

Name _____

Chapter _____

ID # _____

A. Ground Beef Formulation Problem

As the manager of a company which manufactures ground beef for distribution to retail food stores, you must adhere to high quality and food safety standards. Your company goal is to produce fresh and wholesome products that are in compliance with all industry regulations, meat inspections, and retail store specifications. Each retail store has particular specifications for ground beef and costs must be as low as possible. Therefore, least-cost formulations must be calculated.

USDA ground beef regulations are defined as:

Ground Beef: The terms "Ground Beef" and "Chopped Beef" are synonymous. Products labeled as "Ground Beef" and "Chopped Beef" must be made with fresh and/or frozen beef with or without seasoning, without the addition of fat as such, and shall contain no more than 30% fat. These products may not contain added water, binders, extenders, or phosphates. These products may contain beef cheek meat not to exceed 25%; however, heart meat or tongue meats are not acceptable ingredients.

If the name is qualified by the name of a particular cut, such as "Ground Chuck" or "Ground Round", then the product must consist **entirely** of meat from that particular cut or part.

If a product is to qualify for "lean" or "low fat" labeling, the product must contain less than 10% total fat. If a product is to be labeled "extra lean", the product must contain less than 5% total fat.

Industry guidelines for ground beef manufacture:

To get the most desirable color and maximum shelf life, all boneless meats used to manufacture ground beef must be fresh (not frozen), well chilled (temperature no higher than 35° F), and shall arrive at the plant within 96 hours (4 days) of animal harvest. A least-cost formulation shall be calculated using acceptable meat ingredients, selecting those meats that produce the lowest cost product, while meeting all ground beef guidelines. To simplify the grinding and blending operation **only two meat ingredients will be used for each batch**. In order to make specification ground beef in a least-cost formulation process, you must determine the ingredients to use and in what amounts. All government regulations and retail food store specifications must be followed.

Specifications of this particular retail store's ground beef formulation are as follows:

- Batch Size = 3000 lbs.
- Fat content of finished product = 20%
- Manufacturing date = August 27
- All ingredients must be received fresh, not frozen
- Product must be received at the plant within 96 hours (4 days) of animal harvest date
- No product over 4 days old may be used for grinding (from date of harvest)
- No product with a receiving temperature of over 35° F may be used
- Must be least-cost formulated

Available Boneless Meat Ingredient Information:

Meat Ingredients	Date of Harvest	Date Received	Receiving Temperature (° F)	Condition Received	Fat (%)	Price/lb.
85% Lean Trim	8/23	8/26	31°	Fresh	15.0	\$2.71
65% Lean Trim	8/24	8/25	34°	Fresh	35.0	\$1.36
Beef Cheek Meat	8/23	8/26	28°	Frozen	15.0	\$1.90
Beef Heart Meat	8/21	8/26	32°	Fresh	20.0	\$0.74
Boneless Chuck	8/25	8/27	30°	Fresh	10.0	\$2.55
Bull Meat	8/26	8/27	28°	Frozen	8.0	\$2.52

1. For least-cost formulation of 80% lean ground beef meeting all specifications of your retail store you would use a combination of:
 - a. 85% lean trim and beef cheek meat
 - b. 85% lean trim and boneless chuck
 - c. 85% lean trim and 65% lean trim
 - d. 65% lean trim and boneless chuck
 - e. 65% lean trim and bull meat

2. For a least-cost ground beef formulation meeting your retail store's specifications, use the Pearson Square Method to calculate the amount of meat ingredients needed in a 3,000 pound batch of 80% lean ground beef. What would be the proportion of the two meat ingredients? Round to the whole pound (ex., 100.00)
 - a. 1,200 lbs. and 1,800 lbs.
 - b. 2,000 lbs. and 1,000 lbs.
 - c. 1,500 lbs. and 1,500 lbs.
 - d. 2,700 lbs. and 300 lbs.
 - e. 2,250 lbs. and 750 lbs.

3. What would be the price per pound of the least-cost formulated ground beef meeting your retail store's specifications? Round to the nearest penny (ex., 0.00).
 - a. \$2.07 per pound
 - b. \$2.58 per pound
 - c. \$1.94 per pound
 - d. \$2.37 per pound
 - e. \$2.00 per pound

4. If the ground beef you've formulated to meet these specifications was marked up 25% to cover overhead costs and make a profit for this store, what would this batch sell for per pound? Round to the nearest penny (ex., 0.00).
- \$2.96 per pound
 - \$2.89 per pound
 - \$3.33 per pound
 - \$2.43 per pound
 - \$2.59 per pound
5. The ground beef formulation would:
- be labeled at the store's discretion to increase sales
 - be labeled as ground beef
 - be labeled as extra lean ground beef
 - be labeled as low fat ground beef

B. Beef Carcass Pricing Problem

Kleeman Livestock, Inc. retains ownership of their cattle until they are harvested. The ranch receives payment for their cattle on a value-based pricing system that depends on carcass weight, USDA Quality Grades (QG) and Yield Grades (YG). They have recently marketed **300 head** of cattle.

The average live weight, dressing percentage, yield grades, quality grades, and pricing information of the 300 head lot are as follows:

Average live weight: 1,340 lbs.
 Average dressing percent: 63%
 USDA Yield Grade (YG): 40% were YG 2's
 60% were YG 3's
 *Assume equal distribution of yield grades within the four quality grades.

