

FFA Milk Quality and Products Exam 2017 (Manchester)

Part I. There is ONE correct response per question. Completely fill in the scantron with your response.

1. Dairy cows are treated with antibiotics for all the following reasons EXCEPT:
 - a. To promote growth
 - b. Only when they are necessary to treat and cure an illness
 - c. For a prescribed period to treat a specific illness
 - d. Milk from those cows does not make it into the food supply

2. Regarding bovine somatotropin, all the following statements are true EXCEPT:
 - a. It can be distinguished from recombinant bovine somatotropin (rbST)
 - b. It is naturally produced in the pituitary gland of cows
 - c. It directs how energy and nutrients are used for growth of young cattle
 - d. It directs how energy and nutrients are used for milk production in lactating cows

3. The U.S. dairy industry accounts for approximately _____ of the total U.S. greenhouse gas emissions.
 - a. 2%
 - b. 4%
 - c. 24%
 - d. 48%

4. The United States Dairy Sustainability Report states all the following EXCEPT:
 - a. Since 2009, U.S. dairy farmers and companies have made a voluntary commitment to reduce dairy's carbon footprint by 25% by 2020.
 - b. Dairy production accounts for approximately 2% of total U.S. greenhouse gas emissions
 - c. Only 8.4% of U.S. cropland is used for milk production
 - d. Cow methane production contributes 5% towards greenhouse gas emissions

5. Hormones are naturally present in:
 - a. Humans
 - b. Animals
 - c. Plants
 - d. All the above

6. According to the *2010 Dietary Guidelines for Americans*, dairy products supply a lot of the following “nutrients of concern” which Americans do not consume enough of, EXCEPT:
 - a. Vitamin D
 - b. Calcium
 - c. Potassium
 - d. Selenium

7. Dairy products pack a powerful nutritional punch of nine essential nutrients, including all the following, EXCEPT:
 - a. Dietary fiber
 - b. Riboflavin
 - c. Protein
 - d. Vitamin B12

8. According to the *2012 Census of Agriculture Farm Typology*, what percent of US dairy farms are family owned?
 - a. 9%
 - b. 24%
 - c. 49%
 - d. 97%

9. While most regular carbonated beverages contain about 7 teaspoons of added sugar per serving, the same amount of chocolate milk products contain approximately:
 - a. 1 teaspoon
 - b. 2 teaspoons
 - c. 4 teaspoons
 - d. 8 teaspoons

10. Which of the following is not true regarding chocolate milk?
 - a. Flavored milk gives children more calcium without increasing fat and added sugars
 - b. Chocolate milk causes hyperactivity in children
 - c. Chocolate milk provides children with three of the five nutrients that fall short in children's diet
 - d. Chocolate milk contains the same nine essential nutrients as white milk

11. Research has shown that drinking milk after exercise can be as effective as some sports drinks in helping the body do all the following, EXCEPT:
 - a. Reduce muscle damage
 - b. Replace fluids
 - c. Rebuild muscle
 - d. Rest

12. Dairy checkoff programs dollars support the Innovation Center for U.S. Dairy®, which do all the following, EXCEPT:
 - a. Increase the price of dairy products
 - b. Promote the nutrient-rich benefits of dairy foods
 - c. Address challenges and opportunities to help grow dairy sales
 - d. Work to build a foundation of sound science to tell dairy's story of sustainability and environmental stewardship

13. Importers pay _____ per hundred-weight on dairy products imported into the U.S. National Dairy Research and Promotion Program.
- 7.5 cents
 - 15 cents
 - 30 cents
 - 45 cents
14. Which of the following statements about cheese is NOT true?
- Process cheese is made from high-quality natural cheese
 - Cheeses are naturally gluten-free
 - Cheese is the #1 source of dietary sodium for Americans
 - Cheese is the #2 source of dietary calcium for Americans
15. Which of the following is NOT true about dairy and non-dairy beverages?
- Low-fat cow's milk AND almond milk naturally contain at least 10% of the daily value of at least 5 essential vitamins and minerals
 - Low-fat cow's milk costs on average about \$2.05 per ½ gallon; soy milk costs on average about \$3.37 per ½ gallon
 - Rice milk has more calories per 8-oz glass than low-fat cow's milk because of nearly double the sugar
 - Low-fat cow's milk and soy milk contain about 8 g protein per 8-oz serving; almond, coconut and rice milk contain only about 1 g protein per 8-oz serving
16. The 2010 Dietary Guidelines emphasize a total diet approach to health, which includes urging Americans to do all the following, EXCEPT:
- Reduce calories
 - Move more
 - Increase portion size to reduce hunger
 - Make more nutrient-rich choices
17. If a person is lactose intolerant, she or he may be able to comfortably consume all the following dairy products, EXCEPT:
- Greek yogurt
 - Aged cheeses
 - Goat milk
 - Kefir
18. Frozen yogurt:
- Is essentially pure yogurt, but frozen
 - Is much healthier than ice cream
 - Typically has lower fat but higher sugar than ice cream
 - Can only contain all-natural ingredients

19. Some people try to claim that you can get as much calcium by consuming spinach, but you would have to eat 30 cups of spinach to equal the calcium in:
- One cup of fat-free milk
 - Two cups of fat-free milk
 - Three cups of fat-free milk
 - A half-gallon of fat-free milk
20. An 8-ounce glass of milk provides 11% of the daily value of potassium, which helps to:
- regulate the body's fluid balance and helps maintain normal blood pressure
 - build and repair muscle tissue, and serves as a source of energy
 - maintain normal vision and skin
 - strengthen bones and generates energy in your body's cells
21. The microbial standard for Grade 'A' raw milk from a single farm is less than _____ total aerobic bacteria per milliliter of milk.
- 50,000
 - 100,000
 - 200,000
 - 300,000
22. The protein in milk that forms curds when coagulated to produce cheese is:
- Rennet
 - Whey proteins
 - Lactose
 - Casein
23. Which is the first-ever nationwide, multi-year program designed to inspire people to donate milk to hungry families?
- Healthy Food Bank Hub
 - Great American Milk Drive
 - Farm to Fork
 - Fuel Up to Play 60
24. The Federal Milk Market Order program establishes class prices of milk based on market prices of _____.
- Evaporated milk
 - Fresh milk and cream
 - All varieties of cheese
 - Cheddar cheese, butter, and nonfat dry milk
25. Which of the following is an example of an unripened cheese?
- Asiago
 - Brick
 - Chevre
 - Provolone

