Sample final MC and T/F

1. (Multiple Choice) Choose the BEST answer (no credit for circling more than one).

   (A) Which of the following primes is expressible as a sum of 2 squares?
       (a) 3   (b) 11   (c) 23   (d) 59

   (B) Which of the following integers has an even number of positive divisors?
       (a) 9   (b) 24   (c) 100   (d) 225

   (C) Which of the following is **NOT** a square modulo 23?
       (a) 2   (b) 4   (c)6   (d) 13

   (D) Suppose $gcd(a, b)$ is even. Which of the following is **NOT** divisible by $gcd(a, b)$?
       (a) $4a - 3b$ (b) $b^2 + a$ (c) $a + b - 1$ (d) $7a$

2. (True/False) If the statement is true, write "true." If the statement is false, write "false" and provide a counterexample (no credit otherwise).

(A) (*2 points*) If p is a prime, then p divides $(p-1)! + 1$.

(B) (*2 points*) For every odd prime p, there are exactly $\dfrac{p+1}{2}$ squares mod p.