USDA Quality Grade (QG): 10% were high Choice (Ch+)
 30% were average Choice (Ch°)
 40% were low Choice (Ch-)
 20% were USDA high Select (Se+)

USDA carcass yield and quality grades, prices, and adjustments/cwt.

Base Price of YG3 low Choice = \$245.84/cwt.

Acceptable hot carcass weight range = 600 to 900 lbs.
 Under 600 lbs. = deduct \$13.83/cwt. from base price
 Over 900 lbs. = deduct \$4.34/cwt. from base price
 YG 2 carcasses = add \$5.11/cwt. to base price
 Average and high Choice carcasses = add \$3.25/cwt. to base price
 High Select carcasses = deduct \$8.00/cwt. from base price

1. Are you producing cattle with average carcass weights within the acceptable range (no discounts)?
 - a. Yes
 - b. No

2. What is the price/cwt. of the average Choice Yield Grade 2 carcasses?
 - a. \$245.84/cwt.
 - b. \$250.95/cwt.
 - c. \$254.20/cwt.
 - d. \$249.09/cwt.

3. What is the price/cwt. of the high Select Yield Grade 2 carcasses?
 - a. \$237.84/cwt.
 - b. \$254.20/cwt.
 - c. \$245.84/cwt.
 - d. \$242.95/cwt.

4. What is the average price/cwt. for the lot of 300 cattle?
 - a. \$248.58/cwt.
 - b. \$247.59/cwt.
 - c. \$245.84/cwt.
 - d. \$237.47/cwt.

5. Which of the following may affect the quality and yield grades of feedlot cattle? Circle your answer.
 - A. Nutrition
 - B. Genetics
 - C. Humane animal welfare and handling systems
 - D. All of the above

Answer Key p1

A. Ground Beef Formulation Problem

1. a. 85% lean trim and beef chuck meat = NO (frozen)
- b. 85% lean trim and boneless chuck = NO (fat)
- c. 85% lean trim and 65% lean trim = maybe
- d. 65% lean trim and boneless chuck = maybe
- e. 65% lean trim and full meat = NO (frozen)

option c:

85% lean trim

15%

20%

15%

15/20

$$15/20 \times 3000 = 2250 \times \$2.71 = \$6097.50$$

65% lean trim

35%

5%

20%

5/20

$$5/20 \times 3000 = 750 \times \$1.36 = 1020.00$$

3000

7117.50

$$* \$7117.50 \div 3000 = \text{\$}2.37$$

option d:

65% lean trim

35%

20%

10%

$$10/25 \times 3000 = 1200 \times \$1.36 = \$1632$$

Boneless chuck

10%

15%

25%

15/25

$$15/25 \times 3000 = 1800 \times \$2.55 = 4590$$

3000

6222

$$* \$6222.00 \div 3000 = \text{\$}2.07$$

2. a. 1200 lb 65% lean trim and 1800 lb boneless chuck
3. a. \$2.07 per pound
4. e. \$2.59 per pound after markup
5. b. to be labeled as ground beef

Answer Key p 2

B. Beef Contract Pricing Problem

1. a. Yes $1340 \text{ lb live} \times 63\% \text{ DP} = 844.2 \text{ lb cwt}$

2. c. $\$254.20 / \text{cwt}$ $\$245.84 \text{ base}$
 $+ 5.11 \text{ yg 2}$
 $+ 3.25 \text{ ch}^0$

 $\$254.20$

3. d. $\$242.95 / \text{cwt}$ $\$245.84 \text{ base}$
 $+ 5.11 \text{ yg 2}$
 $- 8.00 \text{ Se}^+$

 $\$242.95$

4. b. $\$247.59 / \text{cwt}$

$40\% (462) \text{ of } 300 = 120$

$10\% \times 300 = \text{Ch}^+ (30) \times 40\% 462 = 12 \text{ Ch}^+$ $\frac{462}{0.6} \text{ QG}$

$30\% \times 300 = \text{Ch}^0 (90) \times 40\% 462 = 36 \text{ Ch}^0$ $245.84 + 5.11 + 3.25 = 254.20 \times \frac{12}{300} = 10.17$

$40\% \times 300 = \text{Ch}^- (120) \times 40\% 462 = 48 \text{ Ch}^-$ $245.84 + 5.11 + 0 = 250.95 \times \frac{48}{300} = 40.15$

$20\% \times 300 = \text{Se}^+ (60) \times 40\% 462 = 24 \text{ Se}^+$ $245.84 + 5.11 - 8.00 = 242.95 \times \frac{24}{300} = 19.44$

120

100.26

$60\% (463) \text{ of } 300 = 180$

$\frac{463}{0.6} \text{ QG}$

$10\% \times 300 = \text{Ch}^+ (30) \times 60\% 463 = 18 \text{ Ch}^+$ $245.84 + 0 + 3.25 = 249.09 \times \frac{18}{300} = 14.95$

$30\% \times 300 = \text{Ch}^0 (90) \times 60\% 463 = 54 \text{ Ch}^0$ $+ 0 + 3.25 = 249.09 \times \frac{54}{300} = 44.84$

$40\% \times 300 = \text{Ch}^- (120) \times 60\% 463 = 72 \text{ Ch}^-$ $+ 0 + 0 = 245.84 \times \frac{72}{300} = 59.00$

$20\% \times 300 = \text{Se}^+ (60) \times 60\% 463 = 36 \text{ Se}^+$ $+ 0 - 8.00 = 237.84 \times \frac{36}{300} = 28.54$

180

147.33

100.26

+ 147.33

$\$247.59 / \text{cwt}$

5. D. All of the above