

ALBERTA DISTANCE LEARNING CENTRE
Mathematics 30-1
MAT3791
Workbook 4.1

Student's Questions and Comments

FOR STUDENT USE ONLY
(if label is missing or incorrect) File Number: _____

Name	_____
Address	_____
City/Town	_____
Province	_____
Postal Code	_____

**Please use the pre-printed label for this
course and Workbook**

Apply Workbook Label Here

FOR ADLC USE ONLY
Assigned to _____
Marked by _____
Date received _____

Summary

	Marks Earned	Total Marks	Percent
Practice 4.1A	I have ____ /8 and ____ %		
Practice 4.1B	I have ____ /8 and ____ %		
Explore Your Understanding 4.1			

Teacher's Comments:	
	Teacher's Signature

CANADIAN CATALOGUING IN PUBLICATION DATA

MAT3791

Mathematics 30-1

ISBN: 978-1-927090-09-1

Workbook 4.1

Copyright 2016 Alberta Distance Learning Centre, a subsidiary of The Board of Trustees of Pembina Hills Regional Division No. 7. All rights reserved.

4601 - 63 Avenue
Barrhead, Alberta Canada T7N 1P4

All rights reserved. No part of this courseware may be reproduced, stored in a retrieval system, or transmitted in any form or by any means – electronic, mechanical, photocopying, recording, or otherwise – without written permission from Alberta Distance Learning Centre.

Printed in Canada

Alberta Distance Learning Centre has made every effort to acknowledge original sources and to comply with copyright law. If errors or omissions are noted, please contact Alberta Distance Learning Centre so that necessary amendments can be made.

For Users of Alberta Distance Learning Centre Courseware

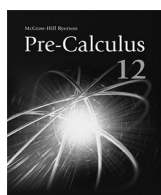
Much time and effort is involved in preparing learning materials and activities that meet curricular expectations as determined by Alberta Education. We ask that you respect our work by honouring copyright regulations.



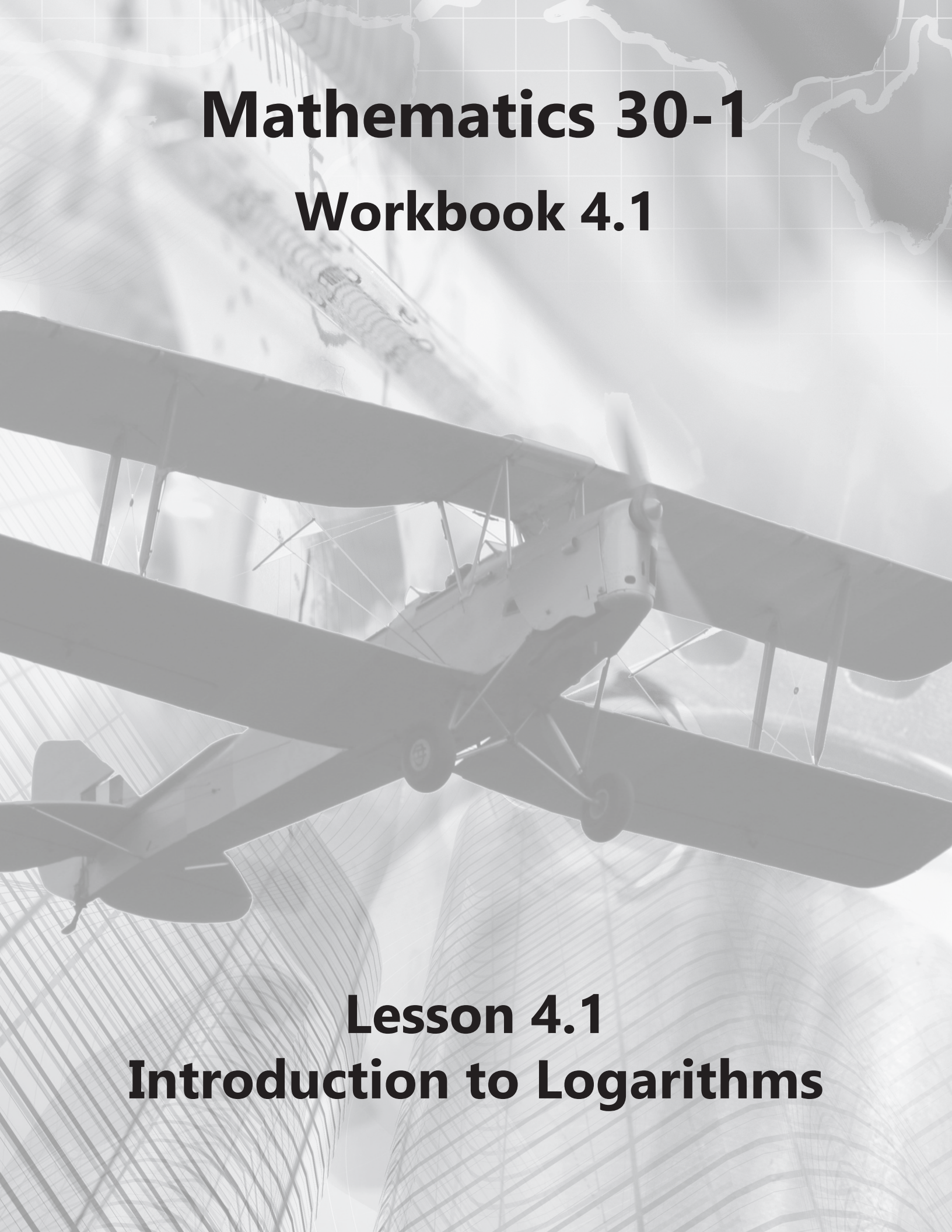
Alberta Distance Learning Centre website:

