

TOPIC: ARITHMETIC SEQUENCES

Intro to Arithmetic Sequences

◆ If the terms of a sequence ____ or _____ by the same amount each time, we call it an **arithmetic sequence**.

► The **common difference** d is the difference between any two consecutive terms (ex. $a_{__} - a_{__}$ or $a_{__} - a_{__}$).

New

Arithmetic Sequences

$$\{2, 6, 10, 14, _, _, \dots\}$$

$$d = \frac{\quad}{a_2} - \frac{\quad}{a_1} =$$

EXAMPLE

Find the common difference of the arithmetic sequence and then use it to find the next two terms.

$$a_1 = 10; a_2 = 8$$

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PRACTICE

Find the common difference of the following sequence.

(A) $-9, -4, 1, 6, \dots$

(B) $\frac{7}{4}, \frac{5}{4}, \frac{3}{4}, \frac{1}{4}$

PRACTICE

Write the first 5 terms of the arithmetic sequence, given the first term and the common difference.

(A) $a_1 = -12; d = -5$

(B) $a_1 = \frac{3}{2}; d = \frac{1}{4}$

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General Term of an Arithmetic Sequence

◆ Recall: The terms of an arithmetic sequence have a common difference d between any two consecutive terms.

► The general (n th) term a_n of an arithmetic sequence is based on _____ (the _____ term) & _____.

New

General Term of Arithmetic Sequences

$$a_n = \underline{\hspace{1cm}} + (\underline{\hspace{1cm}}) \cdot \underline{\hspace{1cm}}$$

$$\{2, 6, 10, 14 \dots\}$$

$$a_n =$$

$$a_{20} =$$

EXAMPLE

Write a formula for the general or n^{th} term for each arithmetic sequence.

(A) $a_1 = 8; d = -6$

(B) $a_1 = 2; a_5 = 14$

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PRACTICE

Write a general formula for the arithmetic sequence given.

(A) $-5, -12, -19, -26, \dots$

(B) $\frac{1}{2}, \frac{5}{6}, \frac{7}{6}, \frac{3}{2}, \dots$

PRACTICE

Find the indicated term of each arithmetic sequence.

(A) $a_n = 7 + 3(n - 1)$

Find a_{12} .

(B) $a_n = \frac{5}{2} + \frac{3(n - 1)}{4}$

Find a_6 .

EXAMPLE

For the arithmetic sequence given below, find the indicated term.

$$a_5 = -12$$

$$a_{15} = 18$$

Find a_9 .

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EXAMPLE

How many terms are in the arithