

# **Data Management and Probability / Number Sense and Numeration**

# Rolling in Sales

## The Task

This task required each student to determine the lowest possible percentage discount and the highest possible percentage discount resulting from their rolling two numbered cubes (dice) and adding the numbers shown on the numbered cubes. Students had to state which percentage discount was most likely to occur and why; the probability of getting a percentage discount greater than 10 percent; and which they would choose, and why, between a 10 percent discount and rolling the numbered cubes. Finally, students were asked to invent a probability game that uses percent.

## Expectations

This task gave students the opportunity to demonstrate their achievement of all or part of each of the following selected over-all and specific expectations from the strands Data Management and Probability, and Number Sense and Numeration. Note that the codes that follow the expectations are from the Ministry of Education's *Curriculum Unit Planner* (CD-ROM).

*Students will:*

1. solve and explain multi-step problems involving fractions, decimals, integers, percents, and rational numbers (8m8);
2. use mathematical language to explain the process used and the conclusions reached in problem solving (8m9);
3. ask “What if” questions; pose problems involving fractions, decimals, integers, percents, and rational numbers and investigate solutions (8m30);
4. explain the process used and any conclusions reached in problem solving and investigations (8m31);
5. apply percents in solving problems involving discounts, sales tax, commission, and simple interest (8m34);
6. identify probability situations and apply knowledge of probability (8m95);
7. list the possible outcomes of simple experiments by using tree diagrams, modelling, and lists (8m118);
8. identify the favourable outcomes among the total number of possible outcomes and state the associated probability (e.g., of getting closer in a random draw) (8m119).

## Prior Knowledge and Skills

To complete this task, students were expected to have some knowledge or skills related to the following:

- the addition and multiplication of integers
- solving multi-step problems involving simple fractions, decimals, and percents
- intuitive concepts of probability and how probability can relate to chance
- listing the possible outcomes of simple experiments by using tree diagrams or matrices

*For information on the process used to prepare students for the task and on the materials, resources, and equipment required, see the Teacher Package reproduced on pages 139–144 of this document.*

## Task Rubric – Rolling in Sales

Expectations*	Level 1	Level 2	Level 3	Level 4
<b>Problem solving</b>	<b>The student:</b>			
1, 3, 7	<ul style="list-style-type: none"> <li>– selects and applies a problem-solving strategy to solve a multi-step problem involving percent and probability, arriving at an incomplete or inaccurate solution</li> </ul>	<ul style="list-style-type: none"> <li>– selects and applies a problem-solving strategy to solve a multi-step problem involving percent and probability, arriving at a partially complete and/or partially accurate solution</li> </ul>	<ul style="list-style-type: none"> <li>– selects and applies a problem-solving strategy to solve a multi-step problem involving percent and probability, arriving at a generally complete and accurate solution</li> </ul>	<ul style="list-style-type: none"> <li>– selects and applies a problem-solving strategy to solve a multi-step problem involving percent and probability, arriving at a thorough and accurate solution</li> </ul>
<b>Understanding of concepts</b>	<b>The student:</b>			
6, 7, 8	<ul style="list-style-type: none"> <li>– demonstrates a limited understanding of percent, fractions, and probability</li> </ul>	<ul style="list-style-type: none"> <li>– demonstrates some understanding of percent, fractions, and probability</li> </ul>	<ul style="list-style-type: none"> <li>– demonstrates a general understanding of percent, fractions, and probability</li> </ul>	<ul style="list-style-type: none"> <li>– demonstrates a thorough understanding of percent, fractions, and probability</li> </ul>
<b>Application of mathematical procedures</b>	<b>The student:</b>			
3, 5, 6, 7	<ul style="list-style-type: none"> <li>– applies a percent algorithm with many errors and/or omissions to solve problems involving discounts</li> <li>– applies mathematical procedures with many errors and/or omissions when investigating situations involving probability</li> </ul>	<ul style="list-style-type: none"> <li>– applies a percent algorithm with some errors and/or omissions to solve problems involving discounts</li> <li>– applies mathematical procedures with some errors and/or omissions when investigating situations involving probability</li> </ul>	<ul style="list-style-type: none"> <li>– applies a percent algorithm with few errors and/or omissions to solve problems involving discounts</li> <li>– applies mathematical procedures with few errors and/or omissions when investigating situations involving probability</li> </ul>	<ul style="list-style-type: none"> <li>– applies a percent algorithm with few, if any, minor errors and/or omissions to solve problems involving discounts</li> <li>– applies mathematical procedures with few, if any, minor errors and/or omissions when investigating situations involving probability</li> </ul>

Expectations*	Level 1	Level 2	Level 3	Level 4
<b>Communication of required knowledge</b>				
<b>The student:</b>				
2, 4	<ul style="list-style-type: none"> <li>– uses mathematical language and notation to describe percent and fractions with limited clarity</li> <li>– uses mathematical language and notation to explain situations involving probability with limited clarity</li> </ul>	<ul style="list-style-type: none"> <li>– uses mathematical language and notation to describe percent and fractions with some clarity</li> <li>– uses mathematical language and notation to explain situations involving probability with some clarity</li> </ul>	<ul style="list-style-type: none"> <li>– uses mathematical language and notation to describe percent and fractions clearly</li> <li>– uses mathematical language and notation to explain situations involving probability clearly</li> </ul>	<ul style="list-style-type: none"> <li>– uses mathematical language and notation to describe percent and fractions clearly and precisely</li> <li>– uses mathematical language and notation to explain situations involving probability clearly and precisely</li> </ul>

\*The expectations that correspond to the numbers given in this chart are listed on page 104.

*Note:* This rubric does not include criteria for assessing student performance that falls below level 1.