<http://www.adlc.ca>

The Internet can be a valuable source of information. However, because publishing to the Internet is neither controlled nor censored, some content may be inaccurate or inappropriate. Students are encouraged to evaluate websites for validity and to consult multiple sources.



Pre-Calculus 12
© McGraw-Hill Ryerson Ltd.

The background of the entire page is a grayscale photograph. It shows a biplane in flight, viewed from below, flying over a city. The city's architecture is characterized by curved, ribbed structures, possibly a modern architectural style. A faint grid pattern is overlaid on the entire image, giving it a technical or mathematical feel.

Mathematics 30-1

Workbook 4.1

Lesson 4.1

Introduction to Logarithms

Instructions for Submitting Workbooks

1. Submit Workbooks **regularly** for assessment.
2. Submit only **one Workbook at a time**. This allows your teacher to provide feedback that you can apply to subsequent course work and exams.
3. Check that your **Workbook is complete**. Your Workbook will be returned as **incomplete** if a reasonable attempt with relevant work has not been made. Therefore, **do not leave any questions blank**. Contact your teacher for help **prior** to submitting this Workbook.
4. Attach the correct address label or complete the Workbook coversheet.
5. Submission Methods:

Postal Mail – Mail the completed Workbook to an Alberta Distance Learning Centre office. Ensure that you attach sufficient postage by having the envelope weighed at the post office.

Electronically – Scan the completed Workbook. Save the file to your computer as **Math 30-1 Workbook# FirstInitial LastName**. Then, upload the file.

Fax – Fax the completed Workbook to Alberta Distance Learning Centre.

In Person – Drop the completed Workbook at the Alberta Distance Learning Centre office in Barrhead. The address is listed below.

Barrhead

4601 - 63 Avenue

Barrhead, Alberta T7N 1P4

Phone 780-674-5333

Toll-free 1-866-774-5333

Fax 780-674-7593

Mathematics 30-1

Workbook 4.1

Our Pledge to You:

Enrolling in this course is another step toward an Alberta High School Diploma. Everyone at Alberta Distance Learning Centre is committed to helping students achieve their educational goals. We welcome your contact in person or by phone, fax, e-mail, voice mail, or postal mail.

Advice:

Your achievement in this course is determined by your success in the assessments of each unit. Your responses to assignments indicate your understanding of outcomes established by Alberta Education.

- Before responding to the assigned questions, read all relevant directions for the Workbook and instruction in the course materials, including the appropriate Guide for Learning and any other resources provided.
- When you encounter difficulties, re-read the directions for the Workbook and review the relevant instruction in the Guide for Learning.
- If you require further clarification, contact your Alberta Distance Learning Centre teacher for assistance.

Notice:

You have one opportunity to submit each Workbook.

