

School Name _____

NATIONAL FFA DAIRY FOODS CDE
TEAM EVENT
2009

This exercise involves calculations of the prices of milk of the four classes provided by Federal Milk Marketing Orders. The overall price for an individual milk producer will be calculated. The information needed is presented **independently** in each part of the problem. **Round ALL values to the nearest 0.01.** You will use formulas applied in federal milk marketing orders.

Mark your answers on the answer sheet. . You may write on this paper. It will be turned in with the answer sheet.

Part 1. Calculate the price of Class III milk (used for cheese making) by summing the values of butterfat, protein and other solids.

Step 1. Calculate the **price of butterfat** using

NASS average price for AA grade butter = \$1.20/lb

make allowance = \$0.12/lb

yield factor = 1.20.

Formula: Butterfat value/lb = (price of butter – make allowance) x yield factor

Solution: (_____ - _____) x _____ = \$ _____ /lb butterfat

1. Mark your answer:

- (2) a. \$2.52 b. \$1.85 c. \$1.58 d. \$1.30
-

Step 2. Calculate the value of protein in Class III milk using

NASS weighted average cheese price = \$1.26/lb

make allowance of \$0.168/lb

yield factor attributable to protein = 1.38

yield factor attributable to fat = 1.57

butterfat price of \$1.85

average ratio of fat to protein in milk = 1.17.

Formula:

Protein value/lb = ((cheese price -make allowance) x protein's yield factor) +

((((cheese price –make allowance) x fat's yield factor) – butterfat price x 0.9) x fat to protein ratio)

Solution: ((_____ - _____) x _____) +

(((((_____ - _____) x _____) - _____ x 0.9) x _____) = \$ _____ /lb protein

2. Mark your answer:

- (2) a. \$4.50 b. \$3.51 c. \$3.33 d. \$1.56
-

Step 3. Calculate the value of “other solids” using

dry whey price = \$0.2925/lb

make allowance = \$0.196/lb

yield factor = 1.03.

Formula:

“Other solids” value/lb = (dry whey price – make allowance) x yield factor

Solution: (_____ - _____) x _____ = \$ _____ /lb other solids

3. Mark your answer:

- (2) a. \$0.07 b. \$0.10 c. \$0.47 d. \$0.50
-

Step 4. Calculate the Class III skim milk price of milk from producer #2994 whose milk tested 3.2% protein and 6.2% other solids. Assume the following prices: protein = \$2.10/lb and other solids = \$0.096 /lb.

Formula:

Class III skim milk price/cwt = (% protein x protein price/lb) + (% other solids x other solids price/lb)

Solution: (_____ x _____) + (_____ x _____) = \$ _____ /cwt Class III skim milk

4. Mark your answer:

- (2) a. \$6.13 b. \$6.40 c. \$7.31 d. \$10.20
-

Step 5. Calculate the price per cwt of Class III whole milk by summing the values of the components of milk producer #4425. Use the following data for the calculation:

3.0% protein at \$2.64/lb

4.8% butterfat at \$2.00/lb

6.2% other solids at \$0.12/lb

Formula:

Class III milk price/cwt = (% protein x price/lb) + (% fat x price/lb) + (% other solids x price/ lb)

Solution: (_____ x _____) + (_____ x _____) + (_____ x _____) = \$ _____ /cwt Class III milk

5. Mark your answer:

- (2) a. \$9.62 b. \$17.94 c. \$18.26 d. \$18.47
-

Part 2. Calculate the Price for Class IV milk (used to make butter and nonfat dry milk) by summing the values of Class IV skim milk and butterfat. There are three steps in this problem.

Step 1. Calculate the nonfat milk solids price using

Average NASS price of nonfat dry milk (NDM) = \$0.8666/lb

Make allowance = \$0.157/lb

Yield factor = 0.99

Formula:

Nonfat solids price/lb = (NDM price - make allowance) x yield factor

Solution: (_____ - _____) x _____ = \$_____/lb NMS

6. Mark your answer:

- (2) a. \$1.20 b. \$0.70 c. \$0.57 d. \$0.51
-

Step 2. Calculate the value of Class IV skim milk containing 9.05% nonfat solids when the value of those solids is \$1.04/lb.

