

# PRIMES AND FACTORS

CROSSROADS ACADEMY  
AMC PREPARATION

## 1. DIVISIBILITY PROBLEMS

- (1) Use the divisibility tests for small numbers to determine which of the numbers 1–11 divide 39916800.
- (2) Using only 2's and 3's what is the smallest integer that you can create which is divisible by both 3 and 8?
- (3) What is the smallest integer, made out of only 4's and 7's that is divisible by 9?
- (4) How many four digit numbers divisible by 11 can be written using two 3's and two 8's?
- (5) How many two digit primes remain prime when their digits are reversed?
- (6) What is the smallest positive integer that has 6 factors?
- (7) How many positive integers less than 100 have an even number of factors?
- (8) How many odd numbers are factors of 120?
- (9) How many perfect squares are factors of 720?
- (10) What is the sum of the factors of 600?

## 2. LCMs, GCDs, AND COUNTING

- (1) What are the LCMs of  $(4,6)$ ,  $(10,15)$ ,  $(7,14)$ , and  $(36,80)$ .
  
- (2) What are the GCDs of  $(4,6)$ ,  $(10,15)$ ,  $(5,7)$ , and  $(36,80)$ .
  
- (3) If the product of two numbers is 315 and their LCM is 105 what is their GCD?
  
- (4) Find two pairs of numbers whose GCD is 18 and whose LCM is 180.
  
- (5) What is the units digit of  $37^{100}$ ?
  
- (6) In how many ways can a debt of 72 dollars be paid with only 2 and 5 dollar bills?
  
- (7) How many multiples of 13 are between 200 and 300?
  
- (8) Is the 100th number of the Fibonacci sequence even or odd?
  
- (9) What is the smallest number that leaves a remainder of 4 when divided by 7 and a remainder of 1 when divided by 12.
  
- (10) What is the smallest number that leaves a remainder of 1 when divided by 8 and a remainder of 3 when divided by 6?