

UH - Math 3336 - Dr. Heier - Fall 2019

HW 8

Due Thursday, Oct. 17, at the beginning of class.

Solutions may be handwritten. Use regular sheets of paper, stapled together.

Do not forget to write your name on page 1.

1. (2 points) Find all solutions of the system of congruences

$$x \equiv 3 \pmod{4}$$

$$x \equiv 1 \pmod{7}$$

$$x \equiv 2 \pmod{5}.$$

2. (2 points) Section 4.5, Problem 15

3. (2 points) Section 4.5, Problem 16

4. (2 points) Alice and Bob are protecting their communication using RSA encryption with published key  $(n = 91, e = 11)$ . Alice wants to send Bob the message  $m = 28$ . What is the numerical value  $c$  of the encrypted message which Alice transmits to Bob? Describe the steps you took to solve the problem. Hint: You may use a (web-based) calculator for this problem.

5. (2 points) You are a spy trying to decipher the communication between Alice and Bob, who are using RSA encryption with published key  $(n = 91, e = 11)$ . You observe the transmission of the number  $c = 46$  from Alice to Bob. What is the secret message  $m$  that Alice is sending to Bob? Describe the steps you took to solve the problem. Hint: You may use a (web-based) calculator for this problem.