Formula:

Price of Class IV skim milk = % nonfat milk solids x price/lb of NMS

Solution: _____ x _____ = \$_____/cwt Class IV skim milk

7. Mark your answer:

- (2) a. \$9.88 b. \$10.32 c. \$11.25 d. \$8.01
-

Step 3. Calculate the **Class IV milk** price using a **skim milk price of \$8.00/cwt.** (To obtain lb skim milk/lb milk, subtract from 1 the amount of milk fat (butterfat) in 1 lb of the milk. For example, if the milk fat test is 5%, $1.00 - 0.05 = 0.95$). **Assume a butterfat content of 3.8% and a butterfat price of \$1.30/lb.**

Formula:

Class IV milk price = (lb skim milk/lb milk x price/cwt) + (lb butterfat x price/lb)

Solution: (_____ x _____) + (_____ x _____) = \$_____/cwt Class IV milk

8. Mark your answer:

- (2) a. \$6.19 b. \$11.80 c. \$11.24 d. \$12.64
-

Part 3. Use the following values to calculate the prices of milk in Classes I and II. These are not the same values that you calculated above.

(NOTE: The Federal Order policy is that the skim milk price for Classes I and II is the higher of skim milk prices of Class III or IV.)

Class III skim milk	\$9.90/cwt	Protein	\$2.20/lb
Class IV skim milk	\$10.10/cwt	Class I differential	\$2.15/cwt
Butterfat	\$1.26/lb	Class II differential	\$1.20/cwt

Step 1. Calculate the value per cwt of Class I milk containing 3.5% butterfat.

Formula:

Class I value/cwt = (lb skim milk/lb milk x price/cwt) + (lb butterfat x price/lb) + Class I differential

Solution: (_____ x _____) + (_____ x _____) + _____ = \$_____/cwt Class I milk

9. Mark your answer:

- (2) a. \$16.31 b. \$17.05 c. \$16.16 d. \$15.24
-

Part 4. Assuming the following utilization percentages and prices for the four classes of milk in the market during the pay period, calculate the individual values of the four classes. Then calculate the overall value per hundred-weight (cwt) of milk from this producer.

Class	Utilization (%)	Price/cwt (\$)	Value (\$)
I	45	12.00	_____
II	10	10.20	_____
III	9	9.10	_____
IV	36	9.80	_____
All milk price/cwt			_____

10. Mark your answer:

- (2) a. \$10.69 b. \$9.69 c. \$10.07 d. \$10.07
-

Part 5. You will receive duplicate milk samples to test for titratable acidity. Add 6 drops of the pH indicator, phenolphthalein, and titrate to the first permanent shade of light pink. Choose the answer closest to your test result. You may titrate both samples as a control on your technique.

11. Mark your answer:

- (2) a. 0.11% b. 0.16% c. 0.21% d. 0.26% e. 0.31%
-

Part 6. Calculate the bacterial count per milliliter of the sample given your team in the form of two Petrifilm plates, one representing the 1:100 dilution and the other representing the 1:1000 dilution of the original sample. Count the colonies, select the plate having 25 to 250 colonies and multiply the result by the reciprocal of the dilution used.

12. Mark your answer:

(2)

- a. Less than 2,500/mL
- b. 2,500 to 25,000/mL
- c. 26,000 to 50,000/mL
- d. 51,000 to 75,000/mL
- e. 76,000 to 100,000/mL

Part 7. A dairyman added 2 fl. oz. of a 5.25% stock solution of sodium hypochlorite (NaOCl) to 2 gallons (1 gal equals 128 fl. oz.) of water. Use the following formula to calculate the concentration in parts per million (ppm) of the resulting sanitizing solution:

$$\frac{\text{Fl. oz. of H}_2\text{O}}{\text{fl. oz. NaOCl}} = \frac{\% \text{ NaOCl} \times 10,000}{\text{Concentration in ppm}}$$

(1)

13. Mark your answer:

- a. 410 ppm
- b. 256 ppm
- c. 205 ppm
- d. 170 ppm