**Arithmetic and Geometric Sequences Formula Sheet:**

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|  | **Arithmetic Sequence:** | **Geometric Sequence:** |
| **General Nth term Formula:** | $$a\_{n}=a\_{1}+\left(n-1\right)d$$ | $$a\_{n}=a\_{1}(r^{n-1})$$ |
| **Partial Sums Formula:** | $$S\_{n}=\left(\frac{a\_{1}+a\_{n}}{2}\right)n$$ | $$S\_{n}=\frac{a\_{1}(1-r^{n})}{1-r}$$ |
| **Common Difference/Ratio:** | $$d=a\_{n}-a\_{n-1}$$ | $$r=\frac{a\_{n}}{a\_{n-1}}$$ |
| **Recursive Formulas:** | $$a\_{n}=a\_{n-1}+1d$$$$a\_{n}=a\_{n-2}+2d$$$$a\_{n}=a\_{n-3}+3d$$$$a\_{n}=a\_{n-k}+kd$$ | $$a\_{n}=a\_{n-1}(r^{1})$$$$a\_{n}=a\_{n-2}(r^{2})$$$$a\_{n}=a\_{n-3}(r^{3})$$$$a\_{n}=a\_{n-k}(r^{k})$$ |
| **Mean (Average):** | $$M= \frac{a+b}{2}$$ | $$M= \sqrt{ab}$$ |
| **Infinite Sum:** | $$N/A$$ | $$S\_{\infty }=\frac{a\_{1}}{1-r} \left|r\right|<1$$ |