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(1) Prove that $(n+5)^2 - n^2 \equiv 5(2n+5)$

(2) Prove that $(2n+1)^2 - (2n-1)^2 \equiv 8n$

(3) Prove that $(n+3)^2 + n^2 - 5 \equiv 2(n+1)(n+2)$

(4) Prove that $(n+3)^2 - (n-3)^2$ is always a multiple of 12 for all positive integer values of n.

(5) Prove that $(n+3)^2 + (n+5)^2$ is always even for all positive integer values of n.

(6) Prove that $(n-4)^2 + (n-4)^3 \equiv (n-3)(n-4)^3$

(7) Prove that $n^2 - 8n + 18$ is always positive for all values of n.

(8) Prove that $(2+3n)^2 + (4+n)^2$ is divisible by 10 for all positive integer values of n.

(9) Prove that $n^2 + (n+1)^2$ is always odd for all positive integer values of n.

(10) Prove that the sum of any two consecutive integers is always odd.

(11) Prove that the difference between any two consecutive odd integers is always 2.

(12) Prove that the sum of any 3 consecutive even numbers is always a multiple of 6.

(13) Prove that the product of any 2 consecutive even integers is always a multiple of 4.

(14) Prove that the sum of the squares of any 3 consecutive inetgers is always 1 less than a multiple of 3.

(15)* Prove that $8n - 5 - 4n^2$ is always negatives for all values of n.

(16)* Prove that the sum of the cubes of any two consecutive odd integers is always divisible by 4.

(17)* Prove that the difference between the cubes of any two consecutive even integers is always at least 8.

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