

## Introduction to Series

**Rewrite each series as a sum.**

1)  $\sum_{m=1}^5 (4m^2 + 4)$

2)  $\sum_{k=1}^5 (30 - k^2)$

3)  $\sum_{n=1}^5 n$

4)  $\sum_{m=1}^6 (50 - m)$

5)  $\sum_{a=1}^6 (3a^2 - 2)$

6)  $\sum_{m=1}^5 (100 - m)$

7)  $\sum_{m=1}^4 (5m^2 + 4)$

8)  $\sum_{a=4}^9 (20 - a^2)$

9)  $\sum_{m=1}^6 \frac{m^2 + 1}{m}$

10)  $\sum_{n=4}^9 (100 - n)$

11)  $\sum_{m=0}^5 m(m + 2)$

12)  $\sum_{k=0}^4 (100 - k)$

**Evaluate each series.**

13)  $\sum_{n=1}^7 (40 - n^2)$

14)  $\sum_{k=1}^5 3k$

15)  $\sum_{a=1}^7 (500 - a)$

16)  $\sum_{k=1}^7 (30 - k)$

17)  $\sum_{a=0}^5 a$

18)  $\sum_{k=0}^4 2k$

19)  $\sum_{k=1}^6 k^2$

20)  $\sum_{m=1}^5 3m$

**Rewrite each series using sigma notation.**

21)  $1 + 2 + 3 + 4$

22)  $3 + 9 + 27 + 81 + 243$

23)  $3 + 9 + 27 + 81$

24)  $1 + 4 + 9 + 16 + 25$

25)  $4 + 8 + 12 + 16$

26)  $\frac{1}{2} + \frac{2}{3} + \frac{3}{4} + \frac{4}{5} + \frac{5}{6}$

27)  $1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \frac{1}{6}$

28)  $\frac{1}{2} + \frac{2}{3} + \frac{3}{4} + \frac{4}{5} + \frac{5}{6} + \frac{6}{7}$

**Critical thinking questions:**

29) Are these equal? Why or why not?

$$\sum_{x=1}^{50} \frac{1}{x} \quad \text{and} \quad \sum_{x=21}^{70} \frac{1}{x-20}$$

30) Rewrite the following so that it starts at  $x = 0$

$$\sum_{x=7}^{10} x(x+1)$$

## Introduction to Series

**Rewrite each series as a sum.**

1)  $\sum_{m=1}^5 (4m^2 + 4)$

$8 + 20 + 40 + 68 + 104$

2)  $\sum_{k=1}^5 (30 - k^2)$

$29 + 26 + 21 + 14 + 5$

3)  $\sum_{n=1}^5 n$

$1 + 2 + 3 + 4 + 5$

4)  $\sum_{m=1}^6 (50 - m)$

$49 + 48 + 47 + 46 + 45 + 44$

5)  $\sum_{a=1}^6 (3a^2 - 2)$

$1 + 10 + 25 + 46 + 73 + 106$

6)  $\sum_{m=1}^5 (100 - m)$

$99 + 98 + 97 + 96 + 95$

7)  $\sum_{m=1}^4 (5m^2 + 4)$

$9 + 24 + 49 + 84$

8)  $\sum_{a=4}^9 (20 - a^2)$

$4 + (-5) + (-16) + (-29) + (-44) + (-61)$

9)  $\sum_{m=1}^6 \frac{m^2 + 1}{m}$

$2 + \frac{5}{2} + \frac{10}{3} + \frac{17}{4} + \frac{26}{5} + \frac{37}{6}$

10)  $\sum_{n=4}^9 (100 - n)$

$96 + 95 + 94 + 93 + 92 + 91$

11)  $\sum_{m=0}^5 m(m + 2)$

$0 + 3 + 8 + 15 + 24 + 35$

12)  $\sum_{k=0}^4 (100 - k)$

$100 + 99 + 98 + 97 + 96$

**Evaluate each series.**

13)  $\sum_{n=1}^7 (40 - n^2)$

$140$

14)  $\sum_{k=1}^5 3k$

$45$

15)  $\sum_{a=1}^7 (500 - a)$

3472

16)  $\sum_{k=1}^7 (30 - k)$

182

17)  $\sum_{a=0}^5 a$

15

18)  $\sum_{k=0}^4 2k$

20

19)  $\sum_{k=1}^6 k^2$

91

20)  $\sum_{m=1}^5 3m$

45

**Rewrite each series using sigma notation.**

21)  $1 + 2 + 3 + 4$

$$\sum_{n=1}^4 n$$

22)  $3 + 9 + 27 + 81 + 243$

$$\sum_{m=1}^5 3^m$$

23)  $3 + 9 + 27 + 81$

$$\sum_{n=1}^4 3^n$$

24)  $1 + 4 + 9 + 16 + 25$

$$\sum_{k=1}^5 k^2$$

25)  $4 + 8 + 12 + 16$

$$\sum_{k=1}^4 4k$$

26)  $\frac{1}{2} + \frac{2}{3} + \frac{3}{4} + \frac{4}{5} + \frac{5}{6}$

$$\sum_{a=1}^5 \frac{a}{a+1}$$

27)  $1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \frac{1}{6}$

$$\sum_{a=1}^6 \frac{1}{a}$$

28)  $\frac{1}{2} + \frac{2}{3} + \frac{3}{4} + \frac{4}{5} + \frac{5}{6} + \frac{6}{7}$

$$\sum_{a=1}^6 \frac{a}{a+1}$$

**Critical thinking questions:**

29) Are these equal? Why or why not?

$$\sum_{x=1}^{50} \frac{1}{x} \quad \text{and} \quad \sum_{x=21}^{70} \frac{1}{x-20}$$

Yes. Both are  $1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \dots$  to 50 terms30) Rewrite the following so that it starts at  $x = 0$ 

$$\sum_{x=7}^{10} x(x+1)$$

$$\sum_{x=0}^3 (x+7)(x+8)$$

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