MathLinks 7

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Acknowledgements

There are many students, teachers, and administrators who the publisher, authors, and consultants of MathLinks 7 wish to thank for their thoughtful comments and creative suggestions about what would work best in their classrooms. Their input and assistance have been invaluable in making sure that the Student Resource and its related Teacher’s Resource meet the needs of students and teachers who work within the Western and Northern Canadian Protocol Common Curriculum Framework.

We would like to thank the Grade 7 students of Wilson Middle School, Lethbridge, Alberta, Principal, Lloyd Yamagishi, and teacher, Ashelyn Redman, for their help in coordinating the photography sessions.

We wish to extend a special thank you to Tom Dart (First Folio Resource Group) and our editorial and production team for their critical collaboration during the final stages of development.

We sincerely thank the many field testers and reviewers for their valuable recommendations for improvements prior to publication and helping provide the best possible resource for you and your students in teaching and learning Grade 7 Mathematics.

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A Tour of Your Textbook

How is MathLinks 7 set up?
Each chapter starts off with a Chapter Problem called a Math Link that connects math and your world. You will be able to solve the problem using the math skills that you learn in the chapter.

You are asked to answer questions related to the problem throughout the chapter. These questions appear in Math Link boxes.

The numbered sections often start with a visual to connect the topic to a real setting. The purpose of this introduction is to help you make connections between the math in the section and the real world, or to make connections to what you already know.

The Wrap It Up! is at the end of the chapter, on the second Practice Test page.
A three-part lesson follows.

The first part helps you find answers to the key question.

- An activity is designed to help you build your own understanding of the new concept and lead toward answers to the key question.

Examples and Solutions demonstrate how to use the concept.

A summary of the main new concepts is given in the Key Ideas box.

Questions in the Communicate the Ideas section let you talk or write about the concepts and assess whether you understand the ideas.

Practise: These are questions to check your knowledge and understanding of what you have learned.

Apply: In these questions, you need to apply what you have learned to solve problems.

Extend: These questions may be more challenging and may make connections to other lessons.
How does *MathLinks 7* help you learn?

**Understanding Vocabulary**

Key Words are listed on the Chapter Opener. Perhaps you already know the meaning of some of them. Great! If not, watch for these terms highlighted the first time they are used in the chapter. The meaning is given close by in the margin.

Literacy Links provide tips to help you read and interpret items in math. These tips will help you in other subjects as well.

**Understanding Concepts**

The Explore the Math and Discuss the Math activities are designed to help you construct your own understanding of new concepts. The key question tells you what the activity is about. Short steps, with illustrations, lead you to make some conclusions in the Reflect on Your Findings question.
The Examples and their worked Solutions include several tools to help you understand the work.

- Notes in a thought bubble help you think through the steps.
- Sometimes different methods of solving the same problem are shown. One way may make more sense to you than the other.
- Problem Solving Strategies are pointed out.
- Calculator key press sequences are shown where appropriate.
- Many Examples are followed by a Show You Know. These questions help you check that you understand the skill covered in the Example.

The exercises begin with Communicate the Ideas. These questions focus your thinking on the Key Ideas you learned in the section. By discussing these questions in a group, or doing the action called for, you can see whether you understand the main points and are ready to start the exercises.

The first few questions in the Practise can often be done by following one of the worked Examples.
What else will you find in MathLinks 7?

Problem Solving
At the beginning of the student resource there is an overview of the four steps you can use to approach Problem Solving. Samples of 7 problem solving strategies are shown. You can refer back to this section if you need help choosing a strategy to solve a problem. You are also encouraged to use your own strategies.

Mental Math and Estimation
This Mental Math and Estimation logo does one of two things:

1. It signals where you can use mental math and estimation.
2. It provides useful tips for using mental math and estimation.

Foldables™
Each chapter opener describes how to make a Foldable to help organize what you learn in the chapter. The last part of each Foldable encourages you to keep track of what you need to work on.

Other Features

Did You Know?
These are interesting facts related to math topics you are learning.

Subject Links
This feature links the current topic to another subject area.

Web Links
You can find extra information related to some questions on the Internet. Log on to www.mathlinks7.ca and you will be able to link to recommended Web sites.
Chapter Review and Practice Test
There is a Chapter Review and a Practice Test at the end of each chapter. The chapter review is organized by section number so you can look back if you need help with a question. The test includes the different types of questions that you will find on provincial tests: multiple choice, numerical response, short answer, and extended response.

Cumulative Review
To help you reinforce what you have learned, there is a review of the previous four chapters at the end of Chapters 4, 8, and 12. Each of these special reviews is followed by a Task.

Task
These tasks require you to use skills from more than one chapter. You will also need to use your creativity.

Math Games and Challenge in Real Life
The last two pages of each chapter provide Math Games and a Challenge in Real Life.
Math Games provide an interesting way to practise the skills you learned during the chapter. Most games can be played with a partner. Some can be played with a larger group. Enjoy them with your friends and family.

The Challenge in Real Life provides an interesting problem that shows how the math you learned in the chapter relates to jobs, careers, or daily life.

Answers
Answers are provided for all Practise, Apply, and Extend questions, as well as Reviews. Sample answers are given for questions that have a variety of possible answers or that involve communication. If you need help, read the sample and then try to give an alternative response.

Answers are omitted for the Math Link questions and for Practice Tests because teachers may use these questions to assess your progress.

Glossary
Refer to the illustrated Glossary at the back of the student resource if you need to check the exact meaning of mathematical terms.
Problem 1
Jonah has 100 m of fencing. He uses it to fence off a rectangular field for his horse to graze in. The length of the field is 30 m. How wide is the field?

