<u>11-1 Arithmetic Sequences</u>

<u>Objective:</u> Use arithmetic sequences.
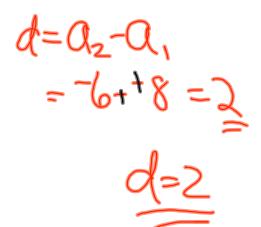Find arithmetic means.

<u>Sequence:</u> A <u>sequence</u> is a list of numbers in a particular order. Each number in a sequence is called a <u>term</u>.

$d = 2$ $3, 5, 7, 9, 11, \ldots$

<u>Arithmetic Sequence:</u> is a sequence in which each term after the first is found by adding a constant, called the <u>difference</u>, to the previous term.

"d"

$a_n = a_1 + (n-1)d$, where n is any positive integer.

a_n is the nth term. a_1 is the first term. d is positive or negative, depending on if increasing or decreasing.

EX 1. Find the next 4 terms: -8, -6, -4, ... $-2, 0, 2, 4$

$d = a_2 - a_1$
$= -6 + 8 = 2$

$d = 2$

EX 2. Rent-A-Crane

Months	Cost
1	75,000
2	90,000
3	105,000
4	120,000

$d = 90,000 - 75,000$
$= 15,000$

A. How much does it cost to rent the crane for 12 months?

$a_n = a_1 + (n-1)d$

$a_{12} = 75,000 + (12-1)(15,000)$

$= 75,000 + 11(15,000)$

$= \boxed{\$240,000}$

B. How much for 24 months?

$a_{24} = 75,000 + (24-1)(15,000)$

$= 75,000 + 23(15,000)$

$\boxed{\$420,000}$

EX 3. Write an equation for the nth term of the sequence –8, –6, –4, ...

$a_n = a_1 + (n-1)d$

$a_n = -8 + (n-1)(2)$

$a_n = -8 + 2n - 2$

$\boxed{a_n = 2n - 10}$

<u>Arithmetic Mean</u> : Sometimes you are given 2 terms of a sequence, but they are not successive terms. The terms between any 2 non-successive terms of an arithmetic sequence are called arithmetic means.

EX 4. Find the 3 arithmetic means between 21 and 45.

$$21, \boxed{\underline{27}, \underline{33}, \underline{39}}, 45$$

Need "d"...

$$\begin{array}{r} 45 \\ -21 \\ \hline 24 \end{array} \div 4 = \boxed{6 = d}$$

EX 5. Find 4 arithmetic means between 16 and 91.

$$16, \underline{31}, \underline{46}, \underline{61}, \underline{76}, 91$$

$$\begin{array}{r} 91 \\ -16 \\ \hline 75 \end{array} \div 5 = 15 = d$$