Question 1. Compute the following greatest common divisor:

(a) $\gcd(12, 8)$

(b) $\gcd(36, 84)$

(c) $\gcd(120, 98)$

Question 2. Using the Euclidean Algorithm to find the greatest common divisor for the numbers in Question 1.

Question 3. Determine the following statements are true or false:

(a)If $\gcd(a, b) = 1$ and $\gcd(a, c) = 1$, then $\gcd(b, c) = 1$

(b)If $\gcd(\mathrm{a}, \mathrm{b}) = 1$ and $\gcd(\mathrm{a}, \mathrm{c}) = 1$, then $\gcd(\mathrm{a}, \mathrm{bc}) = 1$

Question 4. Prove that if $\gcd(x, y) = 1$, then $\gcd(x + y, x - y) = 1$ or 2.

Question 5. Use the Euclidean Algorithm to compute gcd(120,84), and then find the integer a and b such that $\gcd(120, 84) = 120\mathrm{a} + 84\mathrm{b}$.

Question 6. Prove that for any $n \in \mathbb{Z}, \gcd(n, n + 1) = 1$. Conclude that if a prime p divides n, then p cannot divide $n + 1$.

Question 7. If the equation $\gcd(\mathrm{n}, \mathrm{m}) = \gcd(\mathrm{n}+\mathrm{m}, \mathrm{n}-\mathrm{m})$ is true? Prove it if it is true, otherwise, give a counter example.

Question 8. Suppose n is even and $\gcd(n, m) = 5$, show that m is odd.