$\boxed{\text{Case 8:}}$ $p = 6K_1+5 \quad q = 6K_2+5 \quad r = 6K_3+5$

$q = p+d \Rightarrow d = 6(K_2-K_1)$

$r = p+2d \Rightarrow 6K_3+5 = 6K_1+5+12(K_2-K_1) = 6(2K_2-K_1)+5$

$\boxed{\therefore 6 \mid d}$

$\boxed{\text{Prob 28:}}$ Find the last digit of the number 1989^{1989}.

- Its intuitive to see that the last digit of 1989^{1989} is the same as that of 9^{1989}.
- Observe: $9^1 = 9$, $9^2 = 81$, $9^3 = 729$ 9^4 will end with 1 : and so on.
- We can easily show by induction on K, where $K \geq 1$, that the last digit of the number 9^K will either end with 9 or 1.
- After every 2 powers, the same pattern of last digit repeats (observation)
- $\because$ 1989 is an odd no., $\therefore 1989^{1989}$ will end with 9.

$\boxed{\text{Prob 29:}}$ Find the last digit of the number 2^{50}.

- $2^1 = 2$, $2^2 = 4$, $2^3 = 8$, $2^4 = 16$, $2^5 = 32$, $2^6 = 64$, ... and so on.
- We can easily show by induction on K, where $K \geq 1$, that the last digit of the number 2^K will be either 2, 4, 8, or 6. Each of the numbers having last digit 2 will have K of the form $4p+1$, having last digit 4 will have K of the form $4p+2$, having last digit 8 will have K of the form $4p+3$, having last digit 6 will have K of the form $4p$, where $p \in \mathbb{N}$

$\boxed{50 = (4\times 12)+2}$ $\qquad 2^{50} = \underbrace{2^{48}}_{\text{ends with } 6} \cdot 2^2 \rightarrow$ ends with 4

$\boxed{\text{Prob 30:}}$ What is the last digit of 777^{777}?

- Its intuitive to see that the last digit of 777^{777} is the same as that of 7^{777}.