26. According to the Food and Nutrition Board of the National Academy of Sciences, all people need at least _____ mg of calcium per day.
- 100
 - 500
 - 1,000
 - 1,500
27. Some researchers estimate that up to 55% of adolescents may be deficient in _____, putting them at increased risk for debilitating bone diseases. Milk is the leading source of this vitamin:
- Folic acid
 - Thiamin
 - Vitamin C
 - Vitamin D
28. To effectively sanitize a teat and maintain milk quality, how long must a teat pre-dip be left on the teat to be effective?
- 20 seconds
 - 30 seconds
 - 45 seconds
 - 1 minute
29. An 8-ounce glass of milk provides 16% of the daily value of protein, which primarily helps to:
- maintain normal vision and skin
 - strengthen bones and generates energy in your body's cells
 - build and repair muscle tissue, and serves as a source of energy
 - regulate the body's fluid balance and helps maintain normal blood pressure
30. Organic dairy requirements include all the following EXCEPT:
- All feeds must be certified organic.
 - All breeding stock must come from certified organic animals
 - Robotic milking machines are not permissible.
 - At least 30% of dry matter intake must be from pasture during the grazing season.

For questions 31 – 35, observe the DAIRY MARKET NEWS, AUGUST 21-25, 2017 report, provided to you.

31. Approximately how much would the average organic milk consumer have spent in the month of February 2017, if they bought one half gallon of organic milk each week?
- \$4.26
 - \$4.31
 - \$12.93
 - \$17.24
32. Consumers in Minneapolis, MN, paid _____ per half gallon of organic whole milk than their conventional milk-drinking friends.
- \$0.68 less
 - \$1.36 less
 - \$0.68 more
 - \$1.36 more
33. According to the report, all the following statements are true for the period, EXCEPT:
- There was an over-supply of organic milk in the market
 - Organic milk prices were lower than usual in the period
 - There was an increase in culling of organic cows
 - Organic milk sales in New England are the highest in the nation
34. In this period, the cost for an organic cow weighing 1,275 lb., sold for slaughter, would be approximately _____.
- \$99
 - \$851
 - \$995
 - \$85,119
35. Based upon the report, all the following are generally true EXCEPT:
- Consumers paid more for a pound of organic sharp Cheddar than a pound of organic butter
 - Consumers paid more for a pound of organic Colby than a pound of organic butter
 - Consumers paid more for a pound of organic Mozzarella than a pound of organic butter
 - Consumers paid more for a pound of organic Greek yogurt than a pound of organic butter

For questions 36 - 40, observe the Estimated Fluid Milk Product Sales Report from USDA, provided to you.

36. Based upon the report, which of the following statements is true?
- US consumers purchased more organic dairy products than conventional dairy products
 - US consumers purchased more organic dairy products than last year
 - US consumers purchased more conventional dairy products than last year
 - US consumers purchased more whole milk than last year
37. Based upon the report, which of the following statements is true?
- US consumers purchased more organic whole milk than conventional whole milk
 - US consumers purchased more organic reduced fat milk than conventional flavored whole milk
 - Estimated total fluid milk product package sales in Federal Milk Order 30 increased in 2017
 - Estimated total fluid milk product package sales in the Upper Midwest were higher than Central Marketing Area for the year
38. Of the selections below, which product(s) were estimated to have been purchased to the greatest extent, for the year ending in June 2017?
- Total whole milk
 - Total fat-free (skim) milk
 - Total organic milk products
 - Conventional fat-reduced milk
39. Of the selections below, which product(s) saw the greatest loss in sales, for the year ending in June 2017?
- Conventional "other fluid milk products"
 - Conventional fat-free (skim) milk
 - Organic flavored fat-reduced milk
 - Total organic milk products
40. Which Federal Milk Order, or California, saw the most significant change in estimated total fluid milk product sales for the month of June 2017, compared to 2016?
- Northeast
 - Upper Midwest
 - Arizona
 - California

ORGANIC DAIRY FLUID OVERVIEW

High Organic Milk Supplies Cut Into Organic Processor Profitability. The continuing reality of heavy supplies of organic milk has now been reflected into first half financial results of a large organic cooperative. Higher promotional spending and increased sales of organic milk into conventional markets are attributed as reducing expected first half profitability. This has now led to unspecified internal cost control measures in an effort to end the year with a profit. The cooperative attributes challenging factors as slower sales, bulk and ingredient sales below budget, high inventories, declining conventional milk prices, and an oversupplied conventional milk market, cutting into sales of surplus organic milk into conventional markets.

Organic Slaughter Cow Price Report. At an auction in Oregon August 24, organic cows sold for slaughter at lower prices per hundred pounds than conventional cows. The top ten organic cows auctioned brought an average price of \$66.76 per hundred pounds, compared with a \$78.05 average for the top ten conventional cows. Observers sadly reflected on the price weakness of organic cows as an indicator of increased organic herd culling in the face of lower organic milk pay prices as cash squeezed organic dairy producers seek to both reduce herds and raise additional cash. Producer quotas on volumes of organic milk some organic dairy processors will buy under contracts has also accelerated organic herd reductions, sending more organic cows to auction.

New England Organic Milk Sales and Sourcing. In New England, Federal Milk Market Order 1 reports utilization of types of organic milk by pool plants. During July, 2017, organic whole milk utilization totaled 14.1 million pounds, up from 12.3 million pounds one year earlier. The July, 2017 butterfat content was 3.28 percent, down from 3.29 percent in 2016. Organic reduced fat milk utilization for July this year, 18.4 million pounds, was down from 18.5 million pounds one year earlier. Butterfat this July was 1.28 percent, up from 1.22 percent last year.

During July there were also additions to order pooling of some sources of organic milk produced from outside the order, which had previously not been pooled and sold within Order 1. Organic milk from organic handlers in North Carolina, Indiana, and Michigan began sending organic milk to the pool.

Monthly Retail Organic Milk Price Comparison for Twenty Nine U.S. Cities. In a continuing data series, the August 2017 in store survey of supermarkets in twenty nine U.S. cities as to pricing of organic whole milk in half gallon containers reveals that prices range from \$2.98 in Houston, to \$5.24 in Kansas City.

The July average of pricing for the twenty nine cities, \$4.21, has generally trended lower throughout 2017 but is up 1 cent from last month. If you are reading this in text format, images will not appear. To view all images please go to the PDF version of this report, <https://www.ams.usda.gov/mnreports/dybdairyorganic.pdf>.

