



Pascal's Triangle – March 9, 2016

We decided to bring back a Looney Challenge from 2015, Pascal's Triangle. The Challenge has updated to incorporate Pascal's Penguins for younger (K-2) students. This Challenge is worth **10 points!**

What is Pascal's Triangle?

Pascal's Triangle was named after a French mathematician and philosopher, Blaise Pascal (1623-1662). But, he didn't invent the triangle. The Chinese mathematician, Yang Hui, wrote about the triangle in mathematical texts and, even earlier, in the 11th century, by the Islamic mathematician and poet, Omar Khayyam.*

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The Triangle is a "number triangle" with the numbers arranged in a pattern. The mathematical properties in the Triangle are used in various sciences and can also be found in computer science, for example, in sequencing and recursion.

Lets get started!

1. Go to the Math is Fun website to see a definition of Pascal's triangle, <http://www.mathisfun.com/definitions/pascals-triangle.html>.
2. After discussing the definition with your class, allow them to select one of the following options, based on their skill level. We suggest that if the students have not done Pascal's Triangle to start with the beginner level and work your way up. This may be a more difficult Looney Challenge.
 - Beginner –
 - Go to the Beginner's Exploring Pascal's Triangle link: http://mathforum.org/workshops/usi/pascal/pascal_elemdisc.html
 - Have your students study the numbers on the balloons and look for patterns.
 - Ask your students to answer the questions underneath the triangle.
 - Intermediate –
 - Go to the Intermediate Pascal's Triangle Math Forum link: http://mathforum.org/workshops/usi/pascal/pascal_middisc.html.
 - Have your students study the numbers and look for patterns.
 - Ask you students to answer the questions underneath the triangle.
 - Advanced –
 - Go to the Advanced Pascal's Triangle Math Forum link: http://mathforum.org/workshops/usi/pascal/pascal_hsdisc.html.
 - Ask your students to study the numbers and look for patterns.
 - Answer the questions underneath the triangle.
 - Kindergarten-2nd grade option-
 - Go to the Penguin Math link at Math Wire, <http://mathwire.com/themes/themepen.html>. Who doesn't love penguins!

- Scroll down the page to the “Pascal’s Penguins” section and read the introduction.
- Print the Pascal’s Penguins pdf.
- Ask the students to look at the numbers in the penguins and look for a pattern.
- Ask your students to complete the triangle.
- Discuss with you students how they figured out which numbers belonged in the “blank” penguins.

More resources: If your students are interested in learning more about Pascal’s Triangle, there are many websites and tutorials. Click on one of the following links for an explanation of the Triangle and how it works.

- The Mathematical Secrets of Pascal’s Triangle: Wajdi Mohamed Ratemi – <https://www.youtube.com/watch?v=XMriWTvPXHI> (recommended).
- The Art of Problem Solving: Introducing Pascal’s Triangle – https://www.youtube.com/watch?v=ZyZD6yEbR_I.
- Shodor.org: Interactive Pascal’s Triangle Activity - <http://www.shodor.org/interactivate/activities/ColoringMultiples/>

How to earn points:

- 1) If you haven’t registered your class, please go to cs.montana.edu/looney-challenge and click on the “Register for Looney Challenges” link.
- 2) Discuss with your class the difficulty of the activity. What did they learn? How difficult was the activity? Do they understand the concept?
- 3) Briefly, in a couple of sentences, describe in your email what happened during the activity? Did your students understand the concept(s)? Email your description to looneychallenges@gmail.com.
- 4) If you want to attach an example, photographs of students working, or video of student’s outcomes, please send them as an attachment.
- 5) We will send you a confirmation and provide you your point total for the activity and your total points for Looney Challenges.

For questions, please contact Sharlyn Izurieta, 994-4794 or send an email to looneychallenges@gmail.com

Deadline is June 30, 2015.

* Math Forum, http://mathforum.org/workshops/usi/pascal/pascal_intro.html.