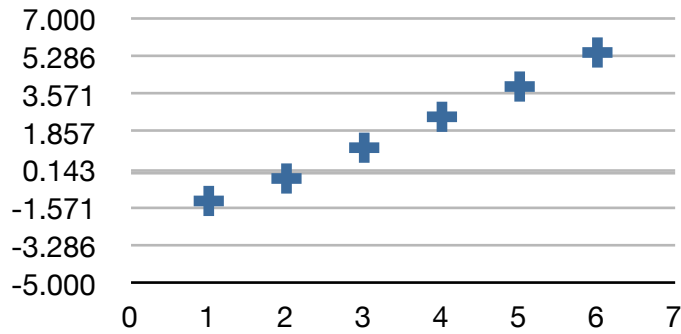


US5256 SOLUTIONS

LESSON ONE:

1. a. 4, 8, 12, 16, 20, 24
 b. 1, 4, 7, 10, 13, 16
 c. 3, 9, 27, 81, 243, 729
 d. -4, 16, -64, 256, -1024, 4096
2. a. $5n$ b. $n + 2$ c. n^2 d. 3^n
3. a. 17.75
 b. For $n < 3$ $t_n < 0$; $t_3 = 1.189$ and $t_4 = 2.59$, so 1.198 is not part of the sequence.

n	t_n
1	-1.231
2	-0.211
3	1.189
4	2.593
5	3.968
6	5.516



the series is divergent.

4. a. 5, 9, 13, 17, 21
 b. 3, 4, 3, 4, 3
 c. 2, 7, 12, 17, 22
 d. 5, 40, 1720, 2963560, 8.78×10^{10}
5. a. $t_n + 4$ b. t_n^2 c. $5t_n$ d. $t_n^2 + 2$
6. 1, 2, -1.25, 2.8, 0.61, -82.9
7. a. no b. no c. no d. yes, limit = 0 e. yes, limit = $\frac{2}{3}$ f. no
8. a. $\sum_{i=1}^5 x_i$ b. $\sum_{i=4}^6 s_i$ c. $\sum_{i=7}^{10} q_i + r_i$
9. a. $4 + 5 + 6 = 15$
 b. $12 + 13 + 14 + 15 + 16 + 17 + 18 + 19 = 124$
 c. $(3 + 2)^2 + (3 + 3)^2 + (3 + 4)^2 + (3 + 5)^2 + (3 + 6)^2 + (3 + 7)^2 = 355$
10. a. 150 b. 94 c. 67 d. -101

LESSON TWO:

Arithmetic Series:

1. a. $T_5 = 16$ $T_n = 4 + 3(n-1)$ $T_{10} = 31$ $S_{10} = 175$
 b. $T_5 = 50.6$ $T_n = 5.4 + 11.3(n-1)$ $T_{10} = 107.1$ $S_{10} = 1509.5$
 c. $T_5 = -10$ $T_n = 12 - 5.5(n-1)$ $T_{10} = -37.5$ $S_{10} = -67.5$
 d. $T_5 = 31$ $T_n = 7 + 6(n-1)$ $T_{10} = 61$ $S_{10} = 295$
2. 7 3. $T_n = 12.4 + 3.4(n-1)$ 4. $(T_n = 5 + 0.2(n-1))$; 5, 5.2, 5.4, 5.6
5. $14 + 8 = 21$, $21/6 = -3.5$ ($=d$); $17 \times -3.5 = 59.5$; $59.5 + 14 = \underline{73.5}$
6. $S_{12} = 398.4$, $S_{19} = 989.9$, $989.9 - 398.4 = \underline{591.5}$

Geometric Series:

1. a. $T_5 = 64$ $T_n = 4(2^{n-1})$ $T_{10} = 2048$ $S_{10} = 4092$
 a. $T_5 = 5.4$ $T_n = 5.4(-1)^{n-1}$ $T_{10} = -5.4$ $S_{10} = 0$
 a. $T_5 = 972$ $T_n = 12(3^{n-1})$ $T_{10} = 236196$ $S_{10} = 64416$
 a. $T_5 = 156.25$ $T_n = 4(-2.5)^{n-1}$ $T_{10} = -15258.8$ $S_{10} = 4360.8$

2. $512 = ar^5$, $32 = ar^2$; $\frac{ar^5}{ar^2} = r^3$; $512/32 = 16 = r^3$; $16^{1/3} = 2.52 (= r)$ $32 = a(2.52^2)$, $a = 5.03$
 $T_n = 5 \cdot 3(2.52^{n-1})$
3. $T_n = 12.4(6.45^{n-1})$
4. a. 1.10×10^{12} b. 9.12×10^{19} c. 1.77×10^7
5. $18.67 = \frac{14}{1-r}$, $r = 0.25$; $T_n = 14(r^{n-1})$; **14, 3.5, 12.25, 30.625**
6. $T_n = 20(\frac{2}{3})^{n-1}$, $S = 60$

LESSON THREE:

- | | | |
|----|---|---|
| 1. | e^2 : three terms: 5
five terms: 7
seven terms: 7.356
calculator: 7.389 | e^5 : three terms: 18.5
five terms: 65.37
seven terms: 113.11
calculator: 148.4 |
| | e^{-7} : three terms: 18.5
five terms: 61.33
seven terms: 84.63
calculator: 0.0009 | $e^{3.2}$: three terms: 9.32
five terms: 19.15
seven terms: 23.44
calculator: 24.53 |
- 2.
- | | | |
|---|----|-----------------|
| a, $e^{3x} = 1 + 3x + \frac{9x^2}{2} + \frac{27x^3}{6} + \frac{81x^4}{24}$ | 3. | a. $\log(12)$ |
| b, $e^{-2x} = 1 - 2x + \frac{4x^2}{2} - \frac{8x^3}{6} + \frac{16x^4}{24}$ | | b. $\log(3)$ |
| c, $e^{x/2} = 1 + \frac{x}{2} + \frac{x^2}{8} + \frac{x^3}{48} + \frac{x^4}{384}$ | | c. $\log(125)$ |
| d, $e^{-2x/3} = 1 - \frac{2x}{3} + \frac{4x^2}{72} - \frac{8x^3}{162} + \frac{16x^4}{1994}$ | | d. $\log(72)$ |
| e, $e^{x^3} = 1 + x^3 + \frac{x^6}{2} + \frac{x^9}{6} + \frac{x^{12}}{24}$ | 4. | a. $x = 2.73$ |
| f, $e^{2x} + e^x = 2 + 3x + \frac{5x^2}{2} + \frac{9x^3}{6} + \frac{17x^4}{24}$ | | b. $x = 1.99$ |
| g, $e^{x/4} + e^{-x} = 2 - 3x + \frac{5x^2}{8} - \frac{3x^3}{24} + \frac{5x^4}{96}$ | | c. $x = 1.98$ |
| h, $(2 + x)e^x = 2 + 3x + \frac{x^2}{6} + \frac{5x^3}{12} + \frac{3x^4}{12}$ | | d. $x = 1.076$ |
| i, $(2x + 3)e^{3x} = 3 + 11x + \frac{39x^2}{2} + \frac{45x^3}{2} + \frac{63x^4}{4} + \frac{27x^5}{4}$ | | e. $x = -1.745$ |
| j, $(2 - e^x)(e^x + 1) = 2 + x - \frac{x^2}{2} + \frac{x^3}{6} - \frac{11x^4}{24}$ | | f. $x = -0.636$ |
| | | g. $x = 4.323$ |
- 5.
- | |
|-------------------|
| a. $32 = 1.78^6$ |
| b. $21 = 1.84^5$ |
| c. $73 = 1.846^7$ |
| d. $17 = 1.762^5$ |
| 3. $42 = 1.864^6$ |

6.

	a	b	c	d	e	f
3 terms	3.565	2.672	4.998	-1.024	0.5948	1.1098
5 terms	3.345	2.526	4.69	-1.109	0.565	1.0606
7 terms	3.255	2.456	4.557	-1.136	0.5555	1.0468
calculator	3.135	2.398	4.394	-1.151	0.5493	1.0397

LESSON FOUR:

1. a. 0.422 b. -0.113 c. 0.609 d. -0.206 e. -0.72

2. a.

											ROW										
											1	0									
											1	1	1								
											1	2	1	2							
											1	3	3	1	3						
											1	4	6	4	1	4					
											1	5	10	10	5	1	5				
											1	6	15	20	15	6	1	6			
											1	7	21	35	35	21	7	1	7		
											1	8	28	56	70	56	28	8	1	8	
											1	9	36	84	126	126	84	36	9	1	9

b. ${}^{10}C_4 = 210$, ${}^3C_2 = 3$, ${}^{11}C_5 = 462$, ${}^9C_7 = 36$, ${}^{12}C_3 = 220$, ${}^{12}C_{10} = 66$, ${}^5C_2 = 10$

3. a. 15 b. 48620 c. 7 d. 792

4. a. $x^4 + 4x^3y + 6x^2y^2 + 4xy^3 + y^4$
 b. $x^6 - 6x^5y - 15x^4y^2 - 20x^3y^3 - 15x^2y^4 - 6xy^5 - y^6$
 c. $d^9 + 9d^8e + 36d^7e^2 + 84d^6e^3 + 126d^5e^4 + 126d^4e^5 + 84d^3e^6 + 36d^2e^7 + 9de^8 + e^9$
 d. $d^3 - 3d^2e - 3de^2 - e^3$

5. a. $x^3 + 9x^2 + 27x + 27$
 b. $256 - 1024x - 1792x^2 - 1792x^3 - 1120x^4 - 448x^5 - 112x^6 - 16x^7 - x^8$
 c. $81x^4 + 216x^3 + 216x^2 + 96x + 16$
 d. $16807 - 24010x - 13720x^2 - 3920x^3 - 560x^4 - 32x^5$
 e. $x^9 + 20x^6 + 150x^4 + 500x^2 + 625$
6. a. $2160x^4$ b. $-1250x^2$ c. $-171532242x^4$ d. $193536x^{10}$

7. a. $x^2 - 330x^{11} - 5500x^{10}$
 b. $59049x^{10} - 4428675x^9 - 19683000x^8$
 c. $256 + 3072x^2 + 16128x^4$