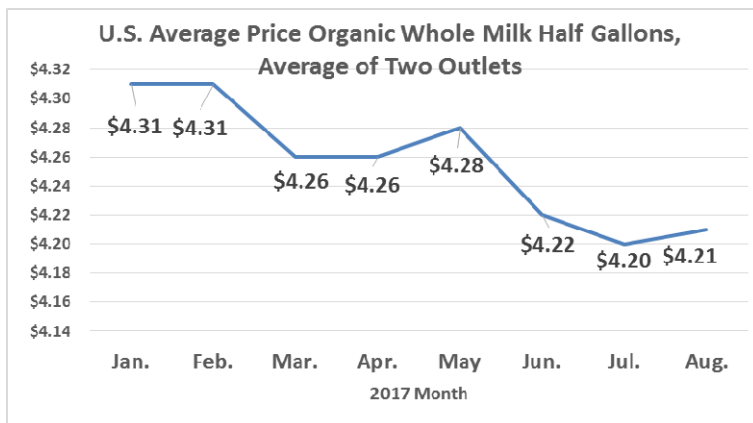


Image: Dairy Market News. Data Source: Federal Milk Market Order Administrators.

City by city, the greatest August organic price premium (the organic milk price minus the conventional milk price) is in Portland, Oregon, \$1.50. The lowest, Fort Lee, New Jersey, \$0.09. Atlanta stands alone as the only city among the twenty nine in which organic whole milk half gallons had a lower price than conventional, \$0.04 lower. The following table provides more detail as to cities with an organic milk price premium.

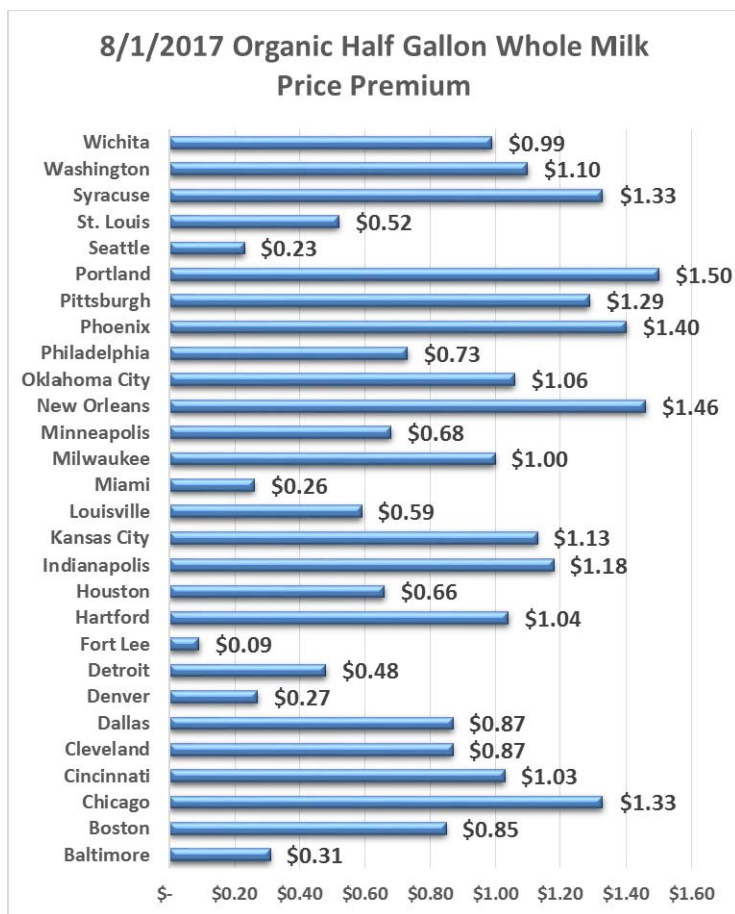


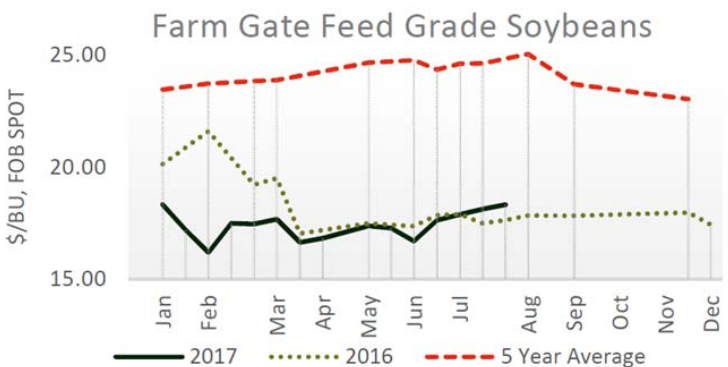
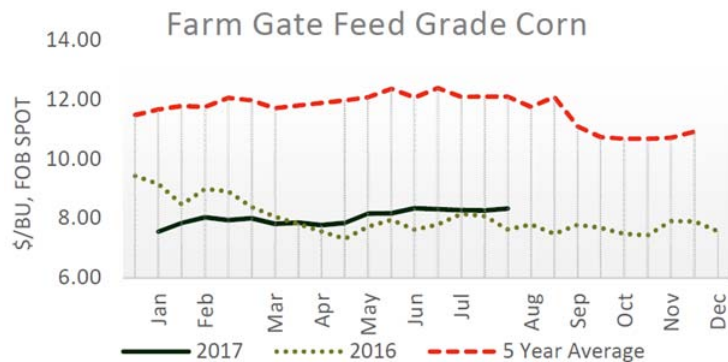
Image: Dairy Market News. Data Source: Federal Milk Market Order Administrators.

ORGANIC GRAIN AND FEEDSTUFF MARKETS: Organic feed grade corn demand and activity is moderate, trading 6 cents higher, with moderate forward contract activity. Organic feed grade soybean demand and activity is light, trading 20 cents higher. Forward contract activity is light. Spot market organic soybean meal, soybean oil, and feed wheat trading is inactive. Food grade bids are 9.00 delivered for organic SRW, 19.00 delivered for organic HRS, and 21.50 delivered for organic Durum. Demand is very good for food grade organic wheat with protein levels of 12.5 percent and above. There were few spot trades for organic feed oats, feed barley, and feed rye.

-CONTINUED ON PAGE 8A-

ORGANIC DAIRY MARKET NEWS
Information gathered August 14 - 25, 2017

-CONTINUED FROM PAGE 8-



Source: Graphs by Livestock, Poultry and Grain Market News

Additional livestock and grain market news information is available at: www.ams.usda.gov/LSMarketNews

ORGANIC DAIRY RETAIL OVERVIEW

DIRECT TO CONSUMER ORGANIC DAIRY PRODUCTS PRICES.

The following tables identify U.S. price range results from a Dairy Market News national survey of publicly available prices of organic dairy products, available from farmstead outlets and online. There may be prices offered outside of the price range which were not identified by the survey. These are cows' milk products.

