**March 6, 2022. HANDOUT on pi and the Pythagorean Theorem Mr. Rasmusen**

(1) A 1995-1996 poem by Mike Keith for coding the first 4,000 digits of pi, via <http://www.cadaeic.net/naraven.htm> starts like this. It is written in Pinglish, in which One = 3, A = 1, Poem = 4, Raven = 5, and so forth.

**One**  
**A Poem**

**A Raven**

Midnights so dreary, tired and weary,  
Silently pondering volumes extolling all by-now obsolete lore.  
During my rather long nap - the weirdest tap!  
An ominous vibrating sound disturbing my chamber's antedoor.  
"This", I whispered quietly, "I ignore".  
   
Perfectly, the intellect remembers: the ghostly fires, a glittering ember.  
Inflamed by lightning's outbursts, windows cast penumbras upon this floor.  
Sorrowful, as one mistreated, unhappy thoughts I heeded:  
That inimitable lesson in elegance - Lenore -  
Is delighting, exciting...nevermore...

It is inspired by Edgar Allen Poe’s poem, *The Raven*, https://www.poetryfoundation.org/poems/48860/the-raven,

which starts like this:

**The Raven**

Once upon a midnight dreary, while I pondered, weak and weary,

Over many a quaint and curious volume of forgotten lore—

    While I nodded, nearly napping, suddenly there came a tapping,

As of some one gently rapping, rapping at my chamber door.

“’Tis some visitor,” I muttered, “tapping at my chamber door—

            Only this and nothing more.”

    Ah, distinctly I remember it was in the bleak December;

And each separate dying ember wrought its ghost upon the floor.

    Eagerly I wished the morrow;—vainly I had sought to borrow

    From my books surcease of sorrow—sorrow for the lost Lenore—

For the rare and radiant maiden whom the angels name Lenore—

            Nameless *here* for evermore.

### (2) The Pythagorean Theorem Joke https://www.rasmusen.org/rasmapedia/index.php?title=Jokes#The\_Pythagorean\_Theorem\_Joke

First explain the Pythagorean Theorem: The square of the hypotenuse, the long side of a right triangle, is equal to the sum of the squares of the other two sides, e.g., if other two sides are 3 and 4, so their squares sum to 9+16= 25, the square of the hypotenuse is 25 and the hypotenuse has length 5. Then tell the joke.

Once there was an Indian chief named Big Hunter, who had a younger brother named Little Hunter and three squaws. The first squaw slept on a bearskin, the second squaw slept on a buffalo hide, and the third Squaw, who was named Hippolita, slept on a hippopotamus hide. (Big Hunter got his name because he was the only Indian who ever killed hippopotamus, or even saw one for that matter.)

Alas, all of the squaws were barren and had no children. The first two squaws schemed to become the favorites, though, and jointly adopted a little baby boy. They boasted about that and shamed Hippolita for being inferior to them and their boy.

One day, the whole family, including the brother, were in a canoe crossing the lake, when the buffalo-hide squaw stood up, which you should never do in a canoe. The bear-hide squaw stood up too, to match her bravery, but the boat started to tip over. "Save the baby, Little Hunter!" shouted Big Hunter, as he swam to save Hippolita. So the baby and Hippolita were saved, though not the other two squaws.

The moral of the story: *"The squaw of the hippopotamus is equal to the son of the squaws of the other two hides."*

**(3) Hero’s Formula for Finding the Area of a Triangle from the Three Sides when You Don’t Know the Height**

Hero of Alexandria (10-70 AD) used the Pythagorean Theorem to find a formula for the area of a triangle. A =b\*h/2 is simpler, but it needs the height. Hero uses the 3 sides, a, b, and c. Let’s define the half-perimeter as (a+b+c)/2. Then

Area = The square root of s\*(s-a)\*(s-b)\*(s-c).