

HW Answers Unit 4 Lesson 1 p. 625

#1 – 21, 29- 33, 51 – 57, 69 - 89 ODD

Solutions to Odd-Numbered Exercises

1. $a_n = 2n + 5$

$$a_1 = 2(1) + 5 = 7$$

$$a_2 = 2(2) + 5 = 9$$

$$a_3 = 2(3) + 5 = 11$$

$$a_4 = 2(4) + 5 = 13$$

$$a_5 = 2(5) + 5 = 15$$

3. $a_n = 2^n$

$$a_1 = 2^1 = 2$$

$$a_2 = 2^2 = 4$$

$$a_3 = 2^3 = 8$$

$$a_4 = 2^4 = 16$$

$$a_5 = 2^5 = 32$$

5. $a_n = (-2)^n$

$$a_1 = (-2)^1 = -2$$

$$a_2 = (-2)^2 = 4$$

$$a_3 = (-2)^3 = -8$$

$$a_4 = (-2)^4 = 16$$

$$a_5 = (-2)^5 = -32$$

7. $a_n = \frac{n+1}{n}$

$$a_1 = \frac{1+1}{1} = 2$$

$$a_2 = \frac{3}{2}$$

$$a_3 = \frac{4}{3}$$

$$a_4 = \frac{5}{4}$$

$$a_5 = \frac{6}{5}$$

9. $a_n = \frac{6n}{3n^2 - 1}$

$$a_1 = \frac{6(1)}{3(1)^2 - 1} = 3$$

$$a_2 = \frac{6(2)}{3(2)^2 - 1} = \frac{12}{11}$$

$$a_3 = \frac{6(3)}{3(3)^2 - 1} = \frac{9}{13}$$

$$a_4 = \frac{6(4)}{3(4)^2 - 1} = \frac{24}{47}$$

$$a_5 = \frac{6(5)}{3(5)^2 - 1} = \frac{15}{37}$$

11. $a_n = \frac{1 + (-1)^n}{n}$

$$a_1 = 0$$

$$a_2 = \frac{2}{2} = 1$$

$$a_3 = 0$$

$$a_4 = \frac{2}{4} = \frac{1}{2}$$

$$a_5 = 0$$

13. $a_n = 3 - \frac{1}{2^n}$

$$a_1 = 3 - \frac{1}{2} = \frac{5}{2}$$

$$a_2 = 3 - \frac{1}{4} = \frac{11}{4}$$

$$a_3 = 3 - \frac{1}{8} = \frac{23}{8}$$

$$a_4 = 3 - \frac{1}{16} = \frac{47}{16}$$

$$a_5 = 3 - \frac{1}{32} = \frac{95}{32}$$

15. $a_n = \frac{1}{n^{3/2}}$

$$a_1 = \frac{1}{1} = 1$$

$$a_2 = \frac{1}{2^{3/2}}$$

$$a_3 = \frac{1}{3^{3/2}}$$

$$a_4 = \frac{1}{4^{3/2}} = \frac{1}{8}$$

$$a_5 = \frac{1}{5^{3/2}}$$

17. $a_n = \frac{3^n}{n!}$

$$a_1 = \frac{3^1}{1!} = \frac{3}{1} = 3$$

$$a_2 = \frac{3^2}{2!} = \frac{9}{2}$$

$$a_3 = \frac{27}{6} = \frac{9}{2}$$

$$a_4 = \frac{81}{24} = \frac{27}{8}$$

$$a_5 = \frac{243}{120} = \frac{81}{40}$$

$$19. a_n = \frac{(-1)^n}{n^2}$$

$$a_1 = \frac{-1}{1} = -1$$

$$a_2 = \frac{1}{4}$$

$$a_3 = \frac{-1}{9}$$

$$a_4 = \frac{1}{16}$$

$$a_5 = \frac{-1}{25}$$

$$21. a_n = (2n - 1)(2n + 1)$$

$$a_1 = (1)(3) = 3$$