- Only under exceptional circumstances will your ADLC teacher re-assess your work. Therefore, apply significant effort to each Workbook.
- If your final exam mark is vastly different from your Quiz marks, your teacher may apply discretion in determining your course mark.

ADLC Plagiarism Policy (ADLC Administrative Policy 60–1)

Program integrity and academic honesty are very important at ADLC. When students are successful in ADLC courses, we want full confidence that they have clearly met the intended program outcomes.

Plagiarism is the practice of representing someone else's work or ideas as one's own. It is an academically dishonest practice and is detrimental to a student's knowledge & skill development.

ADLC takes a progressive approach to plagiarism to educate and correct the behaviour. If a student is currently enrolled in any ADLC course and found to have plagiarized work, the following steps are taken:

Warning: ADLC Teachers decide if a warning happens instead of calling the first instance. The warning is recorded in SIS Communications.

First Instance	Second Instance	Third Instance
Students are assigned a mark of zero and a chance to redo the question or the assignment. It is up to the ADLC teacher's discretion whether or not to assign a mark of zero on the plagiarized question or on the entire assignment.	The student is assigned a mark of zero with no chance to redo the question or the assignment. It is up to the ADLC teacher's discretion whether or not to assign a mark of zero on the plagiarized question or on the entire assignment.	Student is removed from the course in which the third instance occurred.
ADLC teachers record a SIS Communication and a 'Student Note'.	The ADLC Principal, or designate, is notified and the instance is recorded in SIS Communications.	The ADLC Principal, or designate, is notified and the instance is recorded in SIS Communications.

Important

While removal from a course is limited to the course in which the Third Instance has occurred, the preceding steps can occur across different courses. A student who has been found plagiarizing in Course A and held to the First Instance consequences who then plagiarizes in Course B will move to the Second Instance consequences.

Further Instances

After the Third Instance, any further instances of plagiarism in any course will result in immediate removal from that course. Ongoing occurrences may result in removal from all courses and barring of registration with ADLC.

Clean Slate

Students earn a clean slate after one calendar year passes with no instances.

Sharing of ADLC Work (ADLC Administrative Policy 60–4)

Plagiarism is the practice of representing someone else's work or ideas as one's own. It is a dishonest practice and is damaging to a student's knowledge & skill development. Plagiarism is addressed in ADLC Administrative Policy 60-01.

The sharing of school work, especially after having been marked by ADLC, to students for the purposes of submitting plagiarized work (either paraphrasing or directly copying student work) is dishonest, and this sharing goes against the Alberta School Act's expectation of students to respect school rules and co-operate with how schools offer education to their students.

ADLC prefers to take a progressive approach to sharing of work with other students, in order to educate and correct the behaviour.

If a student is currently enrolled in any ADLC course and found to be sharing school work, whether from their current course or another, to others:

First Incidence	Second Incidence
The student is informed that their work has been submitted as plagiarized work by another student; a warning is provided that further submissions of such work, from any course, will be grounds for removal from the current course(s).	The student is removed from all active ADLC courses.

If the student is not currently enrolled in any ADLC course and found to be sharing school work with others, they are informed that their work has been submitted as plagiarized work by another student and, as such, further registrations in any ADLC course will not be permitted. The incident will be recorded on the student's file.

Such actions do not limit ADLC to pursue other remedies (actions), either criminal or civil, for the distribution of its copyrighted materials.

Practice Assessment

Practice provides practice and allows you to self-reflect on your conceptual understanding of the Lesson skills. You will mark your work for *Practice* in each *Workbook* according to the following rubric.

Category	Strategy and Procedures	Response to Questions
	<i>I have...</i>	<i>I have...</i>
4	used efficient and effective strategies to solve the problem(s)	provided detailed explanations and followed directions appropriately to complete all questions
3	used effective strategies to solve the problem(s)	provided clear explanations and followed directions adequately to complete most questions
2	used effective strategies inconsistently to solve the problem(s)	provided incomplete explanations and followed some directions to complete a few questions
1	used ineffective strategies to solve the problem(s)	provided incomplete explanations and have not followed directions to complete some questions

Complete *Practice* exercises using your best work, showing all relevant steps needed to arrive at your solution. Refer to the *Module* to review lesson instructions. Contact your teacher for assistance or clarification as needed, or to investigate the topic further.

