

# Curriculum Inspirations

Inspiring students with rich content from the  
MAA American Mathematics Competitions



## Curriculum Burst 78: How Many Twos?

By Dr. James Tanton, MAA Mathematician in Residence

For  $k > 0$ , let  $I_k = 10 \cdots 064$ , where there are  $k$  zeros between the 1 and the 6. Let  $N(k)$  be the number of factors of 2 in the prime factorization of  $I_k$ . What is the maximum value of  $N(k)$ ?

### QUICK STATS:

#### MAA AMC GRADE LEVEL

This question is appropriate for the lower high-school grade levels.

#### MATHEMATICAL TOPICS

Factors and Primes, Integer Exponents

#### COMMON CORE STATE STANDARDS

**A.SEE.1b** Interpret complicated expressions by viewing one or more of their parts as a single entity.

#### MATHEMATICAL PRACTICE STANDARDS

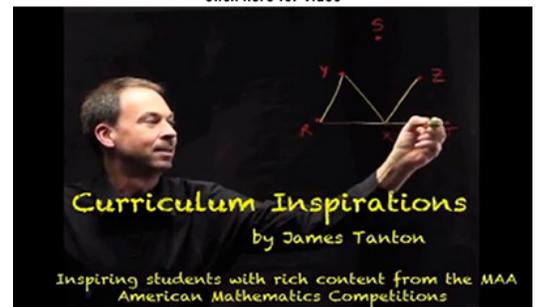
- MP1** Make sense of problems and persevere in solving them.
- MP2** Reason abstractly and quantitatively.
- MP3** Construct viable arguments and critique the reasoning of others.
- MP7** Look for and make use of structure.

#### PROBLEM SOLVING STRATEGY

ESSAY 10: [GO TO EXTREMES](#)

**SOURCE:** This is question # 25 from the 2009 MAA AMC 10A Competition.

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MAA acknowledges with gratitude the generous contributions of the following donors to the Curriculum Inspirations Project:

The TBL and Akamai Foundations  
for providing continuing support

The Mary P. Dolciani Halloran Foundation for providing seed  
funding by supporting the Dolciani Visiting  
Mathematician Program during fall 2012

MathWorks for its support at the Winner's Circle Level