Arithmetic & Geometric Series (notes)

Date:

Consecutive Numbers

Recall the tale of our hero, Carl Friedrich Gauss at the age of eight… (Page 466)

$$S_{100} = 1 + 2 + 3 + \ldots + 98 + 99 + 100$$
$$S_{100} = 100 + 99 + 98 + \ldots + 3 + 2 + 1$$

Arithmetic Series

Use the same method to generalize and derive a formula for the sum of an arithmetic series: (Page 466)

$$S_n = a + (a+d) + (a+2d) + \ldots + [a+(n-2)d] + [a+(n-1)d]$$
$$S_n = [a+(n-1)d] + [a+(n-2)d] + \ldots + (a+d) + a$$

Geometric Series

Use a similar method to generalize and derive a formula for the sum of a geometric series: (Page 473)

$$S_n = a + ar + ar^2 + \ldots + ar^{n-1}$$
$$rS_n = ar + ar^2 + \ldots + ar^{n-1} + ar^n$$