Information is for the period August 14 – 25, 2017.

ORGANIC CHEESE

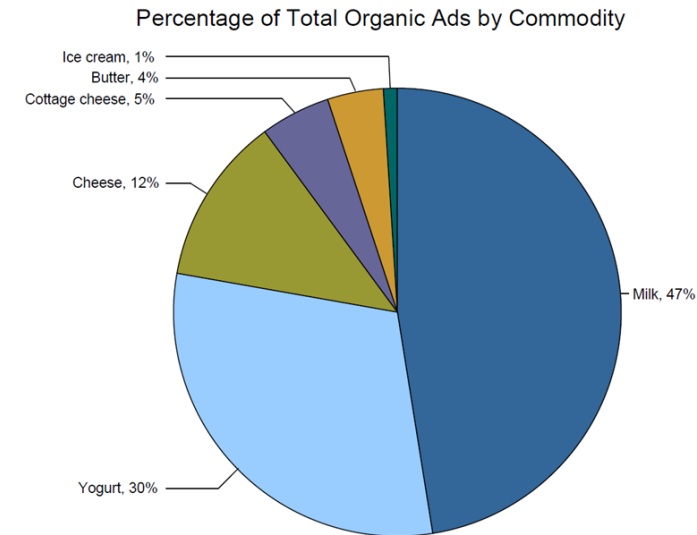
Commodity	Variety	Pack Size	:Organic Price Range \$
Organic Cheese	Cheddar - Mild-Medium	8 oz.	: 3.75 - 6.50
Organic Cheese	Cheddar - Sharp	8oz.	: 3.75 - 6.50
Organic Cheese	Colby	8 oz.	: 3.75 - 5.75
Organic Cheese	Monterey Jack	8 oz.	: 3.75 - 6.00
Organic Cheese	Mozzarella	8 oz.	: 5.50 - 6.00
Organic Cheese	Pepper Jack	8 oz.	: 3.75 - 6.15

ORGANIC BUTTER

Commodity	Pack Size	: Organic Price Range \$
Organic Butter	8 oz.	: 5.00 - 9.00
Organic Butter	1 lb.	: 6.85 - 12.45

Organic Dairy Overview. Organic milk leads the way with 47 percent of total organic dairy retail ad numbers by commodity, followed by organic yogurt at 30 percent. Although down 56 percent from the previous period, organic milk in the half gallon packaging had the highest volume of ads reported. The region with the highest volume of organic milk ads was the Northeast. The Northwest posted the largest percentage change in organic ads, up 163 percent over the previous week, while the Southeast reported the biggest decline in organic milk ads at 70 percent.

The pie chart below displays percentages of all organic commodities detailed in the survey. To view all images please go to the PDF version of this report at, <https://www.ams.usda.gov/mnreports/dybdairyorganic.pdf>



Data source: USDA Dairy Market News

Advertising information presented is compiled from nearly 23,000 surveyed newspaper supermarket ads. Prices are valid from August 25-31 2017, identifying weekly specials and containing organic dairy content. Retail survey ads reflect “advertised specials” and not the range of non-advertised supermarket cooler prices.

Selected organic dairy product pricing information from the current weekly survey is presented in the following table:

NATIONAL RETAIL ORGANIC DAIRY (Wtd.Avg.Price - Dollars)

Commodity	This Week	Last Week	Last Year
Butter	4.62	4.49	5.71
Milk			
Half Gal.	3.45	3.94	4.37
Gal.	6.72	5.49	5.10
8 oz.	.91	.85	1.03
Yogurt			
4-6 oz. Greek	1.15	1.25	1.17
32 oz. Greek	4.21	6.04	3.90
4-6 oz. Yogurt	.80	1.34	1.12
32 oz. Yogurt	3.35	2.95	3.48

Complete results of the “National Retail Report-Dairy” and “Weekly National Organic Summary” is accessible using the following links:

<https://www.ams.usda.gov/mnreports/dybretail.pdf>

<https://www.ams.usda.gov/mnreports/lswnos.pdf>



Estimated Fluid Milk Products Sales Report

United States Department of Agriculture

Agricultural Marketing Service
EFMS-0617

Dairy Programs

Market Information Branch
August 10, 2017

June 2017 Highlights

Total Fluid Products Sales 3.7 billion pounds of packaged fluid milk products were shipped by milk handlers in June 2017. This was 0.8 percent lower than a year earlier. Estimated sales of total conventional fluid milk products decreased 0.8 percent from June 2016 and estimated sales of total organic fluid milk products decreased 1.7 percent from a year earlier.

Estimated Total U.S. Sales of Fluid Milk Products, for June 2017

Product Name	Sales		Change from:	
	Month	Year to Date	Previous Year	Year to Date
	<i>(million pounds)</i>		<i>(percent)</i>	
Conventional Production Practice				
Whole Milk	1,221	7,241	3.9	2.4
Flavored Whole Milk	52	322	7.4	10.3
Reduced Fat Milk (2%)	1,236	7,504	-1.1	-2.8
Low Fat Milk (1%)	473	3,199	-6.1	-7.3
Fat-Free Milk (Skim)	325	2,103	-11.1	-12.6
Flavored Fat-Reduced Milk	188	1,982	5.9	1.6
Buttermilk	41	250	-2.9	-0.6
Other Fluid Milk Products	4	28	-22.7	8.7
Total Fat-Reduced Milk	2,221	14,789	-3.2	-4.8
Total Conventional Products Sold	3,538	22,631	-0.8	-2.3
Organic Production Practice				
Whole Milk	81	498	4.1	7.7
Reduced Fat Milk (2%)	62	398	-2.0	0.7
Low Fat Milk (1%)	34	202	-8.6	-9.0
Fat-Free Milk (Skim)	22	140	-16.8	-14.2
Flavored Fat-Reduced Milk	9	59	30.5	36.1
Other Fluids Milk Products	0	1	1.4	-3.3
Total Fat-Reduced Milk	127	799	-5.1	-3.0
Total Organic Milk Products	208	1,297	-1.7	0.8
Total Fluid Milk Products	3,746	23,928	-0.8	-2.2

Data may not add due to rounding.

