Carpenter Applications

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Acknowledgements

SkillPlan's experience working with apprentices, journeyworkers, trades instructors, content experts and training coordinators allows us to develop materials that demonstrate construction applications. *Carpenter Applications* is the result of tutoring hundreds of trades workers and sharing teaching strategies with our union network of trades instructors, in particular, Bob Whitaker. Peter Waddell, an experienced Carpenter and Goard Sellars, an apprentice Carpenter read early drafts of this publication and contributed their suggestions. We sincerely thank all of these individuals.

The impetus that initiated this project is a now out-of-print text developed and published in 1981 by Joel Kositsky, Bobbi Flint and Bill Darnell. These dedicated Carpenters knew their trade, the required math skills and practical approaches to learning them. In the tradition of dedicated tradesworkers, Bob Whitaker has contributed the majority of the content for this publication. Bob, in his past position as provincial Trades Coordinator for BC, has guided countless young men and women through the years of apprenticeship required for journeyworker status. As an instructor, mentor and union member, he has carried on the tradition of trades training. He currently provides consulting services for trades-related training and curriculum development. His relentless desire to produce this publication and willingness to go the extra distance to make it a reality is sincerely appreciated.

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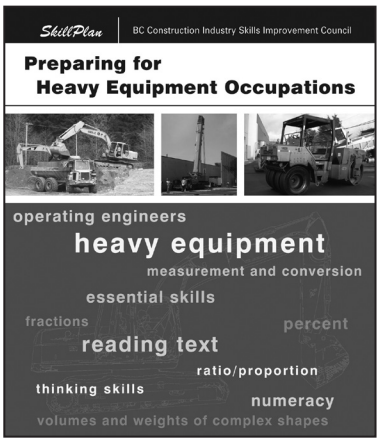
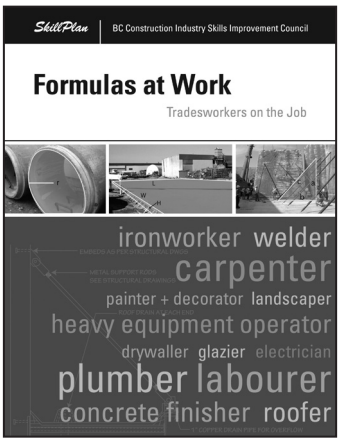
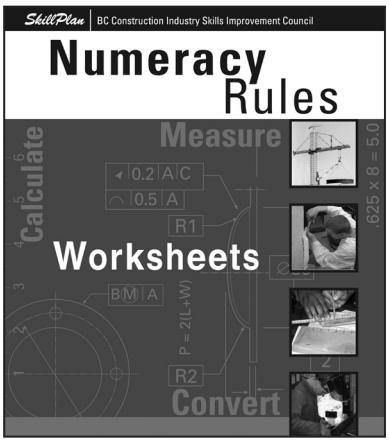
About SkillPlan

SkillPlan, the BC Construction Industry Skills Improvement Council, was formed in response to the learning needs of an evolving industry. The construction workforce requires increasingly higher levels of reading, writing, numeracy, problem solving and oral communication skills. SkillPlan's mandate is to provide a solid foundation of these Essential Skills, the Velcro ™ to which all other training sticks.

Numeracy skills are an integral part of success both on the job and in technical training. *Measurement and Calculation: Carpenter Applications* is another addition to the growing library of resources that support apprentices and journeyworkers in the construction industry. *SkillPlan* publications include: *Formulas at Work*, *Preparing for Heavy Equipment Occupations* and the *Numeracy Rules* kit. Visit www.skillplan.ca for a complete list under Publications.







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Introduction

Carpenters construct, erect, install, maintain, and repair structures and components of structures made of wood, wood-substitutes and other materials. Within the carpenter trade you may be directly employed by contractors who specialize in residential construction. You may be dispatched to commercial or industrial construction sites by your Union. Other options include maintenance departments of factories or plants.

These settings dictate the work tasks and the math skills needed to complete them. You may be interpreting drawings to determine specifications and to calculate tolerances. Some layouts will require you to check code requirements. Measuring, cutting, shaping, assembling and joining are likely to be constant. You may build foundations, install floors, walls and roof systems. You may also fit and install trim items such as doors, stairs and molding, if you are a finish carpenter.

No matter what aspect of carpentry you decide on for your career, you will measure and calculate – every day. The problems included in *Carpenter Applications* are based on requirements for certification in Canada. Although you may not be called upon to complete all of the tasks included in these sections, the math skills are the basis of the many applications you will encounter on the job.

Who should use this book?

If you are completing a level of technical training or writing the Interprovincial Exam, the examples in this book will help you to prepare. The carpenter trade covers a considerable number of applications and you may have only limited experience with some or only learned about them in technical training. This book is for apprentices who are committed to the trade, have experience on the job, and want to refresh and learn math skills that apply to carpentry tasks.

What is the purpose of this book?

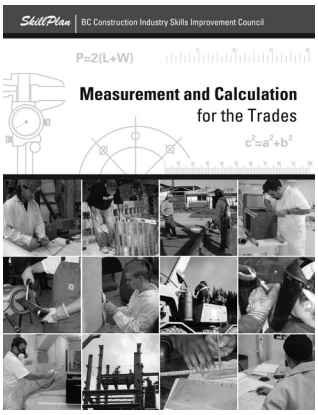
Gaining your Red Seal credentials is a worthy goal but only the beginning of a long career as a Carpenter. Practice can make you feel confident not only in testing situations but on the job. As you are dispatched to high rise construction sites, heritage buildings or dozens of other settings, you will find there is always something to learn and little room for errors. At any time in your career, you can practice and check your understanding of math applications.

