This book has permission to use the "N&K method of COLORS".

Example: Question: If "n" is any positive integer, prove that only one of the numbers, "n-1", "n+1" or "n+3" is divisible by 3.

For speed, while solving something similar, only THINK the words in blue; WRITE only the words in other COLORS.

| When $n=1$ numbers $n=6$ $n=7$ $n=8$ $n=9$ $(n+1)$ is 7 n | | | when | | | | , | when | | | | | when | | | | | when | | | | | |
|--|---|---------|------|----|---|--------------|---|------|-----|-----|-----------|----|---------------|----|---|-----|---------|------|----------|----|---|----------------|----|
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$ | When n= <mark>6</mark> | numbers | n= | =6 | | | | | n=7 | 7 | | | | n= | 8 | | | | n | =9 | | | |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$ | (n-1) is = 5 | 1 | n | | | T | | T | n | | F | | T | | | | Т | | | | | T | |
| $ \begin{array}{c} (n+3) \ is \ = \ 9 \\ The resulting numbers are 5, 7 \& 9. \\ Only one (9) of which is divisible by 3. \\ When n= \hline 2 \\ (n-1) \ is \ = \ 6 \\ (n+1) \ is \ = \ 8 \\ (n+3) \ is \ = \ 10 \\ The resulting numbers are 6, 8 \& 10. \\ Only one (6) of which is divisible by 3. \\ When n= \hline 8 \\ (n+1) \ is \ = \ 7 \\ (n+3) \ is \ = \ 11 \\ The resulting numbers are 7, 9 \& 11. \\ Only one (9) of which is divisible by 3. \\ \end{array}$ | (n+1) is = 7 | | | | | + | + | | | - | ⊢ | | | | | + | + | | \vdash | - | | + | |
| 3 3 9 3 4 5 9 1 1 5 1 1 1 9 1 1 5 1 <th1< th=""> 1 1 1<!--</td--><td>(n+3) is = 9</td><td>2</td><td></td><td></td><td></td><td>+</td><td>+</td><td>+</td><td>+</td><td>-</td><td>┢</td><td></td><td>\rightarrow</td><td></td><td></td><td>+</td><td>+</td><td>-</td><td>\vdash</td><td>++</td><td>-</td><td>+</td><td></td></th1<> | (n+3) is = 9 | 2 | | | | + | + | + | + | - | ┢ | | \rightarrow | | | + | + | - | \vdash | ++ | - | + | |
| Only one (9) of which is divisible by 3. When $n=2^{n}$ $(n-1)$ is = $\begin{bmatrix} 6 \\ (n+1) \\ is = 8 \\ (n+3) \\ is = 10 \end{bmatrix}$ The resulting numbers are 6, 8 & 10. Only one (6) of which is divisible by 3. When $n=3^{n}$ $(n-1)$ is = 7 $(n+1)$ is = 7 $(n+3)$ is = 11 The resulting numbers are 7, 9 & 11. Only one (9) of which is divisible by 3. | The resulting numbers are 5, 7 & 9. | 3 | | | | + | + | - | _ | _ | \vdash | | | | | + | + | _ | | | | \dashv | |
| When $n = \overline{1}$ 5 $n - 1 = 5$ $n - 1 = 6$ $n - 1 = 7$ $(n-1)$ $is = 8$ $n + 1 = 7$ $n - 1 = 7$ $n - 1 = 7$ $(n+1)$ $is = 10$ $n + 1 = 8$ $n - 1 = 7$ $n - 1 = 8$ The resulting numbers are 6, 8 & 10. 9 $n + 3 = 9$ $n + 1 = 9$ $n - 1 = 8$ When $n = \overline{2}$ $(n-1)$ $is = 7$ $(n+1)$ $n + 3 = 10$ $n + 1 = 10$ When $n = \overline{2}$ $(n-1)$ $is = 7$ 11 $n + 3 = 10$ $n + 3 = 11$ $(n+1)$ $is = 11$ 11 $i = 1$ $i = 1$ $i = 1$ $(n+1)$ $is = 7$ $(n+3)$ $is = 11$ $i = 1$ $i = 1$ $(n+3)$ $is = 11$ 14 $i = 1$ $i = 1$ $i = 1$ $(n+3)$ $is = 11$ $i = 1$ $(n+3)$ $is = 11$ $i = 1$ | Only one (9) of which is divisible by 3. | 4 | | | | \downarrow | | | _ | | | | | | | | \perp | | | | | $ \rightarrow$ | |
| When $n=2$ 6 $n - 1 = 6$ $n - 1 = 7$ $(n-1)$ is $= 8$ $n + 1 = 7$ $n - 1 = 7$ $n - 1 = 7$ $(n+3)$ is $= 10$ $n + 1 = 8$ $n - 1 = 7$ $n - 1 = 8$ $Mhen n=8$ $n + 1 = 8$ $n - 1 = 7$ $n - 1 = 8$ $(n+3)$ is $= 11$ $n + 3 = 10$ $n + 1 = 9$ $n + 1 = 10$ $Mhen n=8$ $(n-1)$ is $= 7$ $(n+3)$ is $= 11$ $n + 3 = 12$ $n + 3 = 11$ $(n+3)$ is $= 11$ 11 14 12 13 14 14 $Mhen n=8$ 0 0 0 0 0 0 0 $(n+3)$ is $= 11$ 11 14 0 0 0 0 $Mhen n=8$ 0 0 0 0 0 0 0 $(n+3)$ is $= 11$ 11 0 0 0 0 0 0 $(n+3)$ or (9) of which is divisible by 3. 15 0 0 0 0 0 0 | | 5 | n | - | 1 | = | 5 | | | | | | | | | | | | | | | | |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | When $n=7$ | 6 | | | | | | | n | - 1 | = | 6 | | | | | | | | | | | |
