

Series and Progressions

- Sum of the first 5 natural numbers?
- Sum of the first 7 natural numbers?
- Sum of the first 12 natural numbers?
- Sum of the first 100 natural numbers?
- Sum of the first n natural numbers?
- Arithmetic progression.
Term 1 = 10. Difference = 7.
Term 7?
- Arithmetic progression.
Term 1 = 2. Difference = 7.
Term 3?
- Arithmetic progression.
Term 1 = 5. Difference = 4.
Term 8?
- Arithmetic progression.
Term 1 = 8. Difference = 5.
Term 4?
- Formula for the n th term of an arithmetic progression, given the first term, the number of terms, and the difference?
- Sum of the first 20 even numbers?
- Sum of the first 50 even numbers?
- Sum of the first 10 multiples of 3?
- Sum of the first 7 multiples of 5?
- Sum of squares of the numbers from 1 to 7?
- Sum of squares from $n=1$ to 6?
- Sum of squares from $n=1$ to 24?
- Sum of squares from $n=1$ to 12?
- Sum of squares from $n=1$ to 10?
- Sum of the first 5 natural numbers?
- Arithmetic progression.
Term 1 = 3. Difference = 4.
Term 100?
- Sum of the first 50 natural numbers?
- Sum of the first 35 even numbers?
- Arithmetic progression.
Term 1 = 10. Difference = 13.
Term 200?
- Sum of squares from $n=1$ to 100?
- Sum of the first 10 multiples of 3?
- Arithmetic progression.
Term 1 = 2. Difference = 5.
Term 10?
- Sum of the first 1000 natural numbers?
- Sum of squares from $n=1$ to 9?
- Geometric Progression
First term = 5000. Common ratio = 1.07
30 term?
- Geometric Progression
First term = 1000. Common ratio = 1.03
20th term?
- Geometric Progression
First term = t_1 Common ratio = r
 n^{th} term?
- Arithmetic progression.
Term 1 = 5. Difference = 4.
Term 8?
- Arithmetic progression.
Term 1 = 8. Difference = 5.
Term 4?
- Geometric Progression
First term = 1. Common ratio = 1.0525
15th term?
- Geometric progression.
First term = 20, common ratio 1.01
Sum of first 40 terms?
- Sum of first n terms of geometric progression.
 $S_n = t_1 \frac{r^n - 1}{r - 1}$ or $t_1 \frac{1 - r^n}{1 - r}$
- Sum of the first 5 natural numbers?
- Sum of the first 12 natural numbers?
- Geometric progression
First term = 100, common ratio 1.06
Sum of first 60 terms?
- Sum of first n terms of geometric progression.
 $S_n = t_1 \frac{r^n - 1}{r - 1}$ or $t_1 \frac{1 - r^n}{1 - r}$

42. Geometric Progression
First term = 10. Common ratio = 1.001
100 term?

43. Geometric progression
First term = 10, common ratio 1.001
Sum of first 100 terms?

44. Sum of first n terms of geometric progression.
 $S_n = t_1 \frac{r^n - 1}{r - 1}$ or $t_1 \frac{1 - r^n}{1 - r}$

45. Sum of the first 7 natural numbers?

46. Sum of first n terms of geometric progression

$$S_n = t_1 \frac{r^n - 1}{r - 1} \text{ or } t_1 \frac{1 - r^n}{1 - r}$$

47. Geometric Progression
First term = 1. Common ratio = 1.0525
15th term?

48. Geometric Progression
First term t_1 , common ratio r
Sum of first n terms?

49. Geometric Progression
First term = 1. Common ratio = 1.0025
100 term?

Solutions:

1: 15

$$\frac{5}{2}(1+5) = \frac{n}{2}(t_1+t_n)$$

2: 28

$$\frac{7}{2}(1+7) = \frac{n}{2}(t_1+t_n)$$

3: 78

$$\frac{12}{2}(1+12) = \frac{n}{2}(t_1+t_n)$$

4: 5050

$$\frac{100}{2}(1+100) = \frac{n}{2}(t_1+t_n)$$

5: $\frac{n}{2}(t_1+t_n)$

6: $52=10+6(7)$

$$t_n = t_1 + (n-1)d$$

7: $16=2+2(7)$

$$t_n = t_1 + (n-1)d$$

8: $33=5+7(4)$

$$t_n = t_1 + (n-1)d$$

9: $23=8+3(5)$

$$t_n = t_1 + (n-1)d$$

10: $t_n = t_1 + (n-1)d$

11: $420 = \frac{20}{2}(2+2+(19)2)$

$$S_n = \frac{n}{2}(t_1+t_n) = \frac{n}{2}(t_1+t_1+(n-1)d)$$

12: $2550 = \frac{50}{2}(2+2+(49)2)$

$$S_n = \frac{n}{2}(t_1+t_n) = \frac{n}{2}(t_1+t_1+(n-1)d)$$

13: $165 = \frac{10}{2}(3+3+(9)3)$

$$S_n = \frac{n}{2}(t_1+t_n) = \frac{n}{2}(t_1+t_1+(n-1)d)$$

14: $140 = \frac{7}{2}(5+5+(6)5)$

$$S_n = \frac{n}{2}(t_1+t_n) = \frac{n}{2}(t_1+t_1+(n-1)d)$$

15: $140 = \frac{(7)(8)(15)}{6} = \frac{(n)(n+1)(2n+1)}{6}$

16: $91 = \frac{(6)(7)(13)}{6} = \frac{(n)(n+1)(2n+1)}{6}$

17: $4900 = \frac{(24)(25)(49)}{6} = \frac{(n)(n+1)(2n+1)}{6}$

18: $650 = \frac{(12)(13)(25)}{6} = \frac{(n)(n+1)(2n+1)}{6}$

19: $385 = \frac{(10)(11)(21)}{6} = \frac{(n)(n+1)(2n+1)}{6}$

20: $15 = \frac{5}{2}(1+5) = \frac{n}{2}(t_1+t_n)$

21: $399 = 3 + 99(4)$

$$t_n = t_1 + (n-1)d$$

22: $1275 = \frac{50}{2}(1+50) = \frac{n}{2}(t_1+t_n)$

23: $1260 = \frac{35}{2}(2+2+(34)2)$

$$S_n = \frac{n}{2}(t_1+t_n) = \frac{n}{2}(t_1+t_1+(n-1)d)$$

24: $2597 = 10 + 199(13)$

$$t_n = t_1 + (n-1)d$$

25: $338350 = \frac{(100)(101)(201)}{6} = \frac{(n)(n+1)(2n+1)}{6}$

26: $165 = \frac{10}{2}(3+3+(9)3)$

$$S_n = \frac{n}{2}(t_1+t_n) = \frac{n}{2}(t_1+t_1+(n-1)d)$$

27: $47 = 2 + 9(5)$

$$t_n = t_1 + (n-1)d$$

28: $500500 = \frac{1000}{2}(1001) = \frac{n}{2}(t_1+t_n)$

29: $285 = \frac{(9)(10)(19)}{6} = \frac{(n)(n+1)(2n+1)}{6}$

30: $t_n = t_1 r^{n-1} = 5000(1.07^{29}) = 35571$

31: $t_n = t_1 r^{n-1} = 1000(1.03^{19}) = 1753.51$

32: $t_n = t_1 r^{n-1}$

33: $33 = 5 + 7(4)$

$$t_n = t_1 + (n-1)d$$

34: $23 = 8 + 3(5)$

$$t_n = t_1 + (n-1)d$$

35: $t_n = t_1 r^{n-1} = 1(1.0525^{14}) = 2.046$

36: 977.73

$$S_{40} = 20 * \frac{1.01^{40}-1}{1.01-1}$$

$$S_n = t_1 \frac{r^n-1}{r-1}$$

37: $1 - r^n$

38: $15 = \frac{5}{2}(1+5) = \frac{n}{2}(t_1+t_n)$

39: $78 = \frac{12}{2}(1 + 12) = \frac{n}{2}(t_1 + t_n)$

40: 53312.82
 $S_{60} = 100 * \frac{1.06^{60} - 1}{1.06 - 1}$
 $S_n = t_1 \frac{r^n - 1}{r - 1}$

41: t_1

42: $t_n = t_1 r^{n-1} = 10(1.001^{100}) = 11.05$

43: 10511.57
 $S_{100} = 100 * \frac{1.001^{100} - 1}{1.001 - 1}$
 $S_n = t_1 \frac{r^n - 1}{r - 1}$

44: $1 - r$

45: $28 = \frac{7}{2}(1 + 7) = \frac{n}{2}(t_1 + t_n)$

46: $r - 1$

47: $t_n = t_1 r^{n-1} = 1(1.0525^{14}) = 2.046$

48: $t_1 \frac{r^n - 1}{r - 1}$ or $t_1 \frac{1 - r^n}{1 - r}$

49: $t_n = t_1 r^{n-1} = 1(1.0025^{100}) = 1.28$