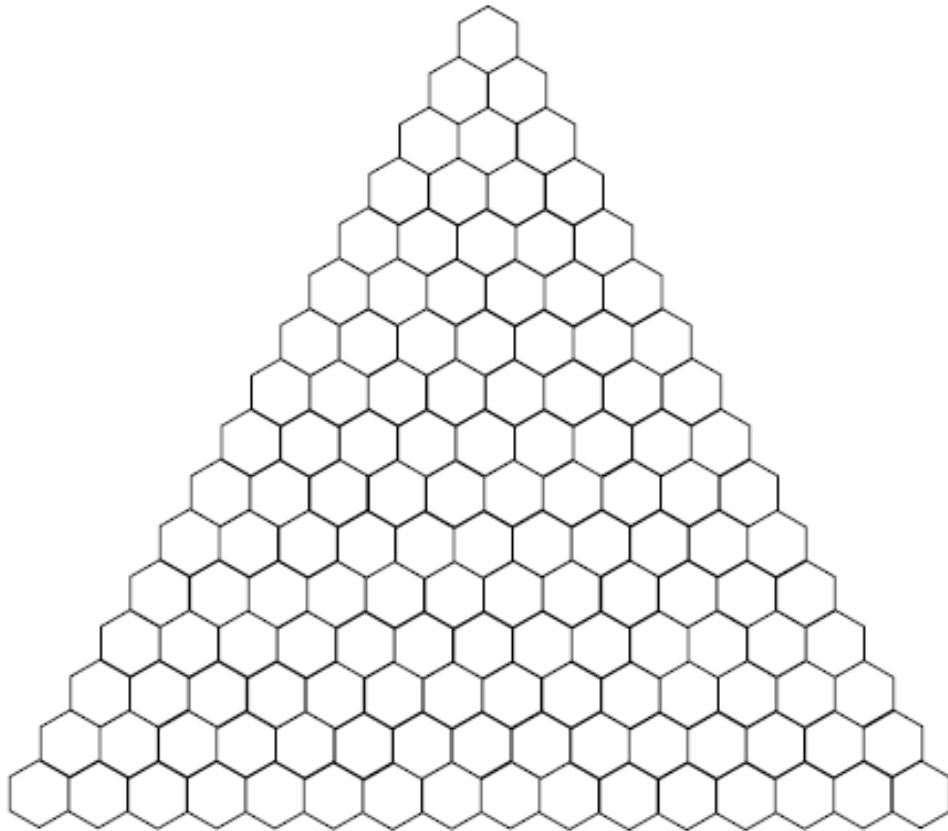


Your Name: _____

Montlake Math Challenge
Montlake Elementary School
February 26, 2009

Instructions: We will be talking about Pascal's triangle for the next few weeks. This week's worksheet will help you become familiar with Pascal's triangle. Work in groups to complete the following problems.

Exercise 1: Fill in the first **eight** rows of pascal's triangle in the diagram shown below. You can use the blank space at the bottom of the page for calculations.



Exercise 2: Look back at the rows of Pascal's triangle that you filled in on the last page. Find the sum of the numbers in each row. Fill these numbers into the following table.

Row Number	Sum
1	
2	
3	
4	
5	
6	
7	
8	

What do you notice about these numbers?

Exercise 3: Pretend you are making a necklace out of two types of stones – circles and squares.

For example, two necklaces are $\square\square O\square O\square\square\square O$ and $O O\square O\square\square O$.

Now let's make a list of all the necklaces with two stones. They are:

$O O, O\square, \square O, \square\square$

Exercise 3a: Make a list of all the three stone necklaces.

Exercise 3b: Make a list of all the four stone necklaces.

Exercise 3c: How many three stone necklaces are there?

Exercise 3d: How many four stone necklaces start with O?

Exercise 3e: How many four stone necklaces start with \square ?

Exercise 3f: What do your answers to exercise 3c, 3d, and 3e have in common?

Exercise 3g: How many four stone necklaces are made up of zero O's and four □'s?

Exercise 3h: How many four stone necklaces are made up of one O and three □'s?

Exercise 3i: How many four stone necklaces are made up of two O's and two □'s?

Exercise 3j: How many four stone necklaces are made up of three O's and one □'s?

Exercise 3k: How many four stone necklaces are made up of four O's and zero □'s?

Exercise 3l: How many four stone necklaces are there?

Exercise 3m: What do you notice about your answers to exercise 3g – 3l?

Now we are going to look at the five stone necklaces.

Exercise 4: How many five stone necklaces do you think there are?

Exercise 5a: How many five stone necklaces are there that start with a O? (Hint: If a five letter word starts with O, how many more letters are there in the word? How many ways are there to fill in these remaining letters?)

Exercise 5b: How many five stone necklaces are there that start with a □? (The same hint from 5a applies here.)

Exercise 5c: Using exercise 5a and 5b, how many five stone necklaces are there?

Exercise 6: Using the information you found in exercises 3g – 3m, can you guess how many five stone necklaces there are that have three O's and two □'s?

Exercise 7: Now we want to see if your guess in exercise 6 was right.

Exercise 7a: How many five stone necklaces with three O's and two □'s start with the a O?
(Hint: If such a word starts with the letter O, how many more stones are there in the necklace?
How many of them have to be O's? How many of them have to be □'s?)

Exercise 7b: How many five stone necklaces with three O's and two □'s start with a □?
(Hint: If such a necklace starts with the a □, how many more stones are there in the necklace? How
many of them have to be O's? How many of them have to be □'s?)

Exercise 7c: Using your answers to exercise 7a and 7b, how many five stone necklaces are
there with three O's and two □'s?

Exercise 8a: How many 8 stone necklaces are there with six O's and two □'s?

Exercise 8b: How many 8 stone necklaces are there with two O's and six □'s?

Exercise 8c: What do you notice about these two numbers? Why do you think that is the
case?