \text{ or } -4.1\%$$

$$\text{lbs sold at \$9.50 per lb price} = 24{,}000 + (24{,}000 * -0.041) = 23{,}027$$

b. (5 points) Explain the difference between an increase in demand and an increase in quantity demanded. List three factors that could lead to an increase in the demand for beef.

Demand is the schedule of quantities consumers would purchase over a range of prices. An increase in demand shifts the demand curve outward.

Quantity demanded is the quantity consumers will purchase at a given price, i.e., refers to a point on the demand curve. When the price of a product is decreased, you expect an increase in consumption. This is an increase in quantity demanded just in response to a lower price.

Factors that could lead to an increase in the demand for beef include: changes in population, changes in income, price of substitutes, price of compliments, and taste and preferences.

2. You are a cow-calf producer and are planning to cull 30 cows from your herd. You typically sell cull cows in December when your culling decisions are made. However, you notice that you typically market cull cows at a seasonally lower price point when marketing in December. You have decided this year to compare opportunities for marketing your cull cows in December or incurring additional costs to target a later marketing date when prices may be higher.

a. (4 points) On December 28, 2019 cull cows are selling for $65.34/cwt. Use the seasonal price index provided on the last page to forecast the cull cow price in May 2020. What is the May 2020 forecast in $/cwt?

Recall: $P_1 \times \frac{I_2}{I_1} = P_2 \quad \text{or} \quad P_{\text{Dec19}} \times \frac{I_{\text{May}}}{I_{\text{Dec}}} = P_{\text{May20}}$

$$P_{\text{Dec19}} \times \frac{I_{\text{May}}}{I_{\text{Dec}}} = P_{\text{May20}} = \$65.34 \times \frac{1.045}{0.928} = \$73.58/\text{cwt}$$

b. (4 points) Given the change in cattle prices since December 2019, do you think your May 2020 cull cow price forecast in part a. is too high, too low, or still accurate? Do you recommend increasing, decreasing, or keeping the same May 2020 cull cow price forecast? Hint: Look at live cattle futures prices at https://www.cmegroup.com/trading/agricultural/livestock/live-cattle.html and "click" on the JUN 2020 Chart icon to see a graph of the price history of that futures contract.

The June 2020 live cattle futures contract has decline from roughly $118/cwt in December 2019, to $109/cwt in February 2020, to below $105/cwt to begin March 2020. The cull cow market and live cattle market are related, i.e., the price of cull cows can be measured or considered as a percentage of live cattle prices. As such, the May 2020 cull cow price forecast made in December 2019 is too high and the price forecast should be decreased.

c. (4 points) On February 15, 2020 cull cows are selling for $57.96/cwt. What is your updated May 2020 cull cow price forecast in $/cwt.

$$P_{\text{Feb20}} \times \frac{I_{\text{May}}}{I_{\text{Feb}}} = P_{\text{May20}} = \$57.96 \times \frac{1.045}{0.975} = \$62.12/\text{cwt}$$

d. (13 points) Before you make any decisions you want to know the required increase in value to justify waiting to sell and the expected increase in value for marketing your cull cows at a later date.

The following is the scenario you want to consider.

- Market your cull cows on February 15, 2020 (early date) or on May 22, 2020 (later date).
- All 30 cull cows to be sold are home raised from within your herd. You will not be selling any purchased cows or calves.
- Cull cows marketed on February 15, 2020 would sell for $57.96/cwt and you assume that cull cows marketed on May 22, 2020 would sell for the $/cwt you calculated in part c.
- Cull cows marketed on February 15, 2020 would weigh 1,325 pounds each and you assume that cull cows marketed on May 22, 2020 would weigh 1,350 pounds each.
- No other assets will be sold on February 15, 2020 or May 22, 2020 along with the sale of your cull cows.
- You assume it will cost you $2.00 for feed costs per day ($/head), $0.50 for other costs per day ($/head), and $0 for additional asset costs.
- You assume 5.0% for opportunity cost on capital invested and $0 for other net earnings if cattle are sold.

Use the *Cow Sell Calculator* (http://www.extension.iastate.edu/agdm/livestock/html/b2-35.html) to calculate the required increase in value to justify waiting to sell and the expected increase in value at a later date. Record the input and calculated values in the template provided.

