Today’s problems are from some of our past Fermat Contests. These problems were compiled using our Problem Set Generator. The Problem Set Generator can be used to create a randomly generated problem set or a problem set focussed on a specific topic and/or a specific level of difficulty. We chose the topic of counting and probability to generate this problem set. Try using the Problem Set Generator to create your own problem set!

1. In the diagram, how many $1 \times 1$ squares are shaded in the $8 \times 8$ grid?
   
   (A) 53  (B) 51  (C) 47
   (D) 45  (E) 49

   (Source: 2017 Fermat (Grade 11), #2)
   Primary Topics: Geometry and Measurement | Counting and Probability
   Secondary Topics: Area | Counting

2. Starting with the 2 in the centre, the number 2005 can be formed by moving from circle to circle only if the two circles are touching. How many different paths can be followed to form 2005?
   
   (A) 36  (B) 24  (C) 12
   (D) 18  (E) 6

   (Source: 2005 Fermat (Grade 11), #12)
   Primary Topics: Counting and Probability
   Secondary Topics: Counting | Digits

3. On each spin of the spinner shown, the arrow is equally likely to stop on any one of the four numbers. Deanna spins the arrow on the spinner twice. She multiplies together the two numbers on which the arrow stops. Which product is most likely to occur?
   
   (A) 2  (B) 4  (C) 6
   (D) 8  (E) 12

   (Source: 2014 Fermat (Grade 11), #15)
   Primary Topics: Counting and Probability | Number Sense
   Secondary Topics: Probability | Counting

4. Amina and Bert alternate turns tossing a fair coin. Amina goes first and each player takes three turns. The first player to toss a tail wins. If neither Amina nor Bert tosses a tail, then neither wins. What is the probability that Amina wins?
   
   (A) $\frac{21}{32}$  (B) $\frac{5}{8}$  (C) $\frac{3}{7}$  (D) $\frac{11}{16}$  (E) $\frac{9}{16}$

   (Source: 2015 Fermat (Grade 11), #21)
   Primary Topics: Counting and Probability
   Secondary Topics: Probability

More Info: Visit our webpage to find past Fermat Contests and their solutions.