

Sequence WS

Name:

New Formulas

(You should have p.907 Rules in your notes, if not your memory):

Arithmetic Sequence

a =first term, d =common difference

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

Arithmetic sum of first n terms:

$$\sum_{k=1}^n a_k = \frac{n(a_1 + a_n)}{2}$$

Geometric Sequence

a =first term, r =common ratio

$$a_n = ar^{n-1}$$

Geometric sum of first n terms (where $r = \frac{a_{n+1}}{a_n} \neq 0$):

$$\sum_{k=1}^n ar^{k-1} = a_1 \left(\frac{1 - r^n}{1 - r} \right)$$

Geometric Sum of ∞ terms if $|r| < 1$

$$\sum_{k=1}^{\infty} ar^{k-1} = \frac{a_1}{1 - r}$$

Binomial Expansion of $(a + b)^n$

$$(a + b)^n = \sum_{k=0}^n {}_n C_k a^{n-k} b^k$$

1. $\{1, 3, 5, 7, 9, \dots\}$

(a) Arithmetic or Geometric?

(b) $a_n =$

(c) sum of first 10 terms:

$$\sum_{k=1}^{10} a_k =$$

2. $\{7, 12, 17, 22, 27, \dots\}$

(a) Arithmetic or Geometric?

(b) $a_n =$

(c) sum of first 10 terms:

$$\sum_{k=1}^{10} a_k =$$

3. $\{2, 4, 8, 16, 32, \dots\}$

(a) Arithmetic or Geometric?

(b) $a_n =$

(c) sum of first 10 terms:

$$\sum_{k=1}^{10} a_k =$$

4. $\{10, 20, 40, 80, 160, \dots\}$

(a) Arithmetic or Geometric?

(b) $a_n =$

(c) sum of first 10 terms:

$$\sum_{k=1}^{10} a_k =$$

5. $\{6, 18, 54, 162, 486, \dots\}$

(a) Arithmetic or Geometric?

(b) $a_n =$

(c) sum of first 10 terms:

$$\sum_{k=1}^{10} a_k =$$

6. $\{6, 12, 24, 48, 96, \dots\}$

(a) Arithmetic or Geometric?

(b) $a_n =$

(c) sum of first 10 terms:

$$\sum_{k=1}^{10} a_k =$$

7. $\{\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \dots\}$

(a) Arithmetic or Geometric?

(b) $a_n =$

(c) sum of first 10 terms:

$$\sum_{k=1}^{10} a_k =$$

(d) sum all terms:

$$\sum_{k=1}^{\infty} a_k =$$

8. A ball, after the first bounce is 30 feet off the ground. The second bounce is 24 feet, then 19.2 on the third bounce.

(a) What is the height after 5 bounces?

(b) The nth bounce?

(c) How many bounces does it take for the bounce to be less than 6?

Binomial expansion

9. $\binom{5}{2} = {}_5 C_2 =$

10. $\binom{7}{0} = {}_7 C_0 =$

11. $\binom{7}{1} = {}_7 C_1 =$

12. $\binom{7}{2} = {}_7 C_2 =$

13. $\binom{7}{3} = {}_7 C_3 =$

14. $\binom{7}{4} = {}_7 C_4 =$

15. $\binom{7}{5} = {}_7 C_5 =$

16. $\binom{7}{6} = {}_7 C_6 =$

17. $\binom{7}{7} = {}_7 C_7 =$

18. $(x + 2)^7 =$

19. What is the x^4 term of $(x - 2)^{11}$?

20. What is the x^4 term of $(2x - 2)^{11}$?