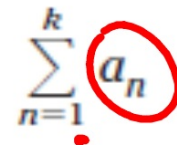


Precalc 12.5

Use sigma notation

sigma  $\Sigma$

$$\sum_{n=1}^k a_n$$


index of summation

typical element

factorial

**Lesson 12-5** (Pages 794-800)

Write each expression in expanded form and then find the sum.

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

2.  $\sum_{a=3}^6 4a$

3.  $\sum_{k=3}^7 (k^2 - 2)$

1	2	3	4	5	
$3 \cdot 1 - 1$	$3 \cdot 2 - 1$	$3 \cdot 3 - 1$	$3 \cdot 4 - 1$	$3 \cdot 5 - 1$	
2	5	8	11	14	= 40

$$4. \sum_{j=4}^8 \frac{j}{j+3}$$

$$5. \sum_{p=0}^4 3^p$$

$$6. \sum_{n=1}^{\infty} 2 \cdot \left(\frac{3}{4}\right)^n$$

n=1	2	3	4	
$2 \cdot \frac{2}{4}$	$2 \cdot \frac{9}{6}$	$2 \cdot \frac{27}{64}$		$\sum = \frac{1}{1-\frac{3}{4}}$
$\frac{2 \cdot 2}{4} = 1$	$\frac{2 \cdot 9}{6} = 3$		$\frac{2 \cdot 27}{64} = \frac{27}{32}$	
				$= \frac{1}{\frac{1}{4}} = 4$

Write each expression in expanded form and then find the sum.

$$4. \sum_{n=1}^6 (n - 3)$$

$$5. \sum_{k=2}^5 4k$$

$$6. \sum_{a=0}^4 \frac{1}{2^a}$$

$$7. \sum_{p=0}^{\infty} 5\left(\frac{3}{4}\right)^p$$

$p=0$	1	2	3
$5 \cdot \frac{3^0}{4^0}$	$5 \cdot \frac{3^1}{4^1}$	$5 \cdot \frac{3^2}{4^2}$	...
5			

$$\frac{5}{1 - \frac{3}{4}} = \frac{5}{\frac{1}{4}}$$

$$= 20$$

$$3n$$

Express each series using sigma notation.

7.  $5 + 8 + 11 + 14$

1	2	3	4
$3 \cdot 1 + 2$	$3 \cdot 2 + 2$	$3 \cdot 3 + 2$	

$$\sum_{n=1}^4 3n + 2$$

$$-4n$$

8.  $-8 - 12 - 16 - \dots - 40$

$$-40 = -4(n+1)$$

1	2	3	4	...	n
$-4 \cdot 2$	$-4 \cdot 3$	$-4 \cdot 4$			$-4(n+1)$
$-4(n+1)$					

$$\sum_{n=1}^9 -4(n+1)$$

$$-4n - 4$$

typo...

9.  $\frac{1}{4} + 1 + 4 + \dots + 65536$

$$\sum_{n=1}^{\infty} 2^{2n}$$

10.  $1 + 2 + 6 + 24 + \dots$

1	2	3 ...	8
$\frac{1}{4} \cdot 4^0$	$\frac{1}{4} \cdot 4$	$\frac{1}{4} \cdot 4 \cdot 4$	$\frac{1}{4} \cdot 65536$

$$\frac{1}{4} n \cdot 4^{n-1} = 65536$$

$$\sum_{n=1}^{\infty} \left(\frac{1}{4}\right) 4^{n-1}$$

TB 4 n

-1	0	1		
$\frac{1}{4}$	1	4	...	65,536
$2^{-2}$	$2^0$	$2^2$		$2^{16}$

$$2^{2n}$$

$$\sum_{n=1}^{\infty} 2^{2n}$$

$$2^{16} = 2^{2n}$$

$$16 = 2n$$