Estimated Fluid Milk Products Sales Report
Agricultural Marketing Service

August 10, 2017

Package Sales of Total Fluid Milk Products in Federal Milk Orders and California, for June 2017

Marketing Area	Order Number	Sales		Change from:	
		Month	Year to Date	Previous Year	Year to Date
		<i>(million pounds)</i>		<i>(percent)</i>	
Northeast	001	646	4,046	-1.6	-2.8
Appalachian	005	249	1,574	0.1	-2.2
Florida	006	215	1,385	1.3	-0.3
Southeast	007	343	2,201	0.2	-1.2
Upper Midwest	030	279	1,794	-2.2	-4.9
Central	032	316	2,052	-0.5	-0.4
Mideast	033	414	2,641	0.9	-2.2
Pacific Northwest	124	155	971	-1.1	-1.7
Southwest	126	339	2,211	-0.2	-0.6
Arizona	131	77	506	-1.7	-4.6
California	---	414	2,632	-3.0	-3.3
All Orders (Totals)		3,033	19,382	-0.5	-2.0
All Areas (Totals)		3,447	22,014	-0.8	-2.2

**Scantron answers for Manchester
FFA Dairy Foods Exam**

- | | |
|-------|-------|
| 1. A | |
| 2. A | |
| 3. A | |
| 4. D | |
| 5. D | |
| 6. D | |
| 7. A | |
| 8. D | |
| 9. C | |
| 10. B | |
| 11. D | |
| 12. A | |
| 13. A | |
| 14. C | |
| 15. A | |
| 16. C | |
| 17. C | |
| 18. C | |
| 19. C | |
| 20. A | |
| 21. B | |
| 22. D | |
| 23. B | |
| 24. D | |
| 25. C | |
| 26. C | |
| 27. D | |
| 28. B | |
| 29. C | |
| 30. C | |
| | 51. d |
| | 52. c |
| | 53. d |
| | 54. b |
| | 55. d |
| | 56. d |
| | 57. b |
| | 58. d |
| | 59. b |
| | 60. d |

Problem Solving Part 1

Chapter: _____

Chapter Number: _____

Team Members: _____

Neatly write answers on the corresponding lines below.

A. _____

J. _____

S. _____

B. _____

K. _____

T. _____

C. _____

L. _____

U. _____

D. _____

M. _____

V. _____

E. _____

N. _____

W. _____

F. _____

O. _____

X. _____

G. _____

P. _____

Y. _____

H. _____

Q. _____

I. _____

R. _____

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Problem Solving Part 1 & Part 2

Chapter: _____

Chapter Number: _____

Team Member Names: _____

Part 1 (2 pts. Each)

- Complete **Table 1**, then submit, and pick up a **Table 1 KEY** to utilize in completing the problems in Part 2.
(see Table 1 and write answers on the sheet labeled **Problem Solving Part 1**)
- For calculations purposes on part 2, use the following information:

- Milk weighs 8.5 pounds per gallon
- 10 pounds of milk are needed to make 1 pound of cheese
- 21 pounds of milk are needed to make 1 pound of butter

Part 2

Neatly write the answer to each of the following questions on the designated line. (If the judges cannot easily read an answer, the answer will receive zero points.)

1. Based on the component prices in **Table 1**, what is the value of 100 pounds of milk at 3.8% milkfat, 3.3% protein, 5.8% other solids and 180,000 SCC?

\$ _____ per hundredweight (4 pts.)

2. If a grocery store sells milk for \$3.39 per gallon, what price are they charging per hundredweight?

\$ _____ per hundredweight (4 pts.)

3. Use the information in **Table 1** to calculate the weighted average somatic cell count for a herd of three cows. The herd includes cows **12**, **13**, and **15**.

Herd Average SCC: _____ cells/ml (4 pts.)

4. A dairy producer shipped 2.0 million pounds of milk in August. Using the butterfat component price in **Table 1**, how much more valuable would the milk had been if the herd produced 0.1% more butterfat?

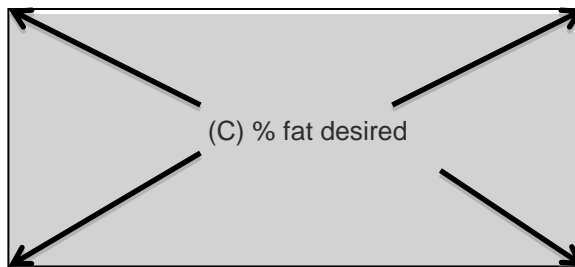
\$ _____ per hundredweight (4 pts.)

A mozzarella cheese producer plans to standardize milk to 5.00% fat prior to cheese making. First, the raw milk must be separated into cream and skim milk. The separation process yields fresh cream of 35% fat and skim milk with 0.05% fat.

The Pearson Square (below) can be used to determine, for a given volume of milk, how much cream and skim milk must be combined to attain a desired fat content.

(A) % fat in cream

difference of B minus C (D parts)



(B) % fat in skim milk

difference of A minus C (E parts)

Sum of (D) + (E) = (X)

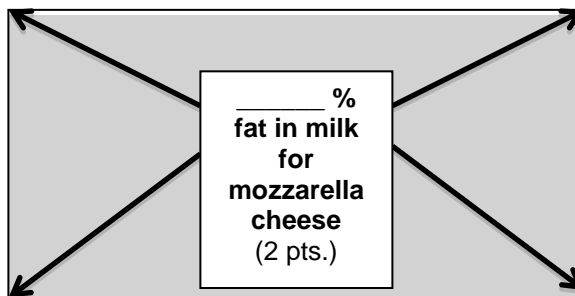
For a given volume of milk (Y), you need: (D) parts cream and (E) parts skim milk for (C) % fat milk.

For Y lb of milk at the desired fat content, you need: $(Y / X) * C = \text{lb cream}$ and $Y - \text{lb cream} = \text{lb skim milk}$

5. Use the information provided above and the Pearson Square below to calculate how much cream and skim milk must be combined to make 2500 lb of 5.0% fat milk. Complete the Pearson Square below for 12 points.

_____ % fat in cream
(2 pts.)

B minus C = _____ parts
(2 pts.)



_____ % fat in skim milk
(2 pts.)

A minus C = _____ parts
(2 pts.)

Sum of (D) + (E) = _____
(2 pts.)

6. Using the information you entered for question 5, in order to have 2,500 lbs. of milk to make mozzarella cheese at the desired fat content. How much cream and how much skim milk will you need?

_____ **lbs of cream** (4 pts.) and _____ **lbs of skim milk** (4 pts.)

7. Approximately how many pounds of mozzarella cheese will you end up with from the above 2,500 lbs of milk?

_____ **lbs of mozzarella cheese** (2 pts.)

8. During one week (7 days), **cows 2, 7, 11, and 14** could produce an estimated total of _____ gallons of milk?

_____ **gallons** (4 pts.)

9. Using the information in **Table 1**, using the same cows from question 8, how much value above feed cost are produced by these four cows in one week?

_____ (2 pts.)

10. Using component pricing in **Table 1**, what is the value of butterfat and protein produced by **cow 6** in one week?