Problem 2
Marja would like to go glow-in-the-dark bowling for her birthday. The bowling alley charges $10 for one lane plus $6 per person. This includes bowling shoe rentals. Marja’s mother can afford $40. How many friends can Marja take bowling?

Problem 3
The corner store has five flavours of ice cream: chocolate, strawberry, bubble gum, rocky road, and orange fizz. How many different two-scoop cones are possible?

People solve mathematical problems at home, at work, and at play. There are many different ways to solve problems. In MathLinks 7, you are encouraged to try different methods and to use your own ideas. Your method may be different but it may also work.
A Problem Solving Model

Where do you begin with problem solving?
It may help to use the following four-step process.

**Understand**

Read the problem carefully.
• Think about the problem. Express it in your own words.
• What information do you have?
• What further information do you need?
• What is the problem asking you to do?

**Plan**

Select a strategy for solving the problem. Sometimes you need more than one strategy.
• Consider other problems you have solved successfully.
  Is this problem like one of them? Can you use a similar strategy?
  Strategies that you might use include
  – Model It
  – Draw a Diagram
  – Solve a Simpler Problem
  – Make an Organized List or a Table
  – Work Backwards
  – Guess and Check
  – Look for a Pattern
• Decide whether any of the following might help. Plan how to use them.
  – tools such as a ruler or a calculator
  – materials such as graph paper or a number line

**Do It!**

Solve the problem by carrying out your plan.
• Use mental math to estimate a possible answer.
• Do the calculations.
• Record each of your steps.
• Explain and justify your thinking.

**Look Back**

Examine your answer. Does it make sense?
• Is your answer close to your estimate?
• Does your answer fit the facts given in the problem?
• Is the answer reasonable? If not, make a new plan. Try a different strategy.
• Consider solving the problem a different way. Do you get the same answer?
• Compare your method with that of other students.
Here are seven strategies you can use to help solve problems. The chart shows you different ways to solve the three problems on page xiv. Your ideas on how to solve the problems might be different from any of these.

To see other examples of how to use these strategies, refer to the page references. These show where the strategy is used in other sections of *MathLinks 7*.

### Problem 1

Jonah has 100 m of fencing. He uses it to fence off a rectangular field for his horse to graze in. The length of the field is 30 m. How wide is the field?

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Example</th>
<th>Other Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model It</td>
<td>Use three 30-cm rulers and a piece of string 100 cm long. Assume that each centimetre represents 1 m.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30 + 30 + 20 + 20 = 100</td>
<td>pages 54, 62, 232, 247, 311, 409</td>
</tr>
<tr>
<td></td>
<td>The width of the field is 20 m.</td>
<td></td>
</tr>
<tr>
<td>Draw a Diagram</td>
<td>30 + 30 = 60</td>
<td>page 317</td>
</tr>
<tr>
<td></td>
<td>The two lengths are 60 m.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>100 − 60 = 40</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The two widths add to 40 m.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20 + 20 = 40</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The width of the field is 20 m.</td>
<td></td>
</tr>
</tbody>
</table>

### Problem 2

Marja would like to go glow-in-the-dark bowling for her birthday. The bowling alley charges $10 for one lane plus $6 per person. This includes bowling shoe rentals. Marja's mother can afford $40. How many friends can Marja take bowling?

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Example</th>
<th>Other Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Backwards</td>
<td>It costs $10 for the lane.</td>
<td>page 429</td>
</tr>
<tr>
<td></td>
<td>40 − 10 = 30</td>
<td></td>
</tr>
<tr>
<td></td>
<td>This means $30 is left for the people.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Each person costs $6.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30 = 5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$30 is enough for 5 people. One of these is Marja.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>She can take four friends.</td>
<td></td>
</tr>
<tr>
<td>Guess and Check</td>
<td>The cost is $10 plus $6 per person.</td>
<td>pages 69, 104, 136</td>
</tr>
<tr>
<td></td>
<td>Try 3 people:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 + 3 × 6</td>
<td>Too low. She can take more friends.</td>
</tr>
<tr>
<td></td>
<td>= 10 + 18</td>
<td>Right on.</td>
</tr>
<tr>
<td></td>
<td>= 28</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Try 5 people:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 + 5 × 6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>= 10 + 30</td>
<td></td>
</tr>
<tr>
<td></td>
<td>= 40</td>
<td></td>
</tr>
<tr>
<td></td>
<td>For $40, five people can go bowling. Marja is one of the people. She can take four friends.</td>
<td></td>
</tr>
</tbody>
</table>
The corner store has five flavours of ice cream: chocolate, strawberry, bubble gum, rocky road, and orange fizz. How many different two-scoop cones are possible?

**Strategy**

What if the only two choices were chocolate and strawberry? There are only 3 possible two-scoop cones: chocolate with strawberry, double chocolate, or double strawberry.

OK, this gets me started. Now I will make an organized list of the possible pairs for five choices. I don’t think the order of scoops of different flavours matters.

**Other Examples**

pages 238, 246, 248, 251, 253

There are 10 different combinations of two scoops.

A person might choose two scoops of the same flavour. That makes 5 more possibilities.

The choices could also be shown in a table.

<table>
<thead>
<tr>
<th></th>
<th>chocolate</th>
<th>strawberry</th>
<th>bubble gum</th>
<th>rocky road</th>
<th>orange fizz</th>
</tr>
</thead>
<tbody>
<tr>
<td>chocolate</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>strawberry</td>
<td>x</td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>bubble gum</td>
<td>x</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>rocky road</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>orange fizz</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fifteen different two-scoop cones are possible using the five flavours.

Look for a pattern: 1, 3, 6, 10, ... . Fifteen different two-scoop cones are possible using the five flavours.