Specifically, in the table below:
1 point for A1, A2, F, G1, L2, L3, N
3 points each for B1, H1

Net Revenue From Immediate Sale

A.	**Cow and Calf Sales - Early Date (m/d/yyyy)**	2/15/2020
	1. Number of raised cows to sell (head)	30
	2. Number of purchased cows to sell (head)	0
	3. Number of calves to sell (head)	0
	If selling pairs, separate total sales into cows (line 2) and calves (line 3).	
B.	**Net Sales Value Per Head - Early Date**	
	1. Net sales value for cows ($ per head)	$768
	2. Net sales value for calves ($ per head)	$0
C.	**Net Revenue Per Head**	
	1. Total net cow sales revenue - early date ($) = A x B	$23,040
	2. Total net calf sales revenue - early date ($) = A x B	$0
D.	**Net Sales Value Of Other Assets That Can Be Sold ($)**	$0
E.	**Total Net Revenue From Immediate Sale**	$23,040

Income And Expenses Associated With Later Sale

F.	**Later Sale Date (m/d/yyyy)**	5/22/2020
	Days between sales dates: days	97
G.	**Cow And Calf Sales - Later Date**	
	1. Number of raised cows to sell (head)	30
	2. Number of purchased cows to sell (head)	0
	3. Number of calves to sell (head)	0
H.	**Net Sales Value Per Head - Later Date**	
	1. Net sales value for cows ($ per head)	$839
	2. Net sales value for calves ($ per head)	$0
I.	**Net Revenue Per Head**	
	1. Total net cow sales revenue - early date ($) = G x H	$25,170
	2. Total net calf sales revenue - early date ($) = G x H	$0
J.	**Net Sales Value Of Other Assets That Can Be Sold ($)**	$0
K.	**Total Net Sales Revenue - Later Date ($) = I + J**	$25,170
L.	**Additional Costs For Enterprise Between Early Sales Date And Alternative Date**	
	1. Number of head	30
	2. Feed cost per day ($/head)	$2.00
	3. Other costs per day ($/head)	$0.50
	4. Additional asset costs ($)	$0
M.	**Total Additional Costs Between Dates ($)**	$7,275
N.	**Opportunity Cost On Capital Invested: Annual Interest Rate (%)**	5.0%
O.	**Earnings On Net Sales Revenue ($) = E x N x (F/365)**	$306
P.	**Other Net Earnings If Cattle Are Sold ($)**	$0
Q.	**Sales Value Required To Generate The Same Revenue ($)** = E + M + O + P	$30,621
R.	**Value Per Animal Or Other Assets To Generate The Same Revenue As A Sale At The Early Date**	$1,021
S.	**Required Increase In Value to Justify Waiting To Sell ($ per head) = R - B**	$253
T.	**Expected Increase In Value At Later Date ($ per head) = H - B**	$71

e. (5 points) Based on your calculations in part d., should you market your cull cows in February or incur additional costs to target a May marketing date? In your discussion make sure to reference the calculated *required increase in value to justify waiting to sell* and the *expected increase in value at a later date* you calculated in part b.

Based on the scenario outlined in part d. you should market your cull cows in February. Marketing 30 head of 1,325-pound cull cows in February at a price of $57.96/cwt versus marketing 30 head of 1,350-pound cull cows in May at a forecasted price of $62.12/cwt increases the expected sales value by $71 per head. However, the required increase in sales value to justify waiting until May to sell is $253 per head. The $182 per head difference between the required increase and the expected increase is way too large to expect an above average seasonal price increase in cull cow prices or lower than expected costs (e.g., feed cost, other costs, opportunity costs on capital invested) to change your decision. You should market your cull cows in February.

3. (10 points) You are a manager for a wean-to-finish operation and want to determine the expected marginal return from feeding pigs to different weights. You know this will depend on several production measures and gather the following data to help with the analysis.

Cost of late finisher diet, $/lb	$0.15
Carcass price, $/cwt	$70
Yield, %	75.0%

a. The table below shows the cumulative amount of feed at 5-pound increments of increasing live selling weight for finished hogs near market weight. Calculate the incremental amount of feed, incremental feed/gain, and marginal cost of gain for each 5-pound increase in live selling weight. Note: The first two rows of answers have been given to provide guidance on how to make the calculations.

