Chapter 13

Where's the Money?: SERIES

WM-1. a) One less than the total in the team.
b) The product will equal double the total number of handshakes. Since two people are involved with a handshake, we counted each handshake twice.

WM-2. a) 1 b) 15 c) 66 d) 4950

WM-3. $\boxed{\frac{N(N \pm 1)}{2}}$ WM-4. a) 15 b) 66

WM-5. The two problems are the same, but the situations are different.

WM-6. a) 30 c) i) 50 ii) $16 \cdot 7 = 112$ iii) $2(b - a + 1)$

WM-7. a) each pair = 101 b) 50 pairs c) 5050

WM-8. a) 50 b) It is twice as large as A. c) 1000 by 999
d) 499,500 e) n = number of terms, a_1= first term of the sequence, and a_n = nth term of the sequence.

WM-9. a) 6 b)

Term Value	Expanded Sum		Factored Sum
$a_1 = 4$	$4 + 0$	=	$4 + 6(1 - 1)$
$a_2 = 10$	$4 + 6$	=	$4 + 6(2 - 1)$
$a_3 = 16$	$4 + 6 + 6$	=	$4 + 6(3 - 1)$
$a_4 = 22$	$4 + 6 + 6 + 6$	=	$4 + 6(4 - 1)$
$a_n = 106$	$4 + 6 + 6 + \ldots + 6$	=	$4 + 6(n - 1)$
In general, a_n =	$a_1 + d + d + \ldots + d$	=	$a_1 + d(n - 1)$

c) 18 d) 990

WM-10. a) 1395 b) 2490 c) 2460 d) 6877

WM-11. a) 4025 b) 4212 c) $20a + 190b$ d) $\boxed{\frac{n[2a+d(n \pm 1)]}{2}}$

WM-12. In each case, the pair sum is not constant.

WM-13. b) \$3020, \$3040, \$3060 c) \$3240 d) \$37,560 e) \$37,000

WM-14. a) \$195,000 b) \$4200 c) \$216,600

WM-15. Offer A is still better, with a five year total of \$126,600 vs. \$105,000.

WM-16. 5A + 36,600 vs. 5A + 15,000

WM-17. b) n^2 c) The sum will be a perfect square.

WM-18. a) 1 + 2 + 3 + 4 b) 1 + 2 + 3 + . . . + n c) $\boxed{\frac{n(n+1)}{2}}$ d) 38th

WM-19. a) 1 + 3 + 5, 1 + 3 + 5 + 7 c) 2n – 1

WM-20. a) 1 + 4 + 7, 1 + 4 + 7 + 10 b) 3n – 2 c) $\boxed{\frac{n(3n\ \ 1)}{2}}$

WM-21. b) 9 c) 4n – 3 d) $\boxed{\frac{n(4n\ \ 2)}{2} \text{ or } n(2n\ \ 1)}$

WM-22. $\frac{n((k \pm 2)(n \pm 1)+2)}{2}$

WM-23. b) geometric c) 2^n d) $2^{(n+1)} - 1$

WM-24. a) 83 b) 900 WM-25. 4075

WM-26. a) 1093 c) 3 times 729; It is the multiplier.
d) 2186; twice as much e) S = 1093

WM-27. a) 19,531 b) 9,331 c) 1,054,685 d) 11,111.111

WM-28. Answers will vary.

WM-29. a) 546.5 b) $\frac{x(y^{31}\ \ 1)}{y\ \ 1}$ WM-30. $\boxed{S = \frac{a[r^{(n+1)}\ \ 1]}{r\ \ 1}}$

WM-31. a) \$209,310 b) \$207,027

WM-32. Plan D is better for a ten-year plan. The total for Plan C would be \$491,638 while Plan D pays \$497,392.

WM-33. a) Plan C = 5.814 A, Plan D = 5.75A
b) $\frac{(1+p)^5\ \ 1}{p}$ = 5.184; p 7.548%

WM-34. a) 6141 b) 23,600 c) 1770.66 d) 105

WM-35. The method still works when $r < 0$; the sum is -1640.

WM-36. a) 5 + 35 + 65 + 95 b) 5 + 15 + 45 + 135 WM-37. 299

WM-38. a) 440 b) The two methods would be to consider two arithmetic series or to create a new arithmetic series by pairing the terms.

WM-39. 1233.56 WM-40. a) 1.01 b) 1.005 c) 1.00667

WM-42. $\frac{100(1.005^{12} \quad 1)}{1.005 \quad 1} = 1233.56$ WM-43. \$6,977.00 WM-44. $T = \frac{A(m^{n} \quad 1)}{m \quad 1}$

WM-45. a) \$16,387.93 b) \$46,204.09 c) \$100,451.50
d) \$199,149.07

WM-46. They will all double. WM-47. Tatianna will have \$262,481.34.

WM-48. About \$381 a month WM-49. 437 months or 36 years and 5 months.

WM-50. About 9.23% WM-51. a) 90 b) 380 c) $n(n - 1)$

WM-52. It will take 28 days. He will run 16.5 miles on the 28th day.

WM-53. a) 1.5% b)

Month	Current Balance	Interest Charged	New Balance After Payment
1	\$1500	\$22.5	\$1422.50
2	\$1422.50	\$21.34	\$1343.84
3	\$1343.84	\$20.16	\$1264.00
4	\$1264.00	\$18.96	\$1182.96

d) 17 times; \$11.89 e) total = \$1711.89; interest = \$211.89

WM-54. a) Loan Amount, Interest Rate and the Monthly Payment.
b) If the payment is less than or equal to the monthly interest.
e) N and B f) P*N + B

WM-55. a) 154 payments of \$25 with a final payment of \$16.15; total of \$3,866.15
b) \$2,366.15

WM-56. $394; the last payment would need to be about $369.70. The total would be around $18,888.

WM-58. $\frac{m^6 - 1}{m - 1}$ WM-61. $P = \frac{Lm^6(m - 1)}{m^6 - 1}$ WM-62. $P = \frac{Lm^n(m - 1)}{m^n - 1}$

WM-63. $393.62 WM-64. 18,890.91 ; interest of $2890.91

WM-65. 15-year: $1,390.52 each month. Total = $250,293.60
Interest = $100,293.60; 30-year: $1,048.82 each month.
Total = $377,575.20 Interest = $227,575.20

WM-66. a) $3000
b) If they use the 15-year loan, they should apply the money as a down payment (monthly payment would be $1362.71 vs. $1369.29).
If they use the 30-year loan, they should pay the points (with points the monthly payment will be $1023.26 vs. $1027.85).

WM-67. $L = \frac{P(m^n - 1)}{m^n(m - 1)}$

WM-68. a) $14, 656.76 b) $12, 194.57 c) $4,933.26

