$n = 6s+1$	$n+1 = 6s+2$	②
$n = 6s+2$	$n+1 = 6s+3$	③
$n = 6s+3$	$n+1 = 6s+4$	④
$n = 6s+4$	$n+1 = 6s+5$	⑤
$n = 6s+5$	$n+1 = 6s+6$	⑥

Taking each case in turn

① $n(n+1) = 6s(6s+1) = 6(6s^2+s)$

so $k = 6s^2+s$, $r = 0$

② $n(n+1) = (6s+1)(6s+2) = 36s^2+18s+2$
$= 6(6s^2+3s)+2$

so $k = 6s^2+3s$, $r = 2$

③ $n(n+1) = (6s+2)(6s+3) = 36s^2+30s+6$
$= 6(6s^2+5s+1)$

so $k = 6s^2+5s+1$, $r = 0$

④ $n(n+1) = (6s+3)(6s+4) = 36s^2+42s+12$
$= 6(6s^2+7s+2)$

so $k = 6s^2+7s+2$, $r = 0$

⑤ $n(n+1) = (6s+4)(6s+5) = 36s^2+54s+20$
$= 6(6s^2+9s+3)+2$

so $k = 6s^2+9s+3$, $r = 2$

⑥ $n(n+1) = (6s+5)(6s+6) = 36s^2+66s+30$
$= 6(6s^2+11s+5)$

so $k = 6s^2+11s+5$, $r = 0$

Hence the only possible values of r are 0 and 2 as required. ✓

b) Expressing n as $10s+t$, and $n+1$ as $10s+t+1$ for $t = 1$ to 9.

$n = 10s+1$	$n+1 = 10s+1$	①
$n = 10s+1$	$n+1 = 10s+2$	②
$n = 10s+2$	$n+1 = 10s+3$	③
$n = 10s+3$	$n+1 = 10s+4$	④
$n = 10s+4$	$n+1 = 10s+5$	⑤

✓