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Discrete MathHW 2B

Section/Pages	Problems
2.4 (pg 177 – 179):	5abcd, 15ab, 19, 25abc, 29, 40
2.5 (pg 186 – 187):	1, 4, 13, ~~25~~ (25 is optional)
2.6 (pg 113 – 115):	3, 5, 9, 17, 18

2.5

5.
   a. 2,5,8,11,14,17,20, 23, 26, 29, 32, 35
   b. 1,1,1,2,2,2,3,3,3,4
   c. 1,1,3,3,5,5,7,7,9,9,11,11
   d. 0, -1, -2, -2, 8, 88, 656

15.
   a. a_n =a_n-1 + 2*a_n-2 + 2n - 9
      a_n-1 = -(n-1)+2
      2*a_n-2 =2*(-(n-2)+2)
      2n = 2*(-n+2)
      -n+1+2-2n+4+4+2n- 9
      -3n+2n +11-9
      -n+2
   b.
      -n+2a_n = a_n-1 + 2 * a_n-2 + 2n-9 a_n-1 =-(n-1)+2 2 * a_n-2 = 2 *(-(n-2)+2) 2n = 2 * (-n + 2) -n + 1 + 2-2n + 4 + 4 + 2n- 9 -3n + 2n + 11-9 -n + 2

19.
   a. b_n = 3*(b_n-1)
   b. 100 * 3^n = 5904900 bacterias

29.
   a. 2+3+4+5+6 = 20
   b. 1 -2 +4 -8 +16 = 11
   c. 3*10 = 30
   d. 1+2+4+8+16+32+64+128+256 = 511

40.
   sum(99...200) k^3 = sum(0..200) k^3 - (0..98) k^3
   sum(0..200) k^3 = (n^2)((n+1)^2)/4 = (200^2) (201^2)/4 = 404010000
   sum(0..98) k^3 = (98^2)(99^2)/4 = 23532201
   404010000 - 23532201 = 380477799

1
   a. Countably infinite
   b. Countably infinite
   c. Countably infinite
   d. Uncountable

e. Finite
f. Countably infinite

4.

a. Countably infinite.
b. Countably infinite
c. Not countable
d. Not countable

13.

A to Z+ is a 1 to 1 relationship.
A has the same cardinality as Z+
A has the same cardinality as a countable set
A is a subset of Z+
A is countable.

3.

a.

1	11
2	18

b.

2	-2	-3
1	0	2
9	-4	4

c.

-4	15	-4	1
3	5	3	2
7	1	3	2
5	3	2	1

5.

2	3
1	4

*

a	b
c	d

=

3	0
1	2

=

2a+3c	2b+3d
a+4c	b+4d

2a+3c= 3
2b+3d= 0
a+4c=1
b+4d =2

9/5	-6/5
-1/5	4/5

9.

Since addition is associative and matrix addition adds like terms on the same row column, it is associative too.

17. IfAandBaren×nmatriceswithAB=BA=In,thenB is called the inverse of A (this terminology is appropriate be- cause such a matrix B is unique) and A is said to be invertible.
ThenotationB=A−1 denotesthatBistheinverseofA.

18.

Show that

$$\begin{bmatrix} 2 & 3 & -1 \\ 1 & 2 & 1 \\ -1 & -1 & 3 \end{bmatrix}$$

is the inverse of

$$\begin{bmatrix} 7 & -8 & 5 \\ -4 & 5 & -3 \\ 1 & -1 & 1 \end{bmatrix}.$$

The identity matrix is

1	0	0
0	1	0
0	0	1