Quiz 2

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1.1) x+x+1+x+2+x+3+x+4 = (5x+10) = 5(x+2) which is divisible by 5.

1.2)

1.3) n=3, 3*3-5=4 which is clearly divisible by four. False.

2.1) Contradiction: n^2 is even and n is odd
n^2 = (n+1)(n+1) = n^2 +2n+1 which is a contradiction. It can also be phrased as (n^2+2n) +1 which if n is odd, adding one must make it even which is a contradiction

2.2) Contraposition: If n is odd then n^2 is odd
n^2 = (n+1)(n+1) = n^2 +2n+1. This can also be phrased as (n^2+2n) +1 which if n is odd, which means that the statement is true

3. Base case n = 2.
3^2 = 9
(3(3^2-3))/2 = 9
(3^2 + 3^3 … 3^k) (3^(k+1)) = (3(3^(k+1)-3)/2 + (3^(k+1))

$$\frac{\left(3\left(3^{k+1}-3\right)\right)\left(3^{k+1}\right)}{2}$$

$$3^k + 3^{k+1} = \frac{3\left(3^{k+1}\right)\left(3^{2k+2} - 3(3k+1)\right)}{2}$$

4. $(a+1)^n + (a+1)^{-n}$