**Math 122 In-Class Assignment 10 - Solutions**

1. (a) Use the Euclidean Algorithm to find $\gcd(493, 221)$.
   (b) Use your answer to part (a) to find a solution to $493x + 221y = 17$ where $x$ and $y$ are integers.

**Solutions:**

1. (a)

$$\begin{aligned} 493 &= 221(2) + 51 \\ 221 &= 51(4) + 17 \\ 51 &= 17(3) + 0 \end{aligned}$$

   Therefore $\gcd(493, 221) = 17$.

   (b) Use the steps from part (a) and solve for all non-zero remainders:

$$\begin{aligned} 51 &= 493 - 221(2) \\ 17 &= 221 - 51(4) \end{aligned}$$

   Therefore

$$\begin{aligned} 17 &= 221 - 51(4) \\ &= 221 - [493 - 221(2)](4) \\ &= 221(9) + 493(-4) \end{aligned}$$

   And so a solution to $493x + 221y = 17$ is $x = -4$ and $y = 9$.