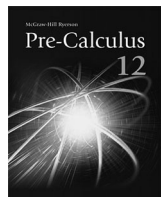
Check and correct your work using the solutions provided in *Appendix* in the *Module*.

Practice is worth 8 marks; your mark can help you gauge your understanding of *Lesson* material.

After you have assessed your work, reflect on your understanding of the concepts addressed in the *Practice* exercises in the table provided.



Practice 4.1A



Now, try what you have learned so far. Turn to pages 380 and 381 in *Pre-Calculus 12* and do questions 2a to 2d, 4a to 4d, 7a to 7c, 12a to 12d, 14a, 14b, 15, 16, and 19.

You may check your practice work by turning to the *Appendix* section of the *Module*.

Questions 2a and 2d, page 380

a.

My solution	My corrections if needed

b.

My solution	My corrections if needed

c.

My solution	My corrections if needed

d.

My solution	My corrections if needed

Questions 4a to 4d, page 380

a.

My solution	My corrections if needed

b.

My solution	My corrections if needed

c.

My solution	My corrections if needed

d.

My solution	My corrections if needed

Questions 7a to 7c, page 380

a.

My solution	My corrections if needed

b.

My solution	My corrections if needed

c.

My solution	My corrections if needed

Questions 12a to 12d, page 381

a.

My solution	My corrections if needed

b.

My solution	My corrections if needed

c.

My solution	My corrections if needed

d.

My solution	My corrections if needed

Questions 14a to 14b, page 381

a.

My solution	My corrections if needed

b.

My solution	My corrections if needed

Question 15, page 381

My solution	My corrections if needed

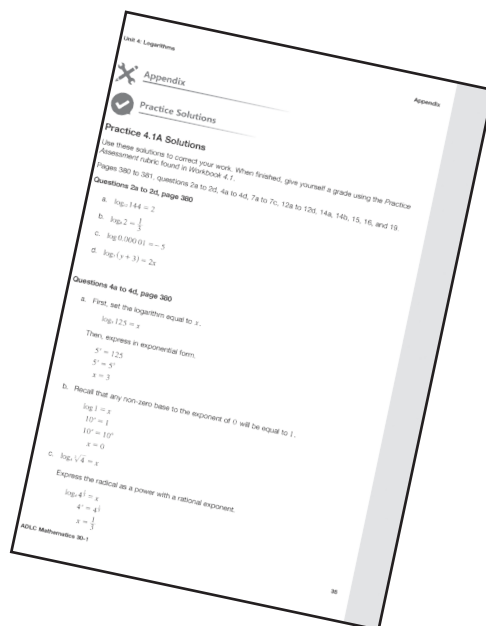
Question 16, page 381

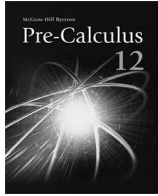
My solution	My corrections if needed

Question 19, page 381

My solution	My corrections if needed

Turn to *Practice 4.1A Solutions* in the *Appendix* in *Unit 4*. Use the solutions to check your work and make corrections. Next, use the Practice Assessment rubric found on page 1 to give yourself a grade. **Record your grade on the cover of this booklet.** When complete, continue in the *Module*.



**Practice 4.1B**

Now, try what you have learned so far. Turn to pages 389 to 391 in *Pre-Calculus 12* and do questions 1c, 4c, 6a, 9a, 12a, and 12b.

You may check your practice work by turning to the *Appendix* section of the *Module*.

Question 1c, page 389

My solution	My corrections if needed

Question 4c, page 390

c.

My solution	My corrections if needed

Question 6a, page 390

a.

My solution	My corrections if needed

Question 9a, page 390

b.

My solution	My corrections if needed

Questions 12a and 12b, page 391

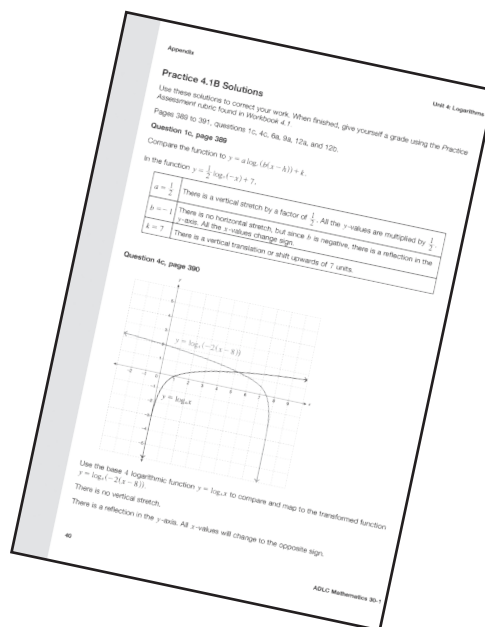
a.

