

Old rules apply. All students benefit by trying all problems. You can use any mathematically valid technique to solve any problem.

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1. (ungraded) – §2.2 – 5fg.
2. (ungraded) – §2.3 – 7.
3. (ungraded) – §2.3 – 10, 11.
4. (graded) – §2.2 – 11 (Hint: binomial theorem.)
5. (graded) – §2.3 – 2, 3 (answer in back, show work!)
6. (graded) – §2.3 – 14 (ditto.)
7. (graded) – §2.3 – 29, 30.
8. (graded) – (E) Solve the linear congruence

$$22x \equiv 26 \pmod{108}.$$

9. (graded) – (E) Find all solutions of the equation

$$x^2 \equiv -1 \pmod{115}.$$

Find all solutions of the equation

$$x^2 \equiv 1 \pmod{115}.$$

Hint: 115 has the prime factorization  $5 * 23$ .

10. (graded) – (E) Determine the number of solutions of the equation

$$x^3 \equiv x^2 \pmod{50}.$$

Hint:  $x^3 - x^2 = x^2(x - 1)$ . You should also factor 50 as well.

11. (bonus) – §2.1 – 26.
12. (bonus) – §2.2 – 12, 13.
13. (bonus) – §2.3 – 34.