_____ **value of butter fat** (2 pts.)

_____ **value of protein** (2 pts.)

11. Using component pricing in **Table 1**, based on value of milk produced after feed cost, which cow should be culled from the herd?

_____ (2 pts.)

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Problem Solving Part 1 & Part 2

Chapter: _____

Chapter Number: _____

Team Member Names: _____

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Part 2

Neatly write the answer to each of the following questions on the designated line. (If the judges cannot easily read an answer, the answer will receive zero points.)

1. Based on the component prices in **Table 1**, what is the value of 100 pounds of milk at 3.8% milkfat, 3.3% protein, 5.8% other solids and 180,000 SCC?

$$100 * .038 * 3.0179 = \$11.46802$$

$$100 * .033 * 1.5536 = \$5.12688$$

$$100 * .058 * 0.2425 = \$1.4065$$

$$(350,000 - 180,000)/1000 * 0.00083 = \$0.1411$$

$$\text{Add all four totals together} = \$18.1425$$

\$18.10 to \$18.14 (4 pts.)

2. If a grocery store sells milk for \$3.39 per gallon, what price are they charging per hundredweight?

$$\$3.39/8.5*100 = \$39.88$$

\$39.88 to \$40.00 per hundred weight (4 pts.)

3. Use the information in **Table 1** to calculate the weighted average somatic cell count for a herd of three cows. The herd includes cows **12**, **13**, and **15**.

$$83 + 59 + 44 = 186$$

$$83/186 = .446$$

$$59/186 = .317$$

$$44/186 = .237$$

$$.446*1,250,000 = 557,500$$

$$.317*175,000 = 55,475$$

$$.237*181,000 = 42,897$$

$$557,500 + 55,475 + 42,897 = \underline{655,872}$$

Herd Average SCC: **645,000 to 665,000** cells/ml (4 pts.)

4. A dairy producer shipped 2.0 million pounds of milk in August. Using the butterfat component price in **Table 1**, how much more valuable would the milk had been if the herd produced 0.1% more butterfat?

$$2,000,000 * 0.001 * 3.0179 = \underline{\$6,035.8}$$

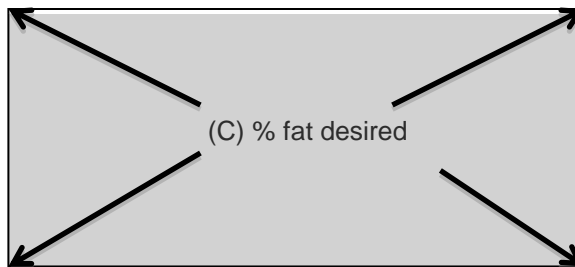
\$6,035.8 (4 pts.)

A mozzarella cheese producer plans to standardize milk to 5.00% fat prior to cheese making. First, the raw milk must be separated into cream and skim milk. The separation process yields fresh cream of 35% fat and skim milk with 0.05% fat.

The Pearson Square (below) can be used to determine, for a given volume of milk, how much cream and skim milk must be combined to attain a desired fat content.

(A) % fat in cream

difference of B minus C (D parts)



(B) % fat in skim milk

difference of A minus C (E parts)

Sum of (D) + (E) = (X)

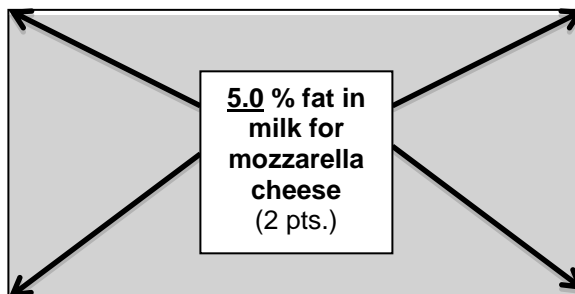
For a given volume of milk (Y), you need: (D) parts cream and (E) parts skim milk for (C) % fat milk.

For Y lb of milk at the desired fat content, you need: $(Y / X) * C = \text{lb cream}$ and $Y - \text{lb cream} = \text{lb skim milk}$

5. Use the information provided above and the Pearson Square below to calculate how much cream and skim milk must be combined to make 2500 lb of 5.0% fat milk. Complete the Pearson Square below for 12 points.

35.0% fat in cream
(2 pts.)

B minus C = 4.95 parts
(2 pts.)



0.05% fat in skim milk
(2 pts.)

A minus C = 30.0 parts
(2 pts.)

Sum of (D) + (E) = 34.95
(2 pts.)

6. Using the information you entered for question 5, in order to have 2,500 lbs. of milk to make mozzarella cheese at the desired fat content. How much cream and how much skim milk will you need?

$$\text{skim milk: } 30.0/34.95 * 2500 = \underline{2,145.92 \text{ lbs.}}$$

$$\text{cream: } 4.95/34.95 * 2500 = \underline{354.08 \text{ lbs.}}$$

350 to 375 lbs of cream (4 pts.) and 2,125 to 2,150 lbs of skim milk (4 pts.)

7. Approximately how many pounds of mozzarella cheese will you end up with from the above 2,500 lbs of milk?

$$2,500/10 = \underline{250}$$

250 lbs of cheddar cheese (2 pts.)

8. During one week (7 days), **cows 2, 7, 11, and 14** could produce an estimated total of ____ gallons of milk?

$$72+70+108+56 = 306 * 7 = 2142/8.5 = \underline{252}$$

252 gallons (4 pts.)

9. Using the information in **Table 1**, using the same cows from question 8, how much value above feed cost are produced by these four cows in one week?

$$6.4571 + 6.0455 + 11.3183 + 2.7279 = \$26.5488 * 7 = \$185.84$$

\$185.00 to \$186.00 (2 pts.)

10. Using component pricing in **Table 1**, what is the value of butterfat and protein produced by **cow 6** in one week?

\$76.59 to \$76.61 value of butter fat (2 pts.)

$$98 * .037 * 3.0179 * 7 = \underline{\$76.60}$$

(Or Butterfat Value on Table 1 * 7)

\$33.03 to \$33.05 value of protein (2 pts.)

$$98 * .031 * 1.5536 * 7 = \underline{\$33.04}$$

(Or Protein Value on Table 1 * 7)

11. Using component pricing in **Table 1**, based on value of milk produced after feed cost, which cow should be culled from the herd?

Cow 10 (2 pts.)