My solution	My corrections if needed

b.

My solution	My corrections if needed

Turn to *Practice 4.1B Solutions* in the *Appendix* in *Unit 4*. Use the solutions to check your work and make corrections. Next, use the Practice Assessment rubric found on page 1 to give yourself a grade. **Record your grade on the cover of this booklet.** When complete, continue to *Explore Your Understanding Assignment 4.1*.



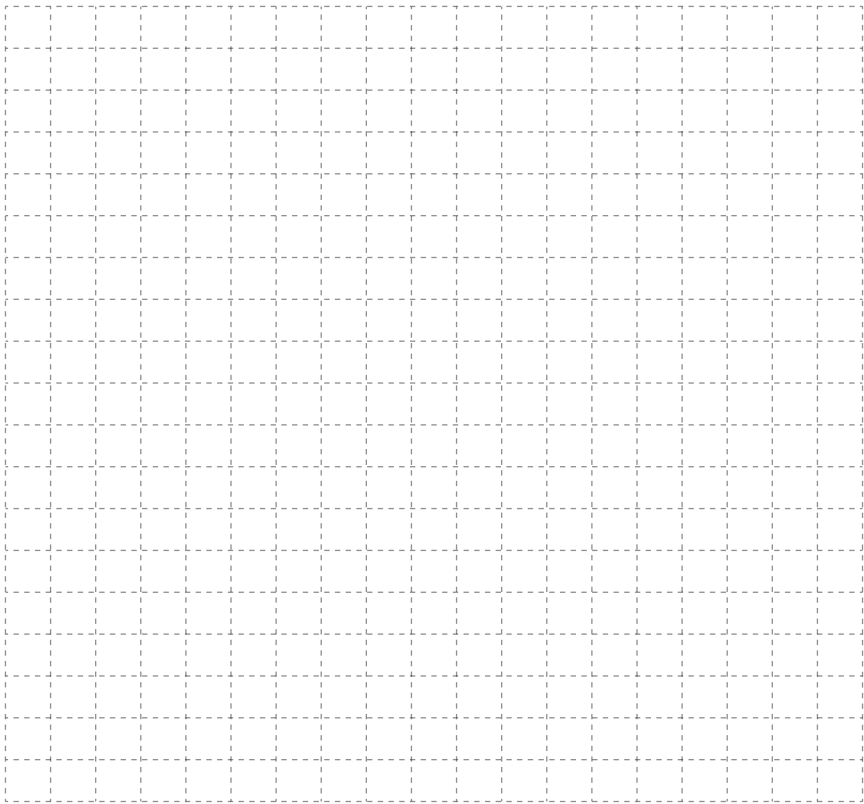


Explore Your Understanding Assignment 4.1

This assignment includes 15 marks. You are expected to complete **13 marks** worth of work. If you complete more than this, all completed questions will be used to assign a grade. For example, if you complete all 15 marks worth of work, your assignment total will be 15 instead of 13. You can also complete a question and label it “DO NOT MARK” if you are not confident in your work. Your teacher will then give feedback on your response, which will help clarify any misconceptions, but will not count it towards your required mark total. Please contact your teacher if you have any questions.

- ① 1. a. Use a numerical example to explain the relationship between exponents and logarithms.

- 2
- b. Use a graphical example to explain the relationship between exponential functions and logarithmic functions.



2. Convert each exponential equation to a logarithmic equation, and convert each logarithmic equation to an exponential equation.

