

**Day 5.1 – Introduction to Sequences*****No calculators***

- 1) List the first five terms of each sequence. Use the ellipsis to indicate terms not written, where appropriate.

a)  $\left\{2^{n/2}\right\}_1^5$

b)  $\left\{\frac{(-1)^{n+1}}{n^2}\right\}_1^\infty$

- 2) Write each sequence correctly in bracket notation.

a)  $-3, 2, 7, 12, \dots$

b)  $-3, 1, -\frac{1}{3}, \frac{1}{9}, \dots$

- 3) Let  $a_1 = 1$ , and  $a_n = 1 + \frac{1}{a_{n-1}}$  for  $n > 1$ . List and simplify the first five terms of this recursively defined sequence. Give your answer in exact form, rather than a decimal approximation.

- 4) Write each sequence recursively.

a)  $-3, 2, 7, 12, \dots$

$a_1 = \underline{\hspace{2cm}}$

$a_n = \underline{\hspace{2cm}}$

b)  $-3, 1, -\frac{1}{3}, \frac{1}{9}, \dots$

$a_1 = \underline{\hspace{2cm}}$

$a_n = \underline{\hspace{2cm}}$

- 5) Find the  $n^{\text{th}}$  term of the sequence

$$1, -4, 9, -16, \dots$$

- (a)  $a_n = 32$                       (b)  $a_n = -2n$                       (c)  $a_n = (-2)^n$   
(d)  $a_n = (-1)^n(n)^2$                       (e)  $a_n = n^2$

- 6) Find the  $5^{\text{th}}$  term of the sequence

$$a_n = 2(n - 1)^2 - 3.$$

- (a)  $-3$                       (b)  $47$                       (c)  $29$                       (d)  $5$                       (e)  $53$

- 7) Find the  $5^{\text{th}}$  term of the recursive sequence

$$a_{k+1} = 2a_k - 1$$

where  $a_1 = 2$ .

- (a)  $17$                       (b)  $10$                       (c)  $9$                       (d)  $5$                       (e)  $2$

- 8) Find the  $8^{\text{th}}$  term of the recursive sequence

$$a_{k+1} = a_k + a_{k-1}$$

where  $a_1 = 2$  and  $a_2 = 3$ .

- (a)  $34$                       (b)  $55$                       (c)  $99$                       (d)  $102$                       (e)  $19$

- 9) Find the  $n^{\text{th}}$  term of the *arithmetic* sequence

$$-8, -5, -2, 1, 4, \dots$$

- (a)  $a_n = -8 + 3(n - 1)$       (b)  $a_n = -8(3)^{n-1}$       (c)  $a_n = -8 - 3n$   
(d)  $a_n = -8^n$       (e)  $a_n = 3 - 8(n - 1)$

- 10) Find the two-hundredth term,  $a_{200}$ , of the sequence

$$2, 5, 8, 11, \dots$$

- (a) 399      (b) 499      (c) 599      (d) 603      (e) 583

- 11) The first term of an *arithmetic* sequence is  $a_1 = 3$  and the eleventh term is  $a_{11} = 23$ . Find the  $n^{\text{th}}$  term,  $a_n$ , of the sequence.

- (a)  $a_n = 3 + 23(n - 1)$       (b)  $a_n = 23 + 10(n - 1)$       (c)  $a_n = 3 + 2(n - 1)$   
(d)  $a_n = 3 + 10(n - 1)$       (e)  $a_n = 23 + 2(n - 1)$

- 12) The  $n^{\text{th}}$  term of the *geometric* sequence

$$3, -6, 12, -24, \dots$$

is

- (a)  $a_n = 3(-2)^{n-1}$       (b)  $a_n = 2(-3)^n$       (c)  $a_n = 2(3)^{n-1}$   
(d)  $a_n = 3(-2)^n$       (e)  $a_n = 3(2)^{n-1}$