Carcass weight, lb	Live wt, lb	Cumulative feed, lb	Incremental feed, lb	Incremental Feed/Gain	Marginal cost of gain, $/cwt gain
157.5	210	470.31			
161.3	215	486.34	16.0	3.21	$48.11
165.0	220	502.58	16.2	3.25	$48.72
168.8	225	519.02	16.4	3.29	$49.33
172.5	230	535.67	16.6	3.33	$49.94
176.3	235	552.52	16.8	3.37	$50.55
180.0	240	569.57	17.1	3.41	$51.16
183.8	245	586.83	17.3	3.45	$51.77
187.5	250	604.29	17.5	3.49	$52.38
191.3	255	621.95	17.7	3.53	$52.99
195.0	260	639.82	17.9	3.57	$53.60
198.8	265	657.89	18.1	3.61	$54.21
202.5	270	676.16	18.3	3.65	$54.82
206.3	275	694.64	18.5	3.70	$55.43
210.0	280	713.32	18.7	3.74	$56.04
213.8	285	732.21	18.9	3.78	$56.65
217.5	290	751.30	19.1	3.82	$57.26
221.3	295	770.59	19.3	3.86	$57.88
225.0	300	790.08	19.5	3.90	$58.49

3 points for the Incremental feed, lb column
3 points for Incremental Feed/Gain column
4 points for Marginal cost of gain, $/cwt gain column

b. (3 points) If the selling price for finished hogs is \$70 per hundredweight (cwt) carcass, what is the optimal live selling weight for your hogs? Explain how you determined this. Hint: Live Price = Carcass Price × Yield

$\text{Live Price} = \text{Carcass Price} \times \text{Yield} = 70 \times 0.75 = \$52.50$

The optimal live selling weight is 250 lbs. At 255 pounds the marginal cost exceeds the selling price. An optimal weight in the range of 250-250 lbs.

c. (2 points) If the price of feed is \$0.15 per pound and the selling price for finished hogs decreased to \$67 per hundredweight (cwt) carcass, would you expect the optimal live selling weight to increase, decrease, or stay the same? Explain why you expect this result.

You would expect the optimal live selling weight to decrease because the marginal cost for each incremental 5-pound of gain is the same and the selling price (marginal revenue) for finished hogs decreased.

d. (3 points) Using your calculations in part a., what is the optimal selling weight if the selling price for finished hogs is \$67 per hundredweight (cwt) carcass? Explain how you determined this.

$\text{Live Price} = \text{Carcass Price} \times \text{Yield} = 67 \times 0.75 = \$50.25$

The optimal selling weight is 230 lbs. At 235 pounds the marginal cost exceeds the selling price. An optimal weight in the range of 230-235 lbs.

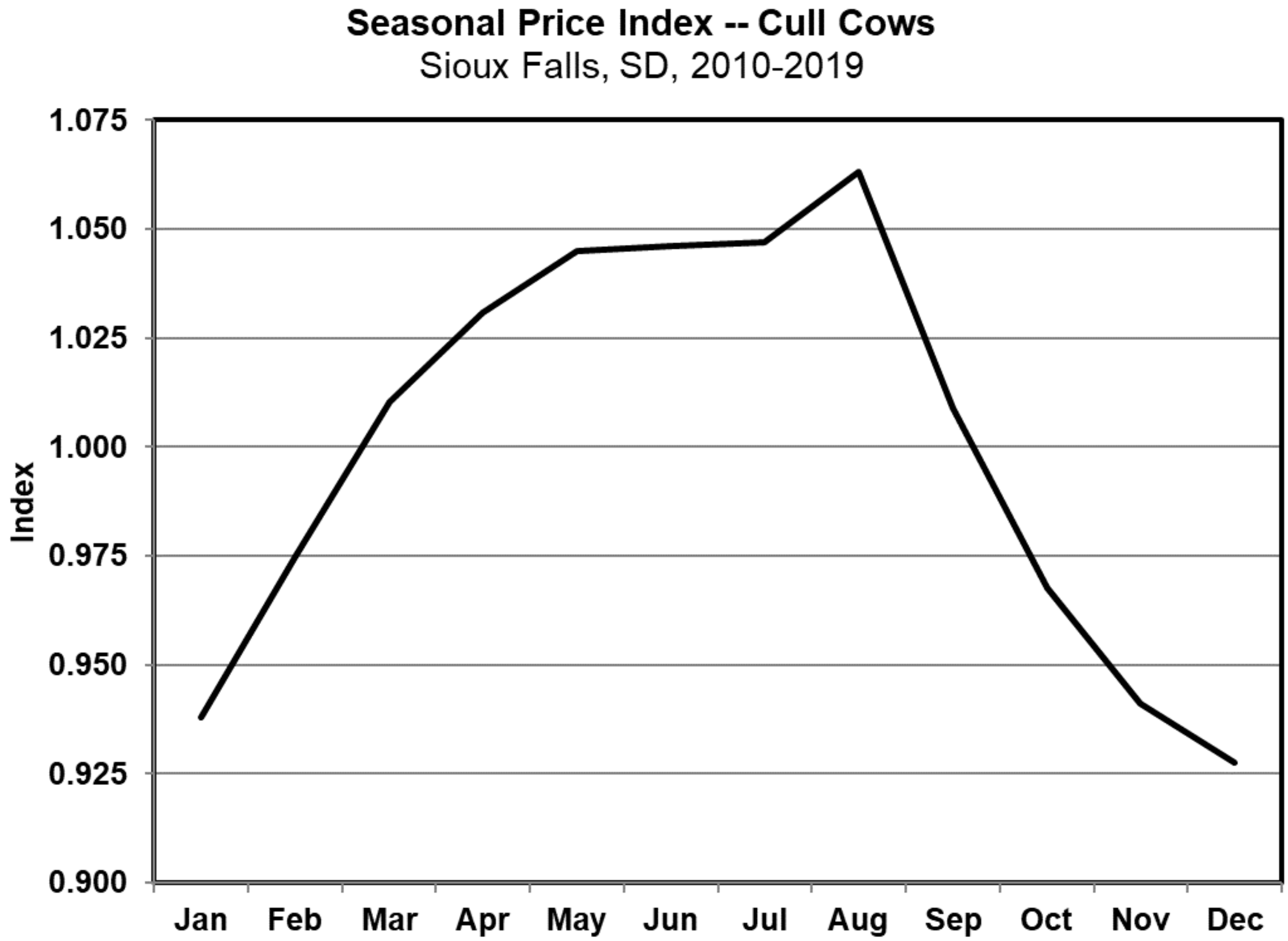
e. (2 points) If the price of feed decreased to \$0.14 per pound and the selling price for finished hogs is \$70 per hundredweight (cwt) carcass, would you expect the optimal live selling weight to increase, decrease, or stay the same? Explain why you expect this result.