①

a. $3^2 = 9$

①

b. $\log_7 16\,807 = 5$

①

c. $a = \sqrt{b}$

3. Explain how each logarithmic expression can be either estimated or evaluated without using a calculator.

①

a. $\log_3 81$

①

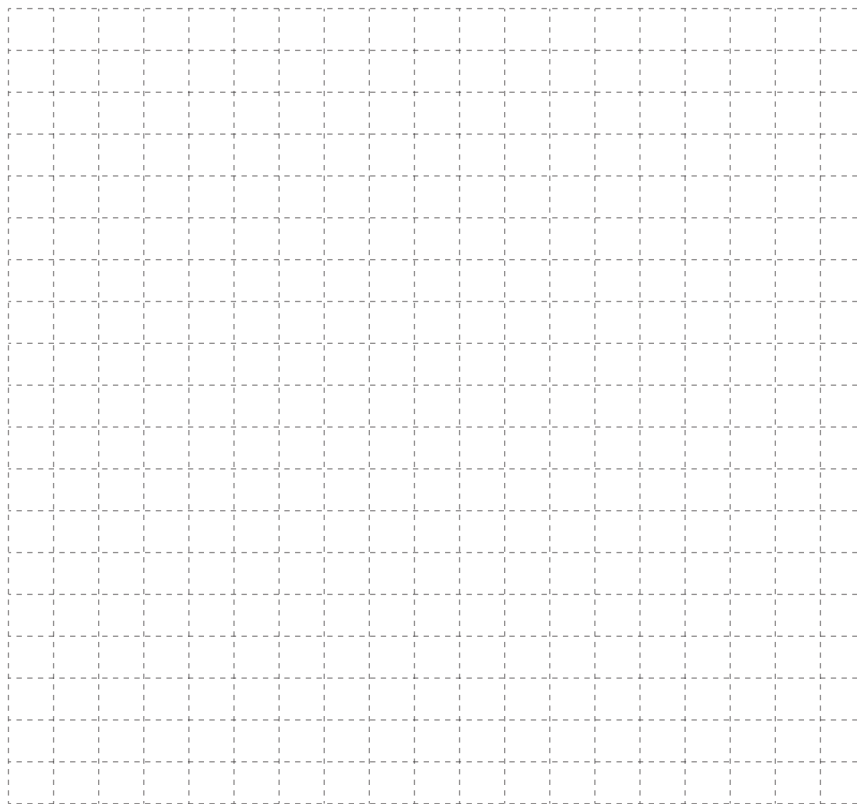
b. $\log_4 50$

①

c. $\log_5 0.0016$

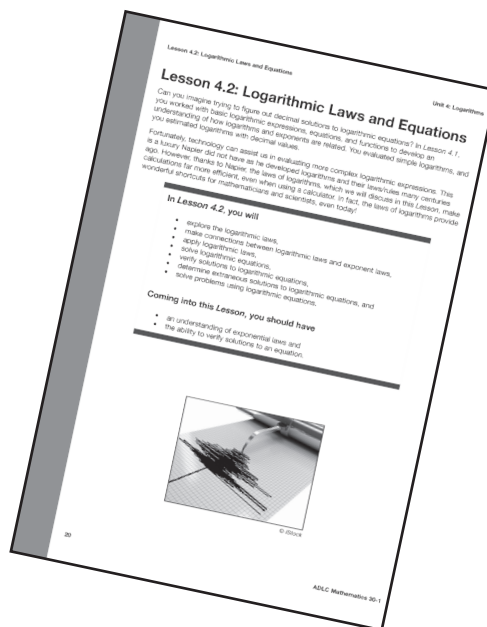
- ② 4. a. Explain how the graph of $f(x) = \log_b x$ can be used to graph $g(x) = p \log_b (q(x-r)) + s$.

- ① b. Sketch the graph of $g(x) = 4 \log_4 \left(\frac{1}{2}(x-1) \right) + 6$.



- ③ 5. The pH of a solution is given by $\text{pH} = -\log[\text{H}^+]$, where $[\text{H}^+]$ is the hydrogen ion concentration in moles per litre. The average pH of human blood is 7.4. A human will die if the pH of her blood goes below 7.0 or above 7.8. What is the difference in hydrogen ion concentration between the allowable pHs? Solve this problem algebraically.

When this workbook is complete, submit it using a method described at the beginning of this *Workbook*. Next, complete *Test Your Understanding Quiz 4.1* online in Moodle. When complete, return to the *Module* and begin *Lesson 4.2*.



ADLC

Alberta Distance
Learning Centre

adlc.ca
1-866-774-5333
info@adlc.ca

Alberta Distance Learning Centre
Box 4000 4601 – 63 Avenue
Barrhead, Alberta T7N 1P4

Revised May 2019