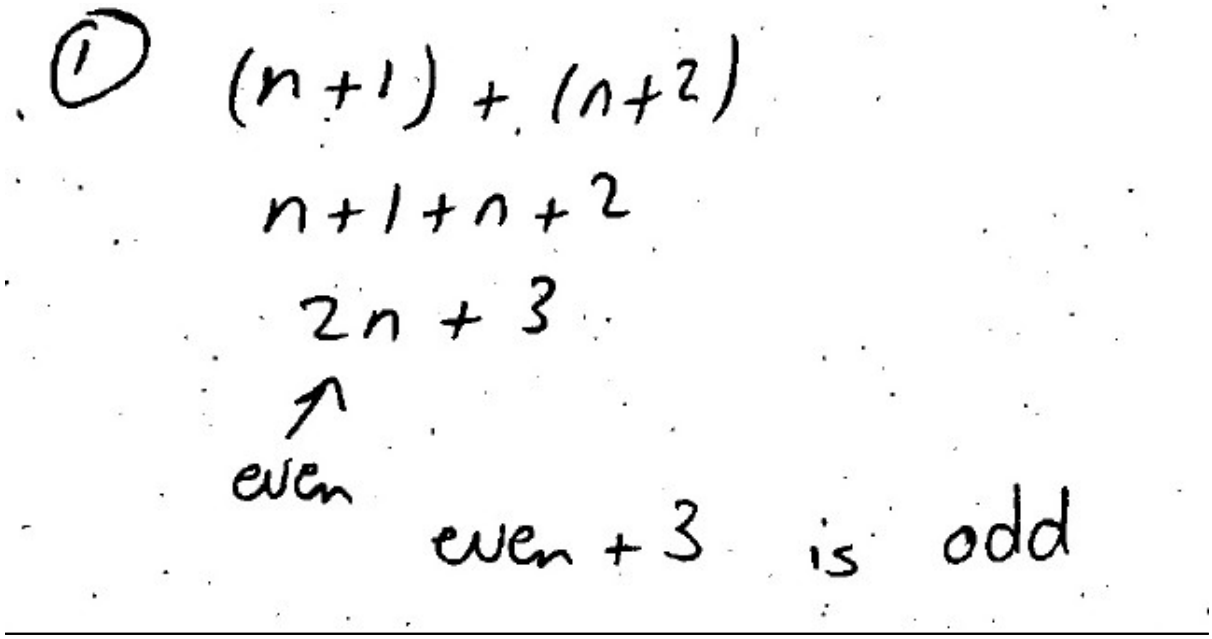
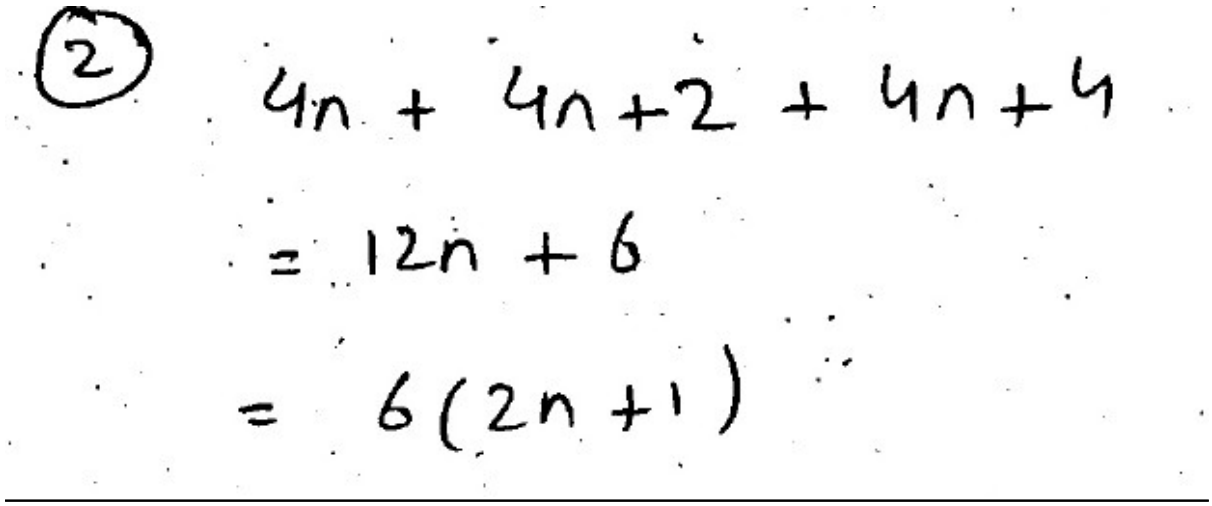
PROOF

ANSWERS

Q1



Q2



Q3

③ $(3m+1)^2-(3m-1)^2$ is always multiple of 12

$[(3m+1)(3m+1)]-[(3m-1)(3m-1)]$

$(9m^2+3m+3m+1)-(9m^2-3m-3m+1)$

$9m^2+6m+1-9m^2+6m-1$

$=12m$

Q4

④

$m(m+1)+m+1$

$m^2+m+m+1$

m^2+2m+1

$(m+1)(m+1)$

$(m+1)^2$

Q5

(5) $[(2m+3)(2m+3)] - [(2m-3)(2m-3)]$

$[4m^2+6m+6m+9] - [4m^2-6m-6m+9]$

$(4m^2+12m+9) - (4m^2-12m+9)$

$4m^2+12m+9 - 4m^2+12m-9$

$24m$

$12(2m)$

Q6

(6) $(m+2)(m+1) + m+2$

$m^2+m+2m+2+m+2$

m^2+4m+4

$(m+2)(m+2)$

$(m+2)^2$

Q7

(7) $2n+3 + 2n+5 + 2n+7$

$6n + 15$

$3(2n+5)$

Q8

(8) $4n + 4n+2 + 4n+4$

$12n+6$

$6(2n+1)$

Q9

(9) $(4n)^2 + (4m)^2$

$16n^2 + 16m^2$

$16(n^2+m^2)$

Q10

(10)

$(2p+1)^2 + (2q+1)^2$

$[(2p+1)(2p+1)] + [(2q+1)(2q+1)]$

$4p^2 + 2p + 2p + 1 + 4q^2 + 2q + 2q + 1$

$4p^2 + 4p + 4q^2 + 4q + 2$

$2(2p^2 + 2p + 2q^2 + 2q + 1)$

Q11

(11)

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

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

$n^2 + n^2 + n + n + 1$

$n^2 + n^2 + 2n + 1$

$2n^2 + 2n + 1$

$\underbrace{2(n^2+n)}_{\text{Even}} + 1$

even + 1 is odd

Q12

(12)

$(2n+1)^2 + (2n+3)^2$

$(2n+1)(2n+1) + (2n+3)(2n+3)$

$4n^2 + 2n + 2n + 1 + 4n^2 + 6n + 6n + 9$

$8n^2 + 16n + 10$

$8n^2 + 16n + 8 + 2$

$\underbrace{8(n^2 + 2n + 1)}_{\text{Multiple of 8}} + \underbrace{2}_{+2}$

Q13

(13)

n and $n+1$

$n + n + 1 = 2n + 1$

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

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

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

$2n + 1$

Q14

(14) $(2m)^2 + (2m+2)^2$

$4m^2 + (2m+2)(2m+2)$

$4m^2 + 4m^2 + 4m + 4m + 4$

$8m^2 + 8m + 4$

$\underbrace{8(m^2+m)}_{\text{Multiple of 8}} + \underbrace{4}_{+4}$