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$$\left.\begin{aligned} S_n &= n^2 m = \frac{n}{2}[2a_1 + d(n-1)] \\ S_k &= k^2 m = \frac{k}{2}[2a_1 + d(k-1)] \end{aligned}\right\} : \quad \frac{n^2 m}{k^2 m} = \frac{n}{k}\cdot\frac{2a_1 + dn - d}{2a_1 + dk - d}$$

$$\frac{n}{k} = \frac{2a_1 + dn - d}{2a_1 + dk - d}$$

$$2a_1 n + dkn - dn = 2a_1 k + dnk - dk$$

$$2a_1(n-k) = d(n-k) \;/:(n-k) \neq 0$$

$$\boxed{2a_1 = d}$$

$$S_n = n^2 m = \frac{n}{2}[2a_1 + d(n-1)] = \frac{n}{2}[2a_1 + 2a_1(n-1)] \longrightarrow n^2 m = n(2a_1 + 2a_1 n - 2a_1)$$

$$n^2 m = 2a_1 n^2 \;/: n^2$$

$$\boxed{a_1 = m} \rightarrow \boxed{d = 2m}$$

$$S_m = \frac{m}{2}[2a_1 + d(m-1)] = \frac{m}{2}[2m + 2m(m-1)] = m^3$$