Complete the Table 1, cells A thru Y (2 pts. per blank cell, IF legible)

Table 1							Part 1						
Cow Production						Feed	Components				Income Comparisons - Statistical Uniform Price @ \$15.65/cwt		
	Lbs. Milk per Day per COW	Butterfat %	Protein %	Other Solids %	Somatic Cell Count (cells/ml)	Feed Cost per Day	Butterfat component \$3.0179 per pound produced	Protein component \$1.5536 per pound produced	Other solids component \$0.2425 per pound produced	SCC component \$0.00083 per 1,000 SCC above/below 350,000 cells/ml	Blended Price: Per Day \$ Value of Daily Milk if sold at @ \$15.65/cwt	Per Day \$ Value of Milk Sold on Component Pricing	AFTER FEED: Value of Component Price Daily Milk Minus Feed Cost per Day
							\$3.0179	\$1.5536	\$0.2425	\$0.00083			
Example	25	3.6	3.2	5.7	199,999	\$6.50	\$2.7161	\$1.2429	\$0.3456	\$0.1245	\$3.9125	\$4.4291	-\$2.0709
Cow 1	57	3.7	3.1	5.7	290,000	\$5.85	\$6.3648	\$2.7452	\$0.7879	\$0.0498	A	\$9.9476	\$4.0976
Cow 2	72	3.7	3.2	5.6	398,000	\$6.10	\$8.0397	\$3.5795	\$0.9778	-\$0.0398	\$11.2680	B	\$6.4571
Cow 3	55	3.5	3.3	5.8	161,000	\$6.05	\$5.8095	\$2.8198	\$0.7736	\$0.1569	\$8.6075	\$9.5597	C
Cow 4	47	3.6	2.9	5.7	1,750,000	\$5.85	D	\$2.1176	\$0.6497	-\$1.1620	\$7.3555	\$6.7115	\$0.8615
Cow 5	41	3.7	3.0	5.8	211,000	\$6.90	\$4.5782	E	\$0.5767	\$0.1154	\$6.4165	\$7.1811	\$0.2811
Cow 6	98	3.7	3.1	5.6	160,000	\$6.75	\$10.9429	\$4.7198	F	\$0.1577	\$15.3370	\$17.1513	\$10.4013
Cow 7	70	3.7	3.0	5.5	250,000	\$6.05	\$7.8164	\$3.2626	\$0.9336	G	H	\$12.0955	\$6.0455
Cow 8	47	3.5	3.1	5.7	80,000	\$6.00	I	\$2.2636	\$0.6497	\$0.2241	\$7.3555	J	\$2.1018
Cow 9	48	3.9	3.4	5.7	110,000	\$5.65	\$5.6495	K	\$0.6635	\$0.1992	\$7.5120	\$9.0477	L
Cow 10	29	3.4	2.9	5.8	800,000	\$5.95	\$2.9756	\$1.3066	M	-\$0.3735	N	\$4.3166	-\$1.6334
Cow 11	108	3.7	2.9	5.4	195,000	\$7.15	\$12.0595	\$4.8659	\$1.4143	O	\$16.9020	P	\$11.3183
Cow 12	83	3.3	2.9	5.5	1,250,000	\$6.05	Q	\$3.7395	\$1.1070	-\$0.7470	\$12.9895	\$12.3656	R
Cow 13	59	3.6	3.1	5.6	175,000	\$6.75	\$6.4100	S	T	U	V	W	\$3.4480
Cow 14	56	3.6	3.0	5.7	760,000	\$6.40	\$6.0841	\$2.6100	X	-\$0.3403	\$8.7640	\$9.1279	\$2.7279
Cow 15	44	3.7	3.2	5.8	181,000	\$6.30	\$4.9131	\$2.1875	\$0.6189	\$0.1403	Y	\$7.8597	\$1.5597

Table 1 Key

Cow Production						Feed	Components				Income Comparisons - Statistical Uniform Price @ \$15.65/cwt		
	Lbs. Milk per Day per Cow	Butterfat %	Protein %	Other Solids %	Somatic Cell Count (cells/ml)	Feed Cost per Day	Butterfat component \$3.0179 per pound produced	Protein component \$1.5536 per pound produced	Other solids component \$0.2425 per pound produced	SCC component \$0.00083 per 1,000 SCC above/below 350,000 cells/ml	Blended Price: Per Day \$ Value of Daily Milk if sold at @ \$15.65/cwt	Per Day \$ Value of Milk Sold on Component Pricing	AFTER FEED: Value of Component Price Daily Milk Minus Feed Cost per Day
							\$ 3.0179	\$ 1.5536	\$ 0.2425	\$ 0.00083			
Example	25	3.6	3.2	5.7	199999	6.5	\$ 2.7161	\$ 1.2429	\$ 0.3456	\$ 0.1245	\$ 3.9125	\$4.4291	-\$2.0709
Cow 1	57	3.7	3.1	5.7	290000	\$ 5.85	\$6.3648	\$2.7452	\$0.7879	\$0.0498	\$8.9205	\$9.9476	\$4.0976
Cow 2	72	3.7	3.2	5.6	398000	\$ 6.10	\$8.0397	\$3.5795	\$0.9778	-\$0.0398	\$11.2680	\$12.5571	\$6.4571
Cow 3	55	3.5	3.3	5.8	161000	\$ 6.05	\$5.8095	\$2.8198	\$0.7736	\$0.1569	\$8.6075	\$9.5597	\$3.5097
Cow 4	47	3.6	2.9	5.7	1750000	\$ 5.85	\$5.1063	\$2.1176	\$0.6497	-\$1.1620	\$7.3555	\$6.7115	\$0.8615
Cow 5	41	3.7	3	5.8	211000	\$ 6.90	\$4.5782	\$1.9109	\$0.5767	\$0.1154	\$6.4165	\$7.1811	\$0.2811
Cow 6	98	3.7	3.1	5.6	160000	\$ 6.75	\$10.9429	\$4.7198	\$1.3308	\$0.1577	\$15.3370	\$17.1513	\$10.4013
Cow 7	70	3.7	3	5.5	250000	\$ 6.05	\$7.8164	\$3.2626	\$0.9336	\$0.0830	\$10.9550	\$12.0955	\$6.0455
Cow 8	47	3.5	3.1	5.7	80000	\$ 6.00	\$4.9644	\$2.2636	\$0.6497	\$0.2241	\$7.3555	\$8.1018	\$2.1018
Cow 9	48	3.9	3.4	5.7	110000	\$ 5.65	\$5.6495	\$2.5355	\$0.6635	\$0.1992	\$7.5120	\$9.0477	\$3.3977
Cow 10	29	3.4	2.9	5.8	800000	\$ 5.95	\$2.9756	\$1.3066	\$0.4079	-\$0.3735	\$4.5385	\$4.3166	-\$1.6334
Cow 11	108	3.7	2.9	5.4	195000	\$ 7.15	\$12.0595	\$4.8659	\$1.4143	\$0.1287	\$16.9020	\$18.4683	\$11.3183
Cow 12	83	3.3	2.9	5.5	1250000	\$ 6.05	\$8.2660	\$3.7395	\$1.1070	-\$0.7470	\$12.9895	\$12.3656	\$6.3156
Cow 13	59	3.6	3.1	5.6	175000	\$ 6.75	\$6.4100	\$2.8415	\$0.8012	\$0.1453	\$9.2335	\$10.1980	\$3.4480
Cow 14	56	3.6	3	5.7	760000	\$ 6.40	\$6.0841	\$2.6100	\$0.7741	-\$0.3403	\$8.7640	\$9.1279	\$2.7279
Cow 15	44	3.7	3.2	5.8	181000	\$ 6.30	\$4.9131	\$2.1875	\$0.6189	\$0.1403	\$6.8860	\$7.8597	\$1.5597

