form, which is not the case. Hence $3k+2$ must have a prime divisor of the form $3k+2$.
(This is not the case for a number of the form $3k+1$:
$(3k+2)(3l+2) = 3(3kl+2k+2l+1)+1$
Hence a no. of the form $3k+1$ may be divisible only by primes of the form $3k+2$).
Suppose that there are only finitely many primes of the form $3k+2$, say $p_1, p_2, p_3, p_4 \ldots\ldots p_n$.
Consider the integer
$N = 3(p_1 p_2 \ldots\ldots p_n) - 1 = 3(p_1 p_2 \ldots\ldots p_n - 1) + 2$.
N is of the form $3k+2$, hence by the proof above it has a prime divisor, p, of the form $3k+2$. As $p_1, p_2, \ldots\ldots, p_n$ are presumed to be the only primes of the form $3k+2$, the prime must be one of these, say $p = p_i$. Then p divides N and p divides $3(p_1 p_2 \ldots\ldots p_n)$ and so p divides the integer combination $3(p_1 p_2 \ldots\ldots p_n) - N = 1$ i.e. p divides 1, but p is a prime (so greater than 1) hence we have arrived at a contradiction.
So there are infinitely many primes of the form $3k+2$.

12

6) a) Try some test data
$m = 2, n = 2$

11011	11011	11011	11011	11001
1	1	1	2	3
11001	11000	110000	(The machine stops here)	
2	3	2		