Q: 1

A. find if the Divides is acceptable
   1. -8 \div 4,
   2. -3 \div -6,
   3. -5 \div 5

B. find the correct answer for
   1. what are the multiples of 4 between -25 and 25
   2. what are the multiplies of 5 between -42 and 42
   3. for what integer a is 1a true
   4. for what integer a is a0 true

C. find all the primes up to \(-55 \leq x \leq 20\)

D. show if the following numbers are Fermat numbers and Fermat prime number
   6. \(2^{2^2}+1\),
   7. \(2^{2^3}+1\),
   8. \(2^{2^4}+1\)

Q: 2

A. Find the q and r guaranteed by the division algorithm for each pair a, b

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<thead>
<tr>
<th>a</th>
<th>b</th>
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</thead>
<tbody>
<tr>
<td>7</td>
<td>-30</td>
<td>9</td>
<td>-29</td>
</tr>
<tr>
<td>43</td>
<td>-500</td>
<td>47</td>
<td>-500</td>
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</tbody>
</table>

B. What are all the common divisors of 12 and 18
C. What are the common divisors of 27 and 18
D. Compute gcd(-24,-63) using the Euclidean Algorithm

Q: 3

A. Let gcd(188,158)=2 find x,y such that gcd(188,158)=188.x+158.y
B. Find all the residue classes for n, such that \(0 \leq n \leq 34\)
   1. Find all the prime residue classes of n
   2. Find all the non-negative residue classes of n
   3. Find all the odd residue classes of n
   4. Find a system
   5. Find a representation for the system
C. Expand the rational numbers \(\frac{51}{239}\) as simple continued fractions
D. Find all the solutions to
   \(x \equiv 1 \mod 2\)
   \(x \equiv 2 \mod 3\)
   \(x \equiv 3 \mod 5\)
   \(x \equiv 4 \mod 11\)
Q.4

A. show if the following are congruences or incongruences.
1. $35 \equiv 11 \pmod{12}$
2. $35 \not\equiv 12 \pmod{11}$
3. $35 \equiv 2 \pmod{11}$
4. $1 \equiv 7 \pmod{6}$
5. $2 \equiv 7 \pmod{6}$

B. if $n=M$
1. Find the least residue of $b \pmod{n}$
2. Find the complete system residue of $b \pmod{n}$
3. Find all residue of $b \pmod{n}$
4. Find all the prime residue of $b \pmod{n}$
5. Find the least prime residue of $b \pmod{n}$
6. Find the complete system for the prime residue of $b \pmod{n}$

where
$M=7, b=100$
$M=51, b=-30$

C. solve the bellow
1. $[7]_{12}^*_{12} [8]_{12}$
2. $[7]_{17}^*_{17} [8]_{17}$
3. $[77]_{12}^*_{12} [9]_{12}$
4. $[7]_{12}^*_{12} [8]_{12}$
5. $[7]_{5}^*_{5} [5]_{5}$
6. $[77]_{12}^*_{12} [9]_{12}$
7. $[7]_{12}^*_{12} [8]_{12}$
8. $[7]_{5}^*_{5} [8]_{5}$
9. $[7]_{17}^*_{17} [8]_{17}$
10. $[77]_{12}^*_{12} [9]_{12}$

D. Find $\gcd(a,b)$ for each pair in problems from 1 through 12 using the Euclidean algorithm then solve the equation backwards to find $x,y$ such that $ax+by=\gcd(a,b)$.

<table>
<thead>
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<tbody>
<tr>
<td>17</td>
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<tbody>
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<tr>
<td>35</td>
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