$$a_2 = (3)(5) = 15$$

$$a_3 = (5)(7) = 35$$

$$a_4 = (7)(9) = 63$$

$$a_5 = (9)(11) = 99$$

$$29. a_1 = 28 \text{ and } a_{k+1} = a_k - 4$$

$$a_1 = 28$$

$$a_2 = a_1 - 4 = 28 - 4 = 24$$

$$a_3 = a_2 - 4 = 24 - 4 = 20$$

$$a_4 = a_3 - 4 = 20 - 4 = 16$$

$$a_5 = a_4 - 4 = 16 - 4 = 12$$

$$31. a_1 = 3 \text{ and } a_{k+1} = 2(a_k - 1)$$

$$a_1 = 3$$

$$a_2 = 2(a_1 - 1) = 2(3 - 1) = 4$$

$$a_3 = 2(a_2 - 1) = 2(4 - 1) = 6$$

$$a_4 = 2(a_3 - 1) = 2(6 - 1) = 10$$

$$a_5 = 2(a_4 - 1) = 2(10 - 1) = 18$$

$$33. a_1 = 2, a_2 = 6, a_{k+2} = a_{k+1} + 2a_k$$

$$a_3 = a_2 + 2a_1 = 6 + 2(2) = 10$$

$$a_4 = a_3 + 2a_2 = 10 + 2(6) = 22$$

$$a_5 = a_4 + 2a_3 = 22 + 2(10) = 42$$

$$51. 1, 4, 7, 10, 13, \dots$$

$$a_n = 1 + (n - 1)3 = 3n - 2$$

$$53. 0, 3, 8, 15, 24, \dots$$

$$a_n = n^2 - 1$$

$$55. \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \frac{5}{6}, \frac{6}{7}, \dots$$

$$a_n = \frac{n + 1}{n + 2}$$

$$57. \frac{1}{2}, \frac{-1}{4}, \frac{1}{8}, \frac{-1}{16}, \dots$$

$$a_n = \frac{(-1)^{n+1}}{2^n}$$

$$69. \frac{3!}{6!} = \frac{3!}{6 \cdot 5 \cdot 4 \cdot 3!} = \frac{1}{6 \cdot 5 \cdot 4} = \frac{1}{120}$$

$$71. \frac{10!}{8!} = \frac{10 \cdot 9 \cdot 8!}{8!} = 90$$

$$73. \frac{12!}{4!8!} = \frac{12 \cdot 11 \cdot 10 \cdot 9 \cdot 8!}{4!8!} = \frac{12 \cdot 11 \cdot 10 \cdot 9}{4 \cdot 3 \cdot 2} = 495$$

$$75. \frac{(n+1)!}{n!} = \frac{(n+1)n!}{n!} = n+1$$

$$77. \frac{(2n-1)!}{(2n+1)!} = \frac{(2n-1)!}{(2n+1)(2n)(2n-1)!} \\ = \frac{1}{2n(2n+1)}$$

$$79. \sum_{i=1}^5 (2i+1) = (2+1) + (4+1) + (6+1) + (8+1) + (10+1) = 35$$

$$81. \sum_{k=1}^4 10 = 10 + 10 + 10 + 10 = 40$$

$$83. \sum_{i=0}^4 i^2 = 0^2 + 1^2 + 2^2 + 3^2 + 4^2 = 30$$

$$85. \sum_{k=0}^3 \frac{1}{k^2+1} = \frac{1}{1} + \frac{1}{1+1} + \frac{1}{1+4} + \frac{1}{9+1} = \frac{9}{5}$$

$$87. \sum_{i=1}^4 [(i-1)^2 + (i+1)^3] = [(0)^2 + (2)^3] + [(1)^2 + (3)^3] + [(2)^2 + (4)^3] + [(3)^2 + (5)^3] = 238$$

$$89. \sum_{i=1}^4 2^i = 2^1 + 2^2 + 2^3 + 2^4 = 30$$