Sample Items for CMT-3 Strand 25: Mathematical Applications

Strand 25 of the 3rd Generation of the Connecticut Mastery Test is called Mathematical Applications. The items that assess this strand are 4-point open-ended items that require students to solve a complex problem, show their work and explain their reasoning.

4th graders are given one numerical and one statistical problem.
6th and 8th graders are given one numerical, one statistical, and one spatial problem.

These items are designed to assess integrated understanding of key mathematical ideas as well as student's ability to communicate their understanding and demonstrate their reasoning.

The generic rubric used to create task specific rubrics for these items is:

Score of 3: Student shows a correct and/or appropriate answer and shows work and/or an explanation that demonstrates full and complete understanding.
Score of 2: Student has minor flaws in the answer, but the work and/or explanation is acceptable and the reasoning is appropriate.
Score of 1: Student does not have a reasonable answer or does not provide a reasonable explanation or show sufficient work, resulting in a demonstration of only limited understanding.
Score of 0: Student shows no understanding of the problem or how to arrive at a solution.

Grade 4 Sample Mathematical Applications Items

Sample Item 4-1 (Numerical): The Nut Store

The owner of a nut store packages nuts into 2 different sizes of packages. The prices for the two sizes are:

Weight	Cost
2 pound bag	$2.00
5 pound bag	$5.00

This morning, she needs to package 50 pounds of nuts and needs at least 5 bags of each size. Complete the table below to show

- **how many 2 pound bags and how many 5 pound bags she could package**
- **the total weight of these bags, and**
- **how much money these bags will sell for.**

In the space below the chart, show how you arrived at your answers.

Bag size	Number of bags packaged	Total weight of packaged nuts	Total value of the bags
2 pounds	_____	_____	$_____
5 pounds	_____	_____	$_____
	Total number of bags packaged: _____	Total weight of the packaged bags: _____	Total value of the bags of nuts: _____

Show your work here:

Sample Item 4-2 (Numerical): The School Store

The school store sells pencils, pens and erasers. The chart below shows the cost of each of these items:

ITEM	COST
Pencils	15¢
Pens	25¢
Erasers	40¢

Allyson purchased several items in the store and spent 95¢. Show three DIFFERENT ways that she could have purchased some pencils, pens and erasers and spent exactly 95¢.

Pens _____ Pencils _____ Erasers _____ Total Cost _____	Pens _____ Pencils _____ Erasers _____ Total Cost _____	Pens _____ Pencils _____ Erasers _____ Total Cost _____

Show your work here:

Sample Item 4-3 (Statistical): Pick a Card, Any Card

A set of cards for a new game contains 25 cards.

Sixteen cards are labeled A
Eight cards are labeled B
One card is labeled C.

In the game, points are awarded in this way:

A cards are worth 2 points
B cards are worth 5 points
C cards are worth 10 points

Bill could have ended up with all 16 A cards for a total of 32 points.

Show THREE other ways that Bill could have gotten a total of 32 points and show how these combinations add up to 32 points.

Sample Item 4-4 (Statistical): Hot Dog Buns

You estimate that you'll need 40 buns for a class picnic.

Hot dog buns are sold in packages of 8 and packages of 12.

The package of 8 costs $1.00
The package of 12 costs $1.20

a. Show three different ways you could buy packages to get at least 40 buns.

b. Which packages would you buy if you wanted to spend the least money? Show or explain how you arrived at your answer.

c. Which packages would you buy if you wanted exactly 40 buns?

Sample Item 4-5 (Numerical): Breakfast Choices

Samantha has the following types of food:

6 donuts that cost 20¢ each
3 bagels that cost 30¢ each
7 pastries that cost 40¢ each
4 granola bars that cost 50¢ each

To make breakfast bags for 5 groups of students, Samantha needs to sort ALL 20 of the food items into 5 bags.

- **Each bag must contain the same total number of items.**
- **Each bag must contain at least three different types of items.**
- **No two bags can be filled exactly like another bag.**

Show how Samantha can put the items into each bag and then find the total cost of each bag.

BAG 1	**BAG 2**	**BAG 3**	**BAG 4**	**BAG 5**
Cost:	**Cost:**	**Cost:**	**Cost:**	**Cost:**

Sample Item 4-6 (Statistical): Puppet Show Songs Schedule

You and your classmates must provide music for a puppet show that will last 30 minutes.

The table below shows the songs that you can use and the number of minutes long each song is:

Song Title	Length in Minutes
Do Re Me	2
Sara's Waltz	5
Puppet Polka	8
Whispering Leaves	6
General March	4
Bells of Billings	4
Trumpet Tune	6
Spring and Fall	3

Use the information in the table to complete the schedule below that shows which songs you will use and the time each song will begin so that you will have exactly 30 minutes of music beginning at 2:00.

Time that Song Begins	Song Title
2:00	
2:30	