Problem Solving Part 1

Chapter: Key

Chapter Number: _____

Team Members: _____

Neatly write answers on the corresponding lines below.

A. \$ 8.9205

J. \$ 8.1018

S. \$ 2.8415

B. \$ 12.5571

K. \$ 2.5355

T. \$ 0.8012

C. \$ 3.5097

L. \$ 3.3977

U. \$ 0.1453

D. \$ 5.1063

M. \$ 0.4079

V. \$ 9.2335

E. \$ 1.9109

N. \$ 4.5385

W. \$ 10.1980

F. \$ 1.3308

O. \$ 0.1287

X. \$ 0.7741

G. \$ 0.0830

P. \$ 18.4683

Y. \$ 6.8860

H. \$ 10.9550

Q. \$ 8.2660

I. \$ 4.9644

R. \$ 6.3156

Flavor Defect											Intensity			
1.	A	B	C	D	E	F	G	H	I	J	11.	Q	R	S
2.	A	B	C	D	E	F	G	H	I	J	12.	Q	R	S
3.	A	B	C	D	E	F	G	H	I	J	13.	Q	R	S
4.	A	B	C	D	E	F	G	H	I	J	14.	Q	R	S
5.	A	B	C	D	E	F	G	H	I	J	15.	Q	R	S
6.	A	B	C	D	E	F	G	H	I	J	16.	Q	R	S
7.	A	B	C	D	E	F	G	H	I	J	17.	Q	R	S
8.	A	B	C	D	E	F	G	H	I	J	18.	Q	R	S
9.	A	B	C	D	E	F	G	H	I	J	19.	Q	R	S
10.	A	B	C	D	E	F	G	H	I	J	20.	Q	R	S

Form Identifier -- Do not mark

Use the LETTERS below to identify the most serious defect of each sample

- A -- Bitter 7
- B -- Feed 5
- C -- Flat/Watery 9
- D -- Foreign 1
- E -- Garlic/Onion 3
- F -- High Acid 4
- G -- Malty 2
- H -- Metallic/Oxidized 6
- I -- Rancid 8
- J -- Salty 10
- AB -- No Defect

Use the LETTERS below to mark the intensity of the flavor

- Q -- Slight
- R -- Definite
- S -- Pronounced

Cheese

1. (A) (B) (C) (D) (E) (F) (G) (H) (I) (J)
2. (A) (B) (C) (D) (E) (F) (G) (H) (I) (J)
3. (A) (B) (C) (D) (E) (F) (G) (H) (I) (J)
4. (A) (B) (C) (D) (E) (F) (G) (H) (I) (J)
5. (A) (B) (C) (D) (E) (F) (G) (H) (I) (J)
6. (A) (B) (C) (D) (E) (F) (G) (H) (I) (J)
7. (A) (B) (C) (D) (E) (F) (G) (H) (I) (J)
8. (A) (B) (C) (D) (E) (F) (G) (H) (I) (J)
9. (A) (B) (C) (D) (E) (F) (G) (H) (I) (J)
10. (A) (B) (C) (D) (E) (F) (G) (H) (I) (J)

Milk Products

11. (A) (B) (C) (D) (E) (F) (G) (H) (I) (J)
12. (A) (B) (C) (D) (E) (F) (G) (H) (I) (J)
13. (A) (B) (C) (D) (E) (F) (G) (H) (I) (J)
14. (A) (B) (C) (D) (E) (F) (G) (H) (I) (J)
15. (A) (B) (C) (D) (E) (F) (G) (H) (I) (J)
16. (A) (B) (C) (D) (E) (F) (G) (H) (I) (J)
17. (A) (B) (C) (D) (E) (F) (G) (H) (I) (J)
18. (A) (B) (C) (D) (E) (F) (G) (H) (I) (J)
19. (A) (B) (C) (D) (E) (F) (G) (H) (I) (J)
20. (A) (B) (C) (D) (E) (F) (G) (H) (I) (J)

Form Identifier -- Do not mark



Cheese

- A -- Blue
- B -- Brie
- C -- Cheddar Mild 4
- D -- Cheddar Sharp 7
- E -- Colby 1
- F -- Cream
- G -- Feta 3
- H -- Gouda 6
- I -- Havarti 9
- J -- Monterey Jack 2
- AB -- Mozzarella 8
- AC -- Munster 5
- AD -- Parmesan
- AE -- Processed American
- AF -- Provolone 10
- AG -- Swiss





Milk Products

- A -- Nonfat (skim) Milk (0.05%) 18
- B -- Reduced Fat Milk (2.0%)
- C -- Milk (3.25%) 13
- D -- Half and Half (10.5%) 14
- E -- Butter (80%)
- F -- Sour Cream (18%) 17
- G -- Flavored Milk (3.3%) 17
- H -- Light Whipped Cream (30%)
- I -- Heavy Whipped Cream (35%)
- J -- Margarine 12
- AB -- Non-Dairy Creamer 11
- AC -- Non-Dairy Sour Cream
- AD -- Non-Dairy Milk 15
- AE -- Non-Dairy Flavored Beverage 16
- AF -- Non-Dairy Whipped Topping 20


Any Chapter, Any Member 1 (101)

2017 Milk Quality

2017 Milk Quality CMT

1.		Sample 1
2.		Sample 2
3.		Sample 3
4.		Sample 4

Form Identifier - Do not mark



Use the letter from the chart below for each sample

CMT Test

Score Appearance

Negative	Mixture liquid, no precipitate	A
T	Slight precipitate tend to disappear with paddle movement	B
1	Distinct precipitate but does not gel	C
2	Distinct gel formation	D
3	Strong gel formation, which tends to adhere to paddle. Forms distinct central peak	E