

# Square Difference

1)  $3 = 2^2 - 1^2$  //  $5 = 3^2 - 2^2$  //  $7 = 4^2 - 3^2$  //  $9 = 5^2 - 4^2$  //  $11 = 6^2 - 5^2$  //  $13 = 7^2 - 6^2$  //  $15 = 8^2 - 7^2$  //  $17 = 9^2 - 8^2$  //  $19 = 10^2 - 9^2$  //  $21 = 11^2 - 10^2$  //  $23 = 12^2 - 11^2$  //  $25 = 13^2 - 12^2$  //  $27 = 14^2 - 13^2$  //  $29 = 15^2 - 14^2$  //  $31 = 16^2 - 15^2$  //  $33 = 17^2 - 16^2$  //  $35 = 18^2 - 17^2$  //  $37 = 19^2 - 18^2$  //  $39 = 20^2 - 19^2$  //  $41 = 21^2 - 20^2$  //  $43 = 22^2 - 21^2$  //  $45 = 23^2 - 22^2$  //  $47 = 24^2 - 23^2$  //  $49 = 25^2 - 24^2$  //  $51 = 26^2 - 25^2$  //  $53 = 27^2 - 26^2$  //  $55 = 28^2 - 27^2$  //  $57 = 29^2 - 28^2$  //  $59 = 30^2 - 29^2$  //  $61 = 31^2 - 30^2$  //  $63 = 32^2 - 31^2$  //  $65 = 33^2 - 32^2$  //  $67 = 34^2 - 33^2$  //  $69 = 35^2 - 34^2$  //  $71 = 36^2 - 35^2$  //  $73 = 37^2 - 36^2$  //  $75 = 38^2 - 37^2$  //  $77 = 39^2 - 38^2$  //  $79 = 40^2 - 39^2$  //  $81 = 41^2 - 40^2$  //  $83 = 42^2 - 41^2$  //  $85 = 43^2 - 42^2$  //  $87 = 44^2 - 43^2$  //  $89 = 45^2 - 44^2$  //  $91 = 46^2 - 45^2$  //  $93 = 47^2 - 46^2$  //  $95 = 48^2 - 47^2$  //  $97 = 49^2 - 48^2$  //  $99 = 50^2 - 49^2$

Odd numbers can be written as the difference of two squares in the form: odd ~~is~~ is  $(n)$

2)  $n = \left(\frac{n+1}{2}\right)^2 - \left(\frac{n+1}{2} - 1\right)^2$  Odd number can be written as  $2n+1$   
So now it is

$$2n+1 = \left(\frac{2n+2}{2}\right)^2 - \left(\frac{2n+2}{2} - 1\right)^2$$

$$\left(\frac{2n+2}{2}\right)^2 = \frac{4n^2 + 8n + 4}{4} \quad \left(\frac{2n+2}{2} - 1\right)^2 = \frac{4n^2 - 4}{4} + 1$$

~~$n^2 + 2n + 1$~~   ~~$n^2 - 1 + 1$~~

$$2n+1 = n^2 + 2n + 1 - (n^2 - 1 + 1)$$

$$\underline{\underline{2n+1 = 2n+1}}$$