Name: Answer key (ʼ'

Date: ________

Period: ______

Pre-calculus

11.1-11.3

Review

Find the first four terms and the 100th term. *plug in 1, 2, 3, 4 and 100 for n!

1. $a_n = \frac{(-1)^n}{n^2}$

$a_1 = \frac{(-1)^1}{1^2} = \frac{-1}{1} = \boxed{-1}$

$a_2 = \frac{(-1)^2}{2^2} = \boxed{\frac{1}{4}}$

$a_3 = \frac{(-1)^3}{3^2} = \boxed{\frac{-1}{9}}$

$a_4 = \frac{(-1)^4}{4^2} = \boxed{\frac{1}{16}}$

$a_{100} = \frac{(-1)^{100}}{100^2} = \boxed{\frac{1}{10000}}$

2. $a_n = n^2 + 1$

$a_1 = 1^2 + 1 = 1 + 1 = \boxed{2}$

$a_2 = 2^2 + 1 = 4 + 1 = \boxed{5}$

$a_3 = 3^2 + 1 = 9 + 1 = \boxed{10}$

$a_4 = 4^2 + 1 = 16 + 1 = \boxed{17}$

$a_{100} = 100^2 + 1 = 10000 = \boxed{10001}$

Find the sum.

3. $\sum_{k=1}^{3} \frac{1}{k}$ plug in 1, 2, 3 for k, then add up

$\frac{1}{1} + \frac{1}{2} + \frac{1}{3} =$

common denominator

$\frac{6}{6} + \frac{3}{6} + \frac{2}{6} = \frac{11}{6} = \boxed{1\frac{5}{6}}$

4. $\sum_{k=1}^{4} k^2$ plug in 1, 2, 3, 4 for k, then add up

$1^2 + 2^2 + 3^2 + 4^2$

$1 + 4 + 9 + 16 = \boxed{30}$

Rewrite each series using sigma notation.

5. 2 + 4 +6 + 8 +10

$2(1) + 2(2) + 2(3) + 2(4) + 2(5)$

$$\boxed{\sum_{k=1}^{5} 2k}$$

Find the nth term of the arithmetic sequence. use formula $a_n = a+(n-1)d$ plug in a and d

6. a = 3, d = 5

$\boxed{a_n = 3+(n-1)\cdot 5}$

7. a = -6, d = 3

$\boxed{a_n = -6+(n-1)\cdot 3}$

Find the partial sum S_n of the arithmetic sequence that satisfies the given conditions. use formula $S_n = \frac{n}{2}[2a+(n-1)d]$ plug in a, d & n

8. a = 1, d = 2, n = 10

$S_{10} = \frac{10}{2}[2\cdot 1+(10-1)\cdot 2]$

$= 5[2+(9)\cdot 2]$

$= 5[2+18] = 5\cdot 20 = \boxed{100}$

9. a = 3, d = 2, n = 12

$S_{12} = \frac{12}{2}[2\cdot 3+(12-1)\cdot 2]$

$= 6[6+(11)\cdot 2]$

$= 6[6+22] = 6\cdot 28 = \boxed{168}$

A partial sum of an arithmetic sequence is given. Find the sum.

10. $1 \overset{+4}{+} 5 \overset{+4}{+} 9 + \ldots + 401$ d=4

use $S_n = n\left(\frac{a+a_n}{2}\right)$ to find the sum

First use $a_n = a+(n-1)d$ to find n.

solve for n

$a_n = a+(n-1)d$

$401 = 1+(n-1)4$

$401 = 1+4n-4$

$401 = 4n-3$

$+3 \quad +3$

$\frac{404}{4} = \frac{4n}{4}$

$101 = n$

$a=1,\ a_n = 401,\ n=101$

$S_{101} = 101\left(\frac{1+401}{2}\right)$

$= 101\left(\frac{402}{2}\right) = 101(201)$

$= \boxed{20,301}$

Find the nth term of the geometric sequence. Then find the fourth term.

11. a = 3 , r = 5 use formula $a_n = ar^{n-1}$

$\boxed{a_n = 3\cdot 5^{n-1}}$

$a_4 = 3\cdot 5^{4-1}$

$= 3\cdot 5^3$

$= 3\cdot 125$

$= \boxed{375}$

Find the first five terms and find the ratio r. plug in 1, 2, 3, 4, 5 for n

12. $a_n = 3^{n-1}$

$a_1 = 3^{1-1} = 3^0 = \boxed{1}$

$a_2 = 3^{2-1} = 3^1 = \boxed{3}$

$a_3 = 3^{3-1} = 3^2 = \boxed{9}$

$a_4 = 3^{4-1} = 3^3 = \boxed{27}$

$a_5 = 3^{5-1} = 3^4 = \boxed{81}$

1, 3, 9, 27, 81

×3 ×3 ×3 times 3 each time $\boxed{r = 3}$

Find the partial sum S_n of the geometric sequence. use formula $S_n = a \cdot \frac{1-r^n}{1-r}$

13. a = 5, r = 2, n = 6

$S_6 = 5 \cdot \frac{1-2^6}{1-2} = 5 \cdot \frac{1-64}{-1} = 5 \cdot \frac{-63}{-1} = 5 \cdot 63 = \boxed{315}$

Find the sum of the geometric series. use $S_n = a \cdot \frac{1-r^n}{1-r}$ to find the sum where $a = 1$, $r = 3$, $n = 8$

14. 1 + 3 + 9 +...+ 2187 ×3 ×3 r = 3

use $a_n = a \cdot r^{n-1}$ first to find n

$a = 1$
$a_n = 2187$
$r = 3$

$2187 = 1 \cdot 3^{n-1}$

$2187 = 3^{n-1}$

plug in to see what makes n true

$3^{8-1} = 3^7 = 2187$

$\boxed{n = 8}$

$S_8 = 1 \cdot \frac{1-3^8}{1-3}$

$= 1 \cdot \frac{1-6561}{-2}$

$= \frac{-6560}{-2}$

$= \boxed{3280}$

Find the sum of the infinite geometric series. use $S = \frac{a}{1-r}$

15. $1 + \frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \ldots$ $\times\frac{1}{3}$ $\times\frac{1}{3}$ $r = \frac{1}{3}$

$a = 1$
$r = \frac{1}{3}$

$S = \frac{1}{1-\frac{1}{3}} = \frac{1}{\frac{3}{3}-\frac{1}{3}} = \frac{1}{\frac{2}{3}}$ flip

$= 1 \cdot \frac{3}{2} = \boxed{\frac{3}{2}}$

16. $1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} + \ldots$ $\times -\frac{1}{2}$ $\times -\frac{1}{2}$ $r = -\frac{1}{2}$

$a = 1$
$r = -\frac{1}{2}$

$S = \frac{1}{1 + \frac{1}{2}}$

$S = \frac{1}{\frac{2}{2}+\frac{1}{2}} = \frac{1}{\frac{3}{2}}$ flip

$= 1 \cdot \frac{2}{3} = \boxed{\frac{2}{3}}$