Name: Answer key Date: 11/16/25

Session 12 (sigma notation)

Warm-up!

a) $\sum_{n=2}^{4} (n+1)^2 = ?$

50

$\sum_{k=1}^{n}$ ← ending value

"index" a counter

9 ← starting value

Show Calculator trick

Math, 0 button

b) $\sum_{n=1}^{100} (4n+5) = ?$

20700

expand letter c!

c) $\sum_{n=1}^{7} 4 = ?$

$\sum_{n=1}^{7} 4 = \underset{1}{4} + \underset{2}{4} + \underset{3}{4} + \underset{4}{4} + \underset{5}{4} + \underset{6}{4} + \underset{7}{4} = 28$

1. Write as a summation

$1^2 + 2^2 + 3^2 + 4^2 + 5^2 + 6^2 + 7^2 + 8^2 = ?$

n ↑ goes to 8

has to be n term
being n^2 every time
so

$\sum_{n=1}^{8} n^2 = \boxed{204}$

↑ starts @ 1

very important
Calc note here!!

arithmetic sequences

$a_n = a + (n-1)d$

2. Find a formula for the following arithmetic sequence

$3, 7, 11, 15, 19, 23, \ldots$

+4 +4 +4 +4 +4

$a = 3$ ← starting term

$\boxed{4n-1}$ $d = 4$ – what it changes by

or

$3 + (n-1)4$

$3 + 4n - 4$

↓

$\boxed{4n-1}$

$4n$

$4(1) = 4$
^ doesn't match 3

$4n - 1 \rightarrow 4(1) - 1 \rightarrow 3$ ✓

$4(2) - 1 \rightarrow 8 - 1 = 7$ ✓

partial sums of arithmetic sequences

$S_n = \frac{n}{2}[2a + (n-1)d]$

$S_n = n\left(\frac{a + a_n}{2}\right)$

3 Find the $\overbrace{150^{th}}^{n}$ partial sum of the arithmetic sequence

I'm dumb and forgot the sequence!

5, 16, 27, 38, 49, ...

11 11 11 11

$d=11$

$a=5$

$a_n=a+(n-1)d$

$a_n=5+(n-1)11$

$a_n=5+11n-11$

$a_n=11n-6$

Ways to find formula

formula I used when I took class

$S_n=\frac{n}{2}(a_1+a_n)$

$\frac{150}{2}(5+1646)$

$75(1651)$

123675

$11(150)-6$

$S_n=\frac{150}{2}(2a+(n-1)d)$

$S_n=\frac{150}{2}(2(5)+(150-1)11)$

$\frac{150}{2}(10+(150-1)11)$

$75(10+(149)11)$

1639

$75(1649)$

123675

both ways work