



# Intermediate Math Circles

## Wednesday November 16 2016

### Problem Set 7

1. Today is a Wednesday! In 240 days, what day of the week will it be?
2. It's November! In 24 145 months, what month will it be? What year will it be?
3. Today is November 16, 2016. We already know it is a Wednesday! What day of the week will November 16, 2017 be on?
4. What day of the week was it on November 16, 2015?
5. Suppose it is currently 7:01 PM. What time will it be in 269 hours?
6. What is the ones digit of  $9 \times 9 \times 9 \times 9 \times 9 \times 9 \times 9 \times 12$ ?
7. Show that for any positive integer  $n$ ,  $2^n 3^{2n} - 1$  is always divisible by 17.
8. TRUE or FALSE. Throughout let  $a, b$  and  $c$  be positive integers.
  - (a) If  $a|(bc)$  then  $a|b$  or  $a|c$ .  
T            F
  - (b) If  $a|b$  and  $b|a$  then  $a = b$  or  $a = -b$ .  
T            F
  - (c) If  $a \equiv 4 \pmod{14}$  then  $a \equiv 4 \pmod{7}$ .  
T            F
  - (d) The ones digit of  $11^{1000000}$  is 1.  
T            F
  - (e) 52 cards can be dealt evenly to 3 players?  
T            F