

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

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

$$S_n = \frac{n(a_1+a_n)}{2}$$

## Unit 14 Review

Find the next three terms in each sequence. Then, tell if the sequence converges or diverges and write the explicit rule.

1)  $5, 1, \frac{1}{5}, \frac{1}{25}, \frac{1}{125}, \dots$

2)  $-\frac{4}{3}, -\frac{2}{3}, 0, \frac{2}{3}, \frac{4}{3}, \dots$

Find the first four terms in each sequence.

3)  $a_n = 2^n - 2$

4)  $a_n = 62 - 30n$

5)  $a_n = a_{n-1} + 2$   
 $a_1 = -24$

6)  $a_n = a_{n-1} + \frac{1}{3}$   
 $a_1 = -6$

Write the explicit formula for each sequence.

7)  $-3, -6, -12, -24, -48, \dots$

8)  $-4, -14, -24, -34, -44, \dots$

Write the recursive formula for each sequence.

9)  $1, 4, 16, 64, 256, \dots$

10)  $-13, 17, 47, 77, 107, \dots$

Evaluate each series.

11)  $\sum_{n=0}^5 (20 - n^2)$

12)  $\sum_{m=0}^4 3m$

**Rewrite each series using sigma notation.**

13)  $3 + 9 + 27 + 81 + 243$

14)  $601 + 602 + 603 + 604 + 605 + 606$

**For each sequence, state if it is arithmetic, geometric, or neither. If it is arithmetic, tell the common difference. If it is geometric, tell the common ratio. Then, find the sum of the first 50 terms.**

15)  $1, \frac{3}{2}, 2, \frac{5}{2}, 3, \dots$

16)  $-108, 18, -3, \frac{1}{2}, -\frac{1}{12}, \dots$

**Evaluate each expression.**

17)  ${}_{10}C_5$

18)  ${}_{12}C_7$

**Find each term described.**

19) 2nd term in expansion of  $(x + 3)^3$

20) 4th term in expansion of  $(3u - 1)^4$

**Expand completely.**

21)  $(2y - x)^4$

22)  $(y - 3x)^3$

22. The length of Mr. Brust's pants is defined by the sequence  $a_n = 32(0.98)^{n-1}$  where  $n$  is the number of years Mr. Brust has taught.

- Is this sequence arithmetic or geometric?
- Mr. Brust has taught for 15 years. How long are his pants?
- Does the length of Mr. Brust's pants converge or diverge?
- Brust plans on "teaching" for 35 years. Is this reasonable based on pant length?

23. Suppose you place 1 cent on the first square of a chessboard, two cents on the second square, 4 cents on the third square, and so on, continuing to double until all 64 squares are covered.

- How much money will be on the 64<sup>th</sup> square?
- How much money will be on the entire board?

<b><i>Skillz Review!</i> Write the equation of a line with the given slope that passes through the given point.</b>			
<b>In slope-intercept form: <math>y = mx + b</math></b>		<b>In point-slope form: <math>y - y_1 = m(x - x_1)</math></b>	
1. slope = $-\frac{3}{17}$ ; through (-51,-2)	2. slope = $\pi$ ; through $(\frac{\pi}{2}, \frac{\pi}{4})$	3. slope = $\frac{\pi}{2}$ ; through (2,-3)	4. slope undefined; through (0,0)