Part A) See attached paper.

Part B)

> restart:

> with(LinearAlgebra):

> T:=Matrix(10,10, [seq([seq(3*x+5*y, x=0..9), y=0..9])]);

\[
\begin{pmatrix}
0 & 3 & 6 & 9 & 12 & 15 & 18 & 21 & 24 & 27 \\
5 & 8 & 11 & 14 & 17 & 20 & 23 & 26 & 29 & 32 \\
10 & 13 & 16 & 19 & 22 & 25 & 28 & 31 & 34 & 37 \\
15 & 18 & 21 & 24 & 27 & 30 & 33 & 36 & 39 & 42 \\
20 & 23 & 26 & 29 & 32 & 35 & 38 & 41 & 44 & 47 \\
25 & 28 & 31 & 34 & 37 & 40 & 43 & 46 & 49 & 52 \\
30 & 33 & 36 & 39 & 42 & 45 & 48 & 51 & 54 & 57 \\
35 & 38 & 41 & 44 & 47 & 50 & 53 & 56 & 59 & 62 \\
40 & 43 & 46 & 49 & 52 & 55 & 58 & 61 & 64 & 67 \\
45 & 48 & 51 & 54 & 57 & 60 & 63 & 66 & 69 & 72 \\
\end{pmatrix}
\]

> sort([seq(seq(3*x+5*y, x=0..10), y=0..10)]);

[0, 3, 5, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 74, 75, 77, 80]

Our conjecture: The numbers that are not of the form $3x + 5y$ with $x$ and $y$ greater than or equal to zero are numbers that are less than the value of the largest coefficient not including multiples of either coefficient.

Part C)

> sort([seq(seq(3*x+7*y, x=0..10), y=0..10)]);

[0, 3, 6, 7, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 90, 91, 93, 94, 97, 100]

The largest number that is not of the form $ax + by$ with $x$ and $y$ greater than or equal to 0, is 11.

> sort([seq(seq(5*x+7*y, x=0..10), y=0..10)]);

[0, 5, 7, 10, 12, 14, 15, 17, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 90, 91, 93, 94, 97, 100]
Group A

The largest number that is not of the form $ax + by$ with $x$ and $y$ greater than or equal to 0, is 23.

```plaintext
> sort({seq(seq(4*x+11*y, x=0..10), y=0..10)});
```

The largest number that is not of the form $ax + by$ with $x$ and $y$ greater than or equal to 0, is 29.

Part D)

To find the largest number that is not of the form $ax + by$ with $x$ and $y$ greater than or equal to 0, you can use the formula: $(ab) - (a + b) = $ Largest possible value that does not occur.

```plaintext
> sort({seq(seq(4*x+7*y, x=0..10), y=0..10)});
[0, 4, 7, 8, 11, 12, 14, 15, 16, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 94, 95, 96, 98, 99, 100, 102, 106, 110]
```

$4*7-(4+7)$

17 is the largest number not present in the sequence.

```plaintext
> sort({seq(seq(11*x+13*y, x=0..15), y=0..15)});
```

$11*13-(13+11)$

119 is the largest number not present in the sequence.

Part E)

They are primes.

Part F)
The largest number not present in the sequence is 29.

In this example multiply the two smallest coefficients and subtract the sum of all three coefficients.
a.) \[ 3x + 5y = 4 \] is no solutions
when \( x \geq 0 \)
and \( y \geq 0 \)
when both \( x \) and \( y \) have to be
greater than or equal to zero there
is no such solution. This is so
because the \( c \) value, 4, is not
greater than both the \( a \) and \( b \)
values, 3 and 5. Therefore, either
\( x \) and \( y \) have to be negative