| $ \begin{array}{c} (n+1) & \text{is} &= 8 \\ (n+3) & \text{is} &= 10 \\ \text{The resulting numbers are 6, 8 & 10.} \\ \text{Only one (6) of which is divisible by 3.} \\ \text{When n=8} \\ (n-1) & \text{is} &= 7 \\ (n+1) & \text{is} &= 9 \\ (n+3) & \text{is} &= 11 \\ \text{The resulting numbers are 7, 9 & 11.} \\ \text{Only one (9) of which is divisible by 3.} \\ \end{array} $ | (n-1) is = 6 | 7 | n | + | 1 | = | 7 | | | | \square | | | n | - | 1 = | | 7 | | | | | |
| $\begin{array}{c} (n+3) is = 10 \\ The resulting numbers are 6, 8 \& 10. \\ Only one (6) of which is divisible by 3. \\ \\ When n=8 \\ (n-1) is = 7 \\ (n+1) is = 9 \\ (n+3) is = 11 \\ The resulting numbers are 7, 9 \& 11. \\ Only one (9) of which is divisible by 3. \end{array}$ | (n+1) is = 8 (n+3) is = 10 | 8 | | | | | | | n - | + 1 | = | 8 | | | | | Τ | | n | - | 1 | = | 8 |
| Only one (6) of which is divisible by 3.10 $n + 3 = 10$ $n + 1 = 10$ When $n = 8$ 1110 $n + 3 = 11$ 11 $(n-1)$ is $= 7$ 1110 $n + 3 = 11$ $n + 3 = 12$ $(n+1)$ is $= 9$ 1310 $n + 3 = 12$ $(n+3)$ is $= 11$ 141010 $n + 3 = 12$ The resulting numbers are 7, 9 & 11.151010Only one (9) of which is divisible by 3.101010 | The resulting numbers are 6.8 & 10. | 9 | n | + | 3 | = | 9 | | | | | | | n | + | 1 = | | 9 | | | | | |
| 11 $n + 3 = 11$ $n + 3 = 11$ $(n-1)$ $is = 7$ $n+3 = 12$ $(n+1)$ $is = 9$ 13 $is = 11$ $n + 3 = 12$ $(n+3)$ $is = 11$ $n + 3 = 12$ $is = 11$ $is = 12$ 14 14 $is = 11$ $is = 12$ $0nly$ one (9) of which is divisible by 3. $is = 11$ $is = 11$ | Only one (6) of which is divisible by 3. | 10 | | | | | | | n - | + 3 | = | 10 | | | | | Τ | | n | + | 1 | = | 10 |
| 12 $n + 3 = 12$ $n+3$ $n + 3 = 12$ 11 $n + 3 = 12$ 11 12 11 12 11 12 11 12 11 12 11 12 11 12 11 12 11 12 11 12 11 12 11 11 12 11 11 11 12 11 11 11 11 12 11 11 11 11 <th< td=""><td></td><td>11</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>n</td><td>+</td><td>3 =</td><td>: 1</td><td>11</td><td></td><td></td><td></td><td></td><td></td></th<> | | 11 | | | | | | | | | | | | n | + | 3 = | : 1 | 11 | | | | | |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | When n= <mark>8</mark> | 12 | | | | ╈ | | | | | \square | | | | | | \top | | n | + | 3 | = | 12 |
| (n+1) is = 9 (n+3) is = 11 The resulting numbers are 7, 9 & 11. Only one (9) of which is divisible by 3. | (n-1) is = 7 | 13 | | | | + | | t | | | \vdash | | | | | | $^{+}$ | | | | | 1 | |
| (n+3) is = 11 The resulting numbers are 7, 9 & 11. Only one (9) of which is divisible by 3. | (n+1) is = 9 | 14 | | | | + | + | | + | - | ┢ | | | | | + | + | | | - | | + | |
| The resulting numbers are 7, 9 & 11. 15 16 17 17 17 17 17 17 17 17 | (n+3) is = 11 | 14 | | | | + | + | + | + | - | ┢ | | \rightarrow | | | + | + | - | \vdash | ++ | - | + | |
| Unly one (9) of which is divisible by 3. | The resulting numbers are 7, 9 & 11. | 15 | | | | | | | _ | _ | | | | | | | + | | | — | | | |
| _ | <mark>O</mark> nly <mark>o</mark> ne (<mark>9</mark>) of which is divisible by 3. | | | | | | | | | | | | | | | | | | | | | | |
| When n=0 | When n-9 | | | | | | | | | | | | | | | | | | | | | | |
| (n-1) is = 8 | (n-1) is = 8 | | | | | | | | | | | | | | | | | | | | | | |
| (n+1) is = 10 | (n+1) is = 10 | | | | | | | | | | | | | | | | | | | | | | |
| (n+3) is = 12 | (n+3) is = 12 | | | | | | | | | | | | | | | | | | | | | | |
| The resulting numbers are 8, 10 & 12. | The resulting numbers are 8, 10 & 12 | | | | | | | | | | | | | | | | | | | | | | |
| $\frac{0}{2}$ Only one (12) of which is divisible by 3. | $\frac{0}{2}$ Only one (12) of which is divisible by 3. | | | | | | | | | | | | | | | | | | | | | | |

As can be seen from the trend above, the results will be <mark>s</mark>imilar when "n" is <mark>a</mark>ny <mark>o</mark>ther positive integer. Therefore, when "n" is any positive integer, only one of the three numbers, "n-1", "n+1" or "n+3" is divisible by 3.