8-2 (Part 2) Arithmetic Means

The terms placed between 2 non-consecutive terms in an arithmetic sequence are called ARITHMETIC MEANS.

Ex. For the sequence: $5, \underbrace{10, 15}, 20$

10 and 15 are the arithmetic means between 5 and 20.

* It's helpful to think of the 2 given terms as the 1st and last terms in a smaller sequence.

Ex. Place 3 arithmetic means between -8 and 4.

1ST Find range: Last - first

* 2ND Divide range by (number of terms in sequence - 1)

3RD Calculate / count means

$4 - -8 = 12$

$12 \div (4) = 3$ This is d

$$\underbrace{\overset{1}{-8}, \overset{2}{t_2}, \overset{3}{t_3}, \overset{4}{t_4}, \overset{5}{4}}$$

$-8 + 3 = -5$

$-5 + 3 = -2$

$-2 + 3 = 1$

Ex. The 3RD + 8TH terms of an Ar. Seq. are 10 and −20.

a) use ar. means to find the 5TH term

$-20 - 10 = -30$

$\underbrace{3 \quad 4 \quad 5 \quad 6 \quad 7 \quad 8}_{\underline{\underline{6}} \text{ terms}}$

$-30 \div (6-1)$

$-30 \div 5 = -6 \Longleftarrow d$

4TH term: $10 + (-6) = 4$

5TH term: $4 + (-6) = -2$

b) State a and d.

a: first term:

3RD	10
2ND	16
1ST	22 = a

$d = -6$

c) State the general formula for this sequence, t_n

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

$t_n = 22 + (n-1)-6$

$t_n = 22 - 6n + 6$

$t_n = 28 - 6n$

$$d = \frac{t_p - t_q}{p - q}$$