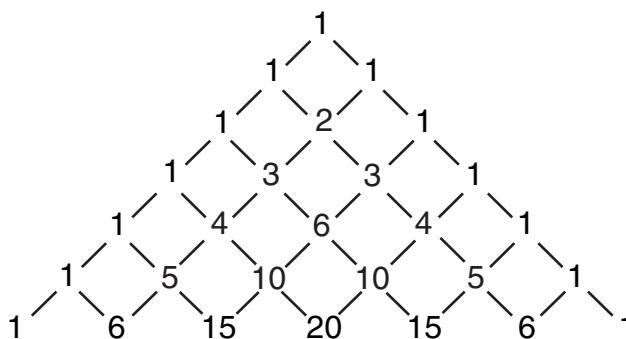


Challenge

Pascal's Triangle

The triangular array of numbers at the right is known as *Pascal's Triangle*, named for the French mathematician Blaise Pascal. Notice that the number 1 is the first and last number in each row.



Look for other patterns in Pascal's Triangle. Then answer the questions.

1. Find the 1 in the second row down on the left side of the triangle, and read the numbers in a diagonal line going down and to the right. Then find the 1 in the second row down on the right side, and read the numbers in a diagonal line going down and to the left. What is the pattern?

2. Find the third 1 from the top on the left side of the triangle, and read the numbers in a diagonal line going down and to the right. Then find the third 1 down on the right side, and read the numbers in a diagonal going down and to the left. What is the pattern?

3. Choose any pair of side-by-side numbers in the triangle. Then look at the number just below the pair. What do you notice?

4. There are seven rows in the Pascal's Triangle shown above including the top row with one 1. Use the patterns from exercises 1, 2, and 3 to write the numbers that would be in the eighth, ninth, and tenth rows of the triangle.

Eighth row: _____

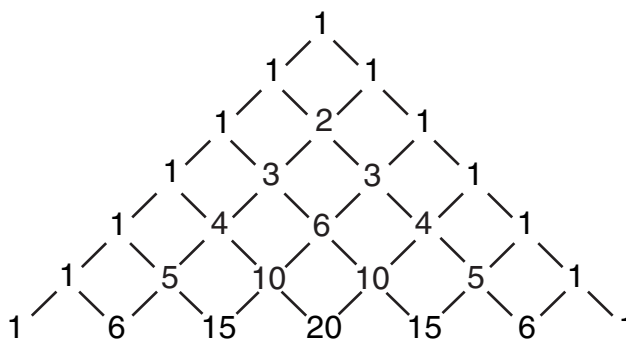
Ninth row: _____

Tenth row: _____

Challenge

Pascal's Triangle

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Look for other patterns in Pascal's Triangle. Then answer the questions.

1. Find the 1 in the second row down on the left side of the triangle, and read the numbers in a diagonal line going down and to the right. Then find the 1 in the second row down on the right side, and read the numbers in a diagonal line going down and to the left. What is the pattern?

The numbers are in counting order: 1, 2, 3, 4, 5, 6.

2. Find the third 1 from the top on the left side of the triangle, and read the numbers in a diagonal line going down and to the right. Then find the third 1 down on the right side, and read the numbers in a diagonal going down and to the left. What is the pattern?

The numbers increase by consecutive numbers, starting with 2: +2, +3, +4, +5.

3. Choose any pair of side-by-side numbers in the triangle. Then look at the number just below the pair. What do you notice?

The number below is the sum of the numbers in the pair.

4. There are seven rows in the Pascal's Triangle shown above including the top row with one 1. Use the patterns from exercises 1, 2, and 3 to write the numbers that would be in the eighth, ninth, and tenth rows of the triangle.

Eighth row: 1, 7, 21, 35, 35, 21, 7, 1

Ninth row: 1, 8, 28, 56, 70, 56, 28, 8, 1

Tenth row: 1, 9, 36, 84, 126, 126, 84, 36, 9, 1