Algebra Warm-up

1. What are the formulas for
    - i. Sum of an arithmetic series with n terms, with first term a_1 and last term a_n?
    - ii. Sum of a geometric series with n terms, with first term a_1 and ratio r?
    - iii. Sum of a geometric series with ∞ terms, with first term a_1 and ratio $-1 < r < 1$?

2. What are Vieta's formulas for:
    - a quadratic $ax^2 + bx + c$ with roots r, s:
        - i. Sum of roots $r + s =$
        - ii. Product of roots $rs =$
    - a cubic $ax^3 + bx^2 + cx + d$ with roots r, s, t:
        - iii. Sum of roots $r + s + t =$
        - iv. Sum of pairwise products of roots (aka taken two at a time) $rs + st + rt =$
        - v. Product of roots $rst =$
    - a general polynomial $a_n x^n + a_{n-1} x^{n-1} + \cdots + a_1 x + a_0$:
        - vi. Sum of roots =
        - vii. Product of roots =
        - vii. Sum of roots taken k at a time =