ALBERTA DISTANCE LEARNING CENTRE
Mathematics 30-1
MAT3791
Workbook 6.1

Student's Questions and Comments

FOR STUDENT USE ONLY

Student Name:

_____

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Assigned to

_____

Marked by

_____

Date received

_____

Summary

	Marks Earned	Total Marks	Percent
Practice 6.1A	**I have ____ /8 and ____%**		
Practice 6.1B	**I have ____ /8 and ____%**		
Explore Your Understanding 6.1			

Teacher's Comments:

_____

Teacher's Signature

REVISED MAY 2019

CANADIAN CATALOGUING IN PUBLICATION DATA

MAT3791
Mathematics 30-1
ISBN: 978-1-927090-09-1
Workbook 6.1

4601 - 63 Avenue
Barrhead, Alberta Canada T7N 1P4

Printed in Canada

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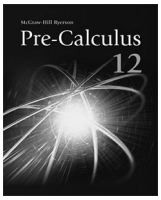

Pre-Calculus 12
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Explore Your Understanding Assignment 6.1

This assignment includes 16 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 16 marks worth of work, your assignment total will be 16 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. Suppose a 3 letter code is to be made from the letters A, B, and C.

(1) a. List all the possible codes if a letter cannot be repeated.

(1) b. List all the possible codes if a letter can be repeated.

(1) c. Explain how the results from both a. and b. can be calculated without writing out all the possibilities.

(2) 2. Show that $n! = {}_nP_n$. What must $0!$ equal for the relationship to be true?

(1) 3. a. Verify ${}_4P_3 = {}_4P_4$.

Left Side	Right Side

(1) b. Explain how making arrangements using three of four objects can also be thought of as arranging all four objects.

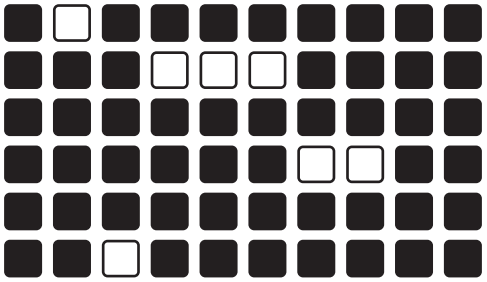
(2) 4. A company selling graduation rings currently allows students to customize rings by selecting a ring shape, a gem type, and a metal type. The number of options for each category are listed in the table.

Category	Number of Options
Ring Shape	6
Gem Type	13
Metal Type	4

The company's product team is considering adding an additional option to one category. Which category should be granted the additional option if they want to generate the greatest increase in the number of possible rings? Justify.

(2) 5. A fish tank at the pet store contains 34 fish. If Jake plans to buy 7 fish, in how many different ways can he do this?

(2) 6. Two couples are trying to buy tickets to a nearly sold-out concert. The seat map shows the section they plan to sit in, where black seats are already sold.

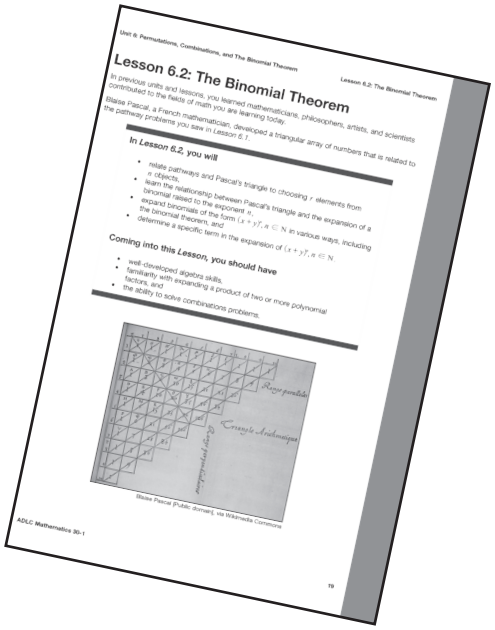


If each couple plans to sit beside each other in the same row, how many different ways can the two couples arrange their seating?

(2) 7. Algebraically determine the value of n for ${}_nP_3 = 2({}_nC_4)$.

(1) 8. For both ${}_nP_r$ and ${}_nC_r$, $n \geq r$. Explain why this is true.

When this workbook is complete, submit it using a method described at the beginning of this *Workbook*. Next, complete *Test Your Understanding Quiz 6.1* online in Moodle. When complete, return to the Module and begin *Lesson 6.2*.


Unit 6: Permutations, Combinations, and The Binomial Theorem

Lesson 6.2: The Binomial Theorem

Lesson 6.2: The Binomial Theorem

In previous units and lessons, you learned mathematicians, philosophers, artists, and scientists contributed to the fields of math you are learning today.

Blaise Pascal, a French mathematician, developed a triangular array of numbers that is related to the pathway problems you saw in Lesson 6.1.

In Lesson 6.2, you will

- relate pathways and Pascal's triangle to choosing r elements from n objects,
- learn the relationship between Pascal's triangle and the expansion of a binomial raised to the exponent n,
- expand binomials of the form $(x+y)^n, n \in \mathbb{N}$ in various ways, including
- The binomial theorem, and
- determine a specific term in the expansion of $(x+y)^n, n \in \mathbb{N}$.

Coming into this Lesson, you should have

- well-developed algebra skills,
- familiarity with expanding a product of two or more polynomial factors, and
- the ability to solve combinations problems.

Blaise Pascal (Public domain), via Wikimedia Commons

ADLC Mathematics 30-1

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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