



**math** **grades 6-8**  
**contest** **2017**

at **PRINCETON UNIVERSITY**

**Sample Items**

## Sample Multiple-choice Items (Round 1)

1. Kayla made the following pattern by writing the first letter of the alphabet once, the second letter twice, and so on.

A BB CCC DDDD ...

If the pattern continues, how many times will Kayla write the letter Z?

- A 24
  - B 25
  - C 26
  - D 351
2. Mrs. Curie wrote the first 100 positive integers on the board. Joseph erased the even numbers. Then, Amanda erased the multiples of 3 from the remaining numbers. How many numbers did Amanda erase?
- A 16
  - B 17
  - C 50
  - D 100

3. Elias started saving money in his piggy bank. He inserted;

- \$1 on Mondays,
- \$2 on Tuesdays,
- \$3 on Wednesdays,
- \$4 on Thursdays,
- \$5 on Fridays,
- \$6 on Saturdays, and
- \$7 on Sundays.

At the end of 24 days, he opened up the piggy bank and realized that he had \$93. On which day of the week did he start inserting money in the piggy bank?

- A** Monday
- B** Tuesday
- C** Friday
- D** Saturday

## Sample Short-answer Items (Round 2)

4. Average water flow rate at Niagara Falls is 1,800 cubic meters per second. What is the average water flow rate at Niagara Falls in liters per minute? Write your answer in scientific notation. (1 cubic meter = 1,000 liters)

5. What is the value of  $(-4) + (-8) \div (-8) \times (-4) - (-8)$ ?

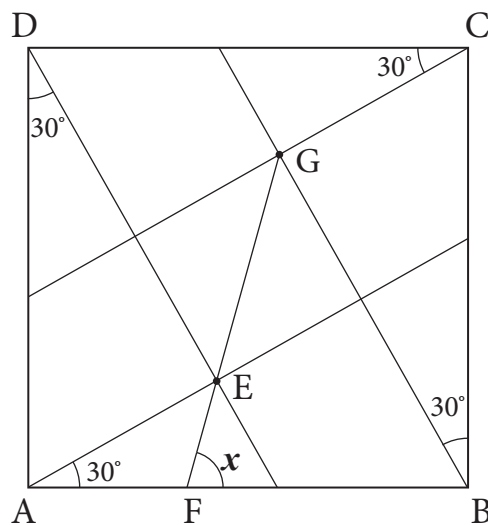
6. Number A is defined as :  $A = 1 \cdot 3 \cdot 5 \cdot 7 \cdot \dots \cdot 47 \cdot 49$   
Number B is defined as :  $B = 2 \cdot 4 \cdot 6 \cdot 8 \cdot \dots \cdot 48 \cdot 50$   
Number C is defined as :  $A + B + A \cdot B$

What is the unit digit of Number C?

## Sample Count Down Items

7. The 5<sup>th</sup> power of a number is equal to the product of  $\frac{2}{3}$  and its 4<sup>th</sup> power. What is the ratio of this number's 8<sup>th</sup> power to its 10<sup>th</sup> power?

8. ABCD is a square and points G, E, and F lie on the same line as shown below.



What is the measure, in degrees, of angle  $x$ ?

9. Don rolls two fair dice. His brother Charlie claims that, on Don's next roll, it is by a  $\frac{1}{3}$  chance that he will get a number greater than both two of his previous rolls. What is the minimum possible sum of Don's first two rolls?



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