You would expect the optimal live selling weight to increase because the marginal cost for each incremental 5-pound of gain decreased and the selling price (marginal revenue) for finished hogs stayed the same.

f. (6 points) Recalculating the marginal cost of gain, \$/cwt gain in part a. based on a feed cost of \$0.14 per pound, what is the optimal selling weight if the selling price for finished hogs is \$70 per hundredweight (cwt) carcass? Explain how you determined this.

$\text{Live Price} = \text{Carcass Price} \times \text{Yield} = 70 \times 0.75 = \$52.50$

The optimal selling weight is 280 lbs. At 285 pounds the marginal cost exceeds the selling price. An optimal weight in the range of 280-285 lbs.



Seasonal Price Index -- Cull Cows, Sioux Falls SD, 2010-2019

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2010	51.75	53.13	57.15	62.00	63.25	62.90	62.44	63.44	60.18	58.69	57.75	59.40	59.34
2011	66.94	75.69	77.35	78.75	79.25	77.65	75.58	72.45	68.03	65.75	65.83	68.21	72.62
2012	72.85	81.73	83.06	83.27	84.84	79.55	73.63	79.54	80.85	76.13	74.55	75.09	78.76
2013	76.24	78.55	77.97	77.07	76.44	77.16	78.85	82.58	81.92	78.38	79.25	79.44	78.65
2014	85.51	92.43	97.35	99.60	98.44	105.83	114.00	118.03	114.38	117.20	115.60	112.50	105.91
2015	104.72	102.47	108.63	108.43	110.44	108.69	109.58	108.93	98.33	87.75	82.53	70.55	100.09
2016	72.16	74.10	77.18	80.25	79.75	81.23	79.82	81.48	71.33	65.19	58.90	55.19	73.05
2017	61.32	61.71	67.88	71.60	75.63	74.81	72.94	71.64	66.50	65.21	63.18	63.53	68.00
2018	62.75	63.17	63.89	64.50	65.13	66.57	67.13	67.39	65.35	63.79	61.71	63.94	64.61
2019	65.07	64.66	64.38	65.16	68.32	68.06	69.12	69.93	66.92	64.21	62.57	63.61	66.00
Avg	71.93	74.76	77.48	79.06	80.15	80.25	80.31	81.54	77.38	74.23	72.19	71.15	76.70
Ratio	0.938	0.975	1.010	1.031	1.045	1.046	1.047	1.063	1.009	0.968	0.941	0.928	