suppose $a = 3^2 = 9$, $b = 3$
Then $\gcd(a, b) = \gcd(9, 3) = 3$
but $ap = 9 \times 3$, $bp^2 = 3 \times 3^2$
$= 27$ $= 27$
and $\gcd(ap, bp^2) = \gcd(27, 27) = 27$
(and in fact $\gcd(ap, bp^2) = p^3$ for a any multiple of p^2 if $p \mid b$)
ii) Notice that $10k+3$ is not divisible by 2 or 5, hence is not divisible by any number which is a multiple of 2, or 5 ie it is not divisible by nos of form $10k, 10k+2, 10k+4, 10k+5, 10k+6$ or $10k+8$. This leaves as possible divisors no's of the form $10k+1, 10k+3, 10k+7$ or $10k+9$. It's easily noticed that $7 \times 6 = 63 = 6 \times 10 + 3$ hence
$(10k+7)(10l+9) = 100kl + 10(9k+7l) + 63$
$= 10(10kl + 9k + 7l + 6) + 3.$
This is of the form $10k+3$, but need not have divisors of the form $10k+3$
eg $133 = 10 \times 13 + 3 = 7 \times 19$
133 is of the form $10k+3$ but its divisors are of the form $10k+7$ ($=7$, with $k=0$) and $10k+9$ ($=19$ with $k=9$). So is it true or false?

iii) p can be expressed in one of the forms $p = 3k+1$ or $p = 3k+2$ where (since $p>3$) k is an integer (p cannot take the form $p = 3k$ since $p > 1$; p would then not be prime).
If $p = 3k+1$
$q = 4p+1$
$= 4(3k+1)+1 = 12k+5$
$r = 4q+1$
$= 4(12k+5)+1 = 48k+20+1$