

Midterm 2 Samples (Answers)

Sample 1

1. $2^8 \cdot 3^4 \cdot 5^2 \cdot 7 \cdot 11$.
2. Conjectured formula: $a_n = \frac{n}{n+1}$.
3. No such x .
4. All integers of the form $30k + 1$ where k is an integer.
5. Since $f(0) = f(2) = 1$, it's not one-to-one, and therefore the received integer 1 cannot be decrypted.
6. 63,273,600
7. No inverse.
8. True. Use the definition of congruence and the fact that $m|m^2$ for every integer m .

Sample 2

1. Use induction on n .
2. Use induction on n .
3. 19
4. 50
5. All integers of the form $73k + 57$ where k is an integer.
6. 43
7. There is no such integer.
8. True. Think of using factorials.
9. (a) 512
(b) 336
(c) 0