***Unit 9: Sequences and Series Review***

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| ***Formulas*** |
| Algebraic (common difference *d* =…) | Geometric (common ratio *r* = …) |
| \*Recursive: $a\_{n}=a\_{n-1}+d$ | \*Recursive: $a\_{n}=\left(a\_{n-1}\right)(r)$ |
| \*Recursive definitions ***MUST*** include the first term ($a\_{1}=$…) |
| **FORMULA SHEET** Explicit: $a\_{n}=a\_{1}+\left(n-1\right)d$ | **FORMULA SHEET** Explicit: $a\_{n}=a\_{1}(r)^{n-1}$ |
| Sum: $S\_{n}=\frac{n}{2}\left(a\_{1}+a\_{n}\right)$ | **FORMULA SHEET** Sum: $S\_{n}=\frac{a\_{1}(1-r^{n})}{1-r}$ ***OR*** $\frac{a\_{1}-a\_{1}r^{n}}{1-r}$ |

The sequences below are defined recursively. Find the next three terms for each.

1. $a\_{n}=a\_{n-1}+10$, $a\_{1}=29$
2. $a\_{n}=a\_{n-1}+n$, $a\_{1}=-4$
3. $b\_{n}=\frac{2+b\_{n-1}}{2}$, $b\_{1}=10$
4. $f\left(n\right)=f\left(n-1\right)+8$, $f\left(1\right)=4$

Given the explicit formula for an arithmetic sequence, determine the common difference and the term named.

1. $a\_{n}=-11+7n$, find $a\_{34}$
2. $a\_{n}=\frac{11}{8}+\frac{1}{2}n$, find $a\_{23}$

With the first term and the common difference of an arithmetic sequence find the first three terms and the explicit formula.

1. $a\_{1}=-34$, $d=-10$
2. $a\_{1}=35, d=4$

With a term and the common difference of an arithmetic sequence find the first three terms and the explicit formula.

1. $a\_{38}=-53.2, d=-1.1$
2. $a\_{37}=249, d=8$

Given two terms in an arithmetic sequence find both the recursive and explicit formula.

1. $a\_{18}=3362, a\_{38}=7362$
2. $a\_{18}=44.3, a\_{33}=84.8$

Given the explicit formula for a geometric sequence, find the 8th term.

1. $a\_{n}=-2.5\left(4^{n-1}\right)$
2. $a\_{n}=-4\left(3^{n-1}\right)$

Given the recursive formula and the common ration, find the first three terms and the explicit formula.

1. $a\_{n}=a\_{n-1}\left(2\right), a\_{1}=2$
2. $a\_{n}=a\_{n-1}\left(-3\right), a\_{1}=-3$

Given the first term and the common ratio of a geometric sequence find the explicit formula.

1. $a\_{1}=0.8, r=-5$
2. $a\_{1}=1, r=2$

Given a term in a geometric sequence and the common ration find both the recursive and explicit formula.

1. $a\_{4}=25, r=-5$
2. $a\_{3}=100, r=5$

Given two terms in a geometric sequence find the 8th term.

1. $a\_{5}=768, a\_{2}=12$
2. $a\_{1}=-2, a\_{5}=-512$
3. $a\_{1}=\frac{2}{5}, a\_{5}=2.025$

For the arithmetic series described below, determine the sum for “*n*” number of terms.

1. $a\_{1}=2, a\_{n}=122, n=13$
2. $20+27+34+41…, n=16$

Determine the number of terms “*n”* for each arithmetic series described below.

1. $a\_{1}=19, a\_{n}=96, S\_{n}=690 $
2. $a\_{1}=15, a\_{n}=79, S\_{n}=423$

For the geometric series described below, determine the sum for “*n*” number of terms.

1. $1-5+25-125…, n=7$
2. $-3-6-12-24…, n=9$
3. $a\_{1}=4, a\_{n}=1024, r=-$2
4. $a\_{1}=4, a\_{n}=8748, r=3$

Determine the number of terms “*n”* for each geometric series described below.

1. $a\_{1}=-2, r=5, S\_{n}=-62$
2. $a\_{1}=3, r=-3, S\_{n}=-60$
3. Write as a series and determine the sum of:

$$\sum\_{k=1}^{5}(k^{2}-2k)$$

Write the following series using sigma notation.

1. $-8-5-2+1+4+7+10+13$
2. $1+\frac{1}{2}+\frac{1}{4}+\frac{1}{8}+\frac{1}{16}+\frac{1}{32}$