2017 Virginia FFA Milk Quality and Products Career Development Event
Problem Solving

Name: _____ **FFA Chapter:** _____

General instructions: *This exercise consists of 20 multiple-choice questions. Each question is worth 5 points. Mark your answer in the "Problem Solving" section on your Scantron sheet. Time limit is 40 minutes.*

Table 1

Milk Label	Fat (g/cup)	Protein (g/cup)	Calories per cup
Skim	0	8	80
1%	2.5	8	100
2%	5	8	120
Whole	8	8	150

1. Using the information in Table 1, how many grams of fat are contained in a gallon of whole milk?

A. 8
B. 64
C. 128
D. 256

2. Overrun in ice cream may be calculated using the formula below.

$$\text{Percent overrun} = \frac{\text{Weight of mix - weight of same volume of frozen dessert}}{\text{Weight of same volume of frozen dessert}}$$

At Barry and Johnny's ice cream plant, a gallon of their best selling vanilla ice cream mix weighs 9.0 pounds. A gallon of the ice cream weighs 4.9 pounds. What is the percent overrun for this ice cream?

A. 45.6%
B. 54.4%
C. 83.7%
D. 100%

3. A manufacturer wants to manufacture 1,000 pounds of frozen yogurt mix containing 2% fat, 3% protein, and 20% carbohydrate. How many pounds of cream containing 40% fat will be needed to supply the fat required for the frozen yogurt?

A. 25
B. 40
C. 50
D. 200

Answer questions 4-6 using the following information. The price of cheddar cheese decreased from $1.80/lb in 2011 to $1.58/lb in 2016. Farmers were paid $18.37/cwt for their milk in 2011.

4. If the milk price had kept pace proportionally with the retail price of cheddar cheese, what should the price of milk be in 2016?

A. $16.12
B. $18.15
C. $18.59
D. $20.93

5. If it takes 10 pounds of milk to make one pound of cheese, what did the farmer receive per pound of cheese in 2011?

A. $0.18
B. $1.58
C. $1.80
D. $1.84

6. If a gallon of milk weighs 8.6 pounds, what did the farmer receive per gallon in 2011?

A. $1.58
B. $2.13
C. $15.80
D. $21.36

Use the following information to answer questions 7-9. The formula for 4% fat-corrected milk is:

4% FCM (lbs) = (.4 x milk lbs) + (15 x fat lbs)

7. For 150 pounds of milk with 3.7% fat, what would be the fat pounds entered into the FCM formula?

A. 3.7
B. 5.55
C. 37
D. 555

8. For 150 pounds of milk with 3.7% fat, what is the 4% FCM?

A. 5.55
B. 55.5
C. 60
D. 143.25

9. The FCM formula is based on what?

A. Dollar value of milk fat
B. Energy provided by milk fat
C. Protein provided by milk fat
D. None of the above

10. A gallon of milk costs $3.15 per gallon in the grocery store. If a gallon weighs 8.6 pounds, how much would the milk cost on a hundredweight basis?

A. $27.09
B. $31.50
C. $34.88
D. $36.63

11. The average dairy cow on DHIA in Virginia produces 76 pounds of milk per day. Approximately how many half pints does the average cow produce each day?

A. 41
B. 70
C. 76
D. 141

Use the information in the table below to answer questions 12-13.

2016 Milk Production - Top 10 Dairy States

State	Milk output (million pounds)	Rank
California	40,469	1
Wisconsin	30,123	2
New York	14,765	3
Idaho	14,665	4
Michigan	10,876	5
Pennsylvania	10,820	6
Texas	10,773	7
Minnesota	9,666	8
New Mexico	7,711	9
Washington	6,650	10
U.S.	**212,436**	

12. What percent of the nation's milk did California produce in 2016?

A. 5.25%
B. 19.0%
C. 25.9%
D. 40.5%

13. What percent increase in milk production would be needed by Idaho to overtake New York for third place assuming no change in New York's production?

A. 0.68%
B. 6.8%
C. 68%
D. 100%

14. Dairy farmers pay $0.15 per hundredweight of milk sold for dairy promotion and research. How much would a farmer pay this year if his 200 cow produced an average of 20,000 pounds per cow?

A. $1,500
B. $6,000
C. $15,000
D. $60,000

A dairy farmer's milk is sold in a federal order and the farmer is based upon all the components in his milk. Answer questions 15-18 based upon the following information.

Monthly milk production: 500,000 pounds, 3.8%fat, 3.1% protein, 5.8% other solids

Market information
Butterfat price = $2.42/lb
Protein price = $1.77/lb
Other solids price = $0.32/lb
SCC premium = $0.25/cwt (SCC must be below 200,000 cells/ml.)

15. How much would the farmer be paid for butterfat for this month?

A. $459.80
B. $4,598
C. $45,980
D. $459,800

16. How much would the farmer be paid for protein for this month?

A. $4,960
B. $27,435
C. $32,745
D. $37,510

17. How much would the farmer be paid for other solids for this month?

A. $928
B. $9,280
C. $18,560
D. $928,000

18. How much would the farmer receive for the SCC premium this month if the average SCC was 190,000 cells/ml?

A. $0
B. $1,250
C. $20,000
D. $125,000

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19. If you wanted to produce 200 pounds of cheddar cheese, 100 pounds of butter, and 50 gallons of ice cream, how much whole milk would you need?

A. 4,260
B. 4,720
C. 5,020
D. 5,840

20. Which of the following is most expensive per gallon?

Product	Unit	Price
Buttermilk	Pint	$1.39
Chocolate milk	Half Gallon	$1.99
Organic whole milk	Gallon	$4.22
Whole milk	Quart	$1.09

A. Buttermilk
B. Chocolate milk
C. Organic whole milk
D. Whole milk