How can this book be used?

The chapters can be completed in sequence or by topic. If you are studying for the Interprovincial Exam, you can review by working through the exercises in each section. If you are preparing for the next level of technical training, you can go to the sections that will preview the applications that you will study next. Try to work through the problems on your own and use the steps in the answer keys, at the end of each section, for difficult questions.

What other practice is available?

For more assistance, you could get someone to help you review basic math skills or use *Measurement and Calculation for the Trades* to refresh the skills you need in order to tackle applications.



Measurement and Calculation for the Trades is a companion text to *Carpenter Applications* that reviews and teaches math foundations. If you find the calculations difficult in any section of *Carpenter Applications*, you may need to go back and review related math skills. For example, you may need to review right angle triangles in *Measurement and Calculation* before you tackle **Framing a Flight of Stairs** in Section 3 of *Carpenter Applications*.

How is this book organized?

Each section is a topic that is highlighted in the National Occupational Analysis (NOA). The federal government of Canada sponsors a program, under the guidance of the Canadian Council of Directors of Apprenticeship (CCDA), to develop a series of occupational analyses. Provincial and territorial apprenticeship representatives meet from time to time to identify and group tasks performed by Carpenters across the country. The NOA is used to prepare Interprovincial Standards that include the Red Seal examination and curricula for technical training.

Each Section in *Carpenter Applications* is a Block in the National Occupational Analysis. Each Block is covered in the four levels of technical training and all blocks will be tested in the Interprovincial Exam. A math review is included as a reference.

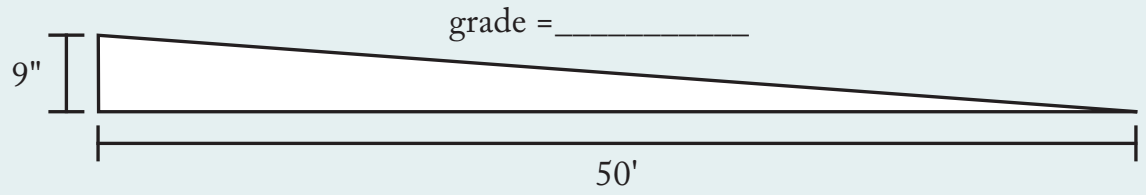
Carpenter Applications		National Occupational Analysis	
Math Review	• Formulas for Perimeter, Area and Volume • Converting Between Fractions, Inches and Decimals of a Foot • Trigonometry • Using Degrees		
Section 1 Occupational Skills	• Surveying • Working with Grades • Calculating Volume, Swell & Shrinkage	Block A	Occupational Skills
Section 2 Concrete	• Calculating Volume for a Battered Wall • Calculating Volume in an L-Shaped Building	Block B	Concrete
Section 3 Framing	• Framing a Gable Roof • Framing a Flight of Straight Stairs • Circular Stairs	Block C	Framing
Section 4 Exterior Finish	• Calculating Siding Exposure • Calculating Roofing for a Gable Roof	Block D	Exterior Finish
Section 5 Interior Finish	• Floor and Ceiling Tile • Calculating the Number of Shelves in a Bookcase	Block E	Interior Finish

In completing this text, SkillPlan consulted with several experienced Carpenters. The methods used to approach trade applications vary from journeyworker to journeyworker. Some applications are used less often because prefabricated options are available. The methods presented here are ONLY ONE WAY to get to the answer. You may have learned a different approach in technical training or developed your own strategy. All of these approaches can be correct.

Our best wishes for your continued success in the carpenter trade.

Example 5: Calculating Grade as a Percent

Calculate the percent grade if the total fall is 9 inches in 50 feet.

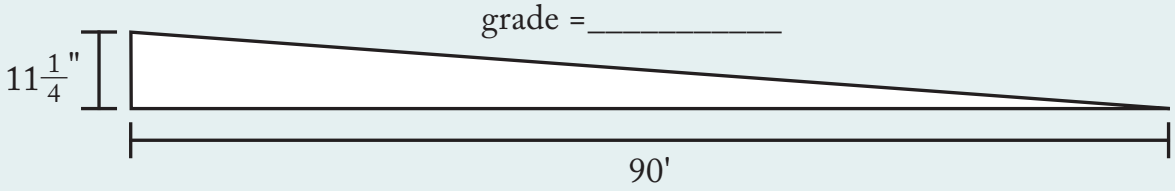


$$\text{Grade} = \frac{\text{total fall}}{\text{distance}} = \frac{9"}{50'} = \frac{0.75'}{50'} = 0.015 = 1.5\%$$

Note: 9 inches must be converted to a decimal of a foot if you are calculating grade as a percent.

Example 6: Calculating Grade as Inches per Foot

Calculate the grade as inches per foot if the total fall is 11 1/4" in 90'.



$$\text{Grade} = \frac{\text{rise or fall}}{\text{distance}} = \frac{11\frac{1}{4}"}{90'} = \frac{1}{8} \text{ in per foot}$$

Application 2: Practice

Calculate the rise, distance or grade.

Question 1

Calculate the rise for a road that measures 875' long with a 3% grade.

Note: The answer will be in feet because percent grade was used.