

MAT1830 - Discrete Mathematics for Computer Science
Assignment #1

To be handed in at the beginning of your support class in week 3 (13–17 March)

Show your working and give full explanations for all questions.

1. Are the following statements true or false? For each, explain why.
 - (a) 4 divides 16
 - (b) $13 \equiv 24 \pmod{6}$
 - (c) 12 divides 3
 - (d) For any positive integer $n \neq 13$, $\gcd(13, n) = 1$.
 - (e) If x is an integer such that $3x \equiv 6 \pmod{9}$, then definitely $x \equiv 2 \pmod{9}$.
 - (f) There are integers x , y and z such that 14 divides $2^x \times 3^y \times 5^z$.

2. Let x and y be integers such that $x \equiv 5 \pmod{8}$ and $y \equiv 3 \pmod{8}$. Find the integer z such that $0 \leq z \leq 7$ and $68x + 2y^2 \equiv z \pmod{8}$.

3. Use the extended Euclidean algorithm to find an integer x such that $127x \equiv 1 \pmod{545}$.