CS 173, Fall 2016
Examlet 2, Part B

NETID:

FIRST:	**LAST:**

Discussion: Thursday 2 3 4 5 Friday 9 10 11 12 1 2

1. (5 points) Let a and b be integers, $b > 0$. We used two formulas to define the quotient q and the remainder r of a divided by b. One of these is $a = bq + r$. What is the other?

2. (6 points) Use the Euclidean algorithm to compute $\gcd(7839, 1474)$. Show your work.

3. (4 points) Check the (single) box that best characterizes each item.

$-7 \equiv 13 \pmod 5$ true ☐ false ☐

$\gcd(p, q) = \frac{pq}{\text{lcm}(p, q)}$
(p and q positive integers) always ☐ sometimes ☐ never ☐

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1. (5 points) Is the following claim true? Informally explain why it is false, or give a concrete example showing that it is true.

   There is an integer n such that $n \equiv 2 \pmod{6}$ and $n \equiv 1 \pmod{9}$?

2. (6 points) Use the Euclidean algorithm to compute $\gcd(1702, 1221)$. Show your work.

3. (4 points) Check the (single) box that best characterizes each item.

   Two positive integers p and q are relatively prime if and only if $\gcd(p, q) > 1$. true ☐ false ☐

   $25 \equiv 4 \pmod{7}$ true ☐ false ☐

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1. (5 points) Is the following claim true? Informally explain why it is, or give a concrete counter-example showing that it is not.

   Claim: For all non-zero integers a and b, if $a \mid b$ and $b \mid a$, then $a = b$.

2. (6 points) Use the Euclidean algorithm to compute $\gcd(221, 1224)$. Show your work.

3. (4 points) Check the (single) box that best characterizes each item.

   For any positive integers p and q,
   if $\text{lcm}(p, q) = pq$, then p and q are relatively prime. true ☐ false ☐

   $-7 \mid 0$ true ☐ false ☐

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Discussion: **Thursday** **2** **3** **4** **5** **Friday 9** **10** **11** **12** **1** **2**

1. (5 points) Is the following claim true? Informally explain why it is false, or give a concrete example showing that it is true.

   There is an integer n such that $n \equiv 2 \pmod 6$ and $n \equiv 5 \pmod{15}$?

2. (6 points) Use the Euclidean algorithm to compute $\gcd(221, 1224)$. Show your work.

3. (4 points) Check the (single) box that best characterizes each item.

   If a and b are positive and $r = \text{remainder}(a, b)$, then $\gcd(a, b) = \gcd(r, a)$ — true ☐ false ☐

   $7 \equiv -7 \pmod k$ — always ☐ sometimes ☐ never ☐

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1. (5 points) Is the following claim true? Informally explain why it is false, or give a concrete example showing that it is true.

   For any positive integers a, b, and c, if $a \mid c$ and $b \mid c$, then $ab \mid c$

2. (6 points) Use the Euclidean algorithm to compute $\gcd(535, 1819)$. Show your work.

3. (4 points) Check the (single) box that best characterizes each item.

   If a and b are positive and $r = \text{remainder}(a, b)$, then $\gcd(b, r) = \gcd(r, a)$ — true ☐ false ☐

   $-7 \equiv 13 \pmod 5$ — true ☐ false ☐

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1. (5 points) Is the following claim true? Informally explain why it is, or give a concrete counter-example showing that it is not.

   Claim: For all positive integers a, b, and c, if $\gcd(a, bc) > 1$, then $\gcd(a, b) > 1$ and $\gcd(a, c) > 1$.

2. (6 points) Use the Euclidean algorithm to compute $\gcd(2385, 636)$. Show your work.

3. (4 points) Check the (single) box that best characterizes each item.

   If p, q, and k are positive integers, then $gcd(pq, qk) =$ q ☐ pq ☐ pqk ☐ $q \gcd(p, k)$ ☐

   $0 \mid 7$ true ☐ false ☐