

ÇANKAYA UNIVERSITY
Department of Mathematics and Computer Science

MATH 365
Elementary Number Theory I
First Midterm Practice Exam (E)

November 12, 2007
16:40 – 18:00

In the first eight problems, tell whether each statement is true or false.

1. $5 \equiv 27 \pmod{11}$
2. $63 \equiv 15 \pmod{9}$
3. $101 \equiv 29 \pmod{16}$
4. $-5 \equiv 43 \pmod{12}$
5. $7 \equiv -34 \pmod{9}$
6. $-50 \equiv 2 \pmod{13}$
7. $17 \equiv 62 \pmod{90}$
8. $-73 \equiv -29 \pmod{128}$

In the next 18 problems, find the least residue of b modulo m .

9. $m = 7, b = 100$
10. $m = 8, b = 77$
11. $m = 50, b = 17$
12. $m = 51, b = 19$
13. $m = 50, b = -12$
14. $m = 51, b = -30$

In problems 13 through 19, find all solutions with x and y positive.

15. $5x + 6y = 100$

16. $6x + 7y = 200$

17. $6x + 8y = 120$

18. $9x + 6y = 150$

19. $121x + 561y = 13,200$

20. $169x + 663y = 2340$

21. $621x + 1026y = 49,194$

22. If $abc \neq 0$, is it possible for $ax + by = c$ to have infinitely many solutions in positive integers?

23. For what triples a, b, c is it true that for each integer x there is an integer y such that $ax + by = c$?