

Write the first 4 terms of each sequence. Assume that n begins with 1.

1.  $a_n = \frac{n+1}{n}$   
 $a_1 = 2$      $a_2 = \frac{3}{2}$   
 $a_3 = \frac{4}{3}$      $a_4 = \frac{5}{4}$

2.  $a_n = \frac{3^n}{n!}$   
 $a_1 = 3$      $a_2 = \frac{9}{2}$   
 $a_3 = \frac{27}{6}$      $a_4 = \frac{27}{8}$

3.  $a_1 = 3, a_n = 2(a_{n-1} - 1)$   
 $a_1 = 3$   
 $a_2 = 4$   
 $a_3 = 6$   
 $a_4 = 10$

Evaluate.

4.  $\frac{(2n+2)!}{(2n)!}$   
 $\frac{(2n+2)(2n+1)}{4n^2 + 6n + 2}$

5.  $\sum_{i=0}^5 3i^2$   
 $0 + 3 + 12 + 27 + 48 + 75 = 165$

6.  $\sum_{k=1}^5 6$      $6 + 6 + 6 + 6 + 6 = 30$

Write in summation notation.

7.  $\frac{1}{3} + \frac{2}{9} + \frac{4}{27} + \frac{8}{81}$   
 or  $\sum_{i=0}^3 \frac{2^i}{3^{i+1}}$

8.  $\frac{1}{1} + \frac{2}{1} + \frac{4}{2} + \frac{8}{6} + \frac{16}{24} + \frac{32}{120}$   
 or  $\sum_{i=1}^5 \frac{2^{i-1}}{(i-1)!}$

Write the rule for  $a_n$  of each arithmetic sequence.

9.  $a_1 = 15, a_n = a_{n-1} + 4$   
 $a_n = 15 + 4(n-1)$   
 $a_n = 4n + 11$

10.  $10, 5, 0, -5, -10, \dots$   
 $a_1 = 10, d = -5$      $a_n = 10 - 5(n-1)$   
 $a_n = -5n + 15$

11.  $a_5 = 190, a_{10} = 115$   
 $d = \frac{115 - 190}{10 - 5} = -15$      $a_1 = 250$   
 $a_n = -15n + 265$

12.  $4, \frac{3}{2}, -1, -\frac{7}{2}, \dots$      $a_1 = 4, d = -\frac{5}{2}$   
 $a_n = 4 - \frac{5}{2}(n-1)$   
 $a_n = -\frac{5}{2}n + \frac{13}{2}$     or  $a_n = -2.5n + 6.5$

Find each sum.

13.  $40, 37, 34, 31, \dots, n=10$   
 $a_n = 40 - 3(n-1) = -3n + 43$   
 $a_1 = 40, a_{10} = 13$      $S_n = \frac{(40+13) \cdot 10}{2} = 265$

14. Odd integers between 30 and 54  
 $31 + 33 + \dots + 53$   
 $53 = 2n + 29$      $n = 12$   
 $S_n = \frac{(31+53) \cdot 12}{2} = 504$

15.  $\sum_{n=1}^{50} (-3n + 8)$   
 $a_1 = 5, a_{50} = -142$   
 $S_n = \frac{(5 + (-142)) \cdot 50}{2} = -3425$

16.  $\sum_{n=51}^{100} (2n + 2)$   
 $a_{51} = 104, a_{100} = 202$   
 $S_n = \frac{(104 + 202) \cdot 50}{2} = 7650$

17.  $\sum_{n=11}^{30} n - \sum_{n=1}^{10} n$      $(11+30) \cdot \frac{20}{2} + (1+10) \cdot \frac{10}{2}$   
 $410 + 55 = 465$

18. An object (with negligible air resistance) is dropped from a plane. It falls 4.9 meters during the 1<sup>st</sup> second, 14.7 meters during the 2<sup>nd</sup> second, 24.5 meters during the 3<sup>rd</sup> second, and so on. How many meters will it fall in 10 seconds if this pattern continues?

$4.9, 14.7, 24.5, \dots$      $d = 9.8$   
 $a_n = 4.9 + 9.8(n-1)$   
 $a_n = 9.8n - 4.9$   
 $S_n = \frac{(4.9 + 93.1) \cdot 10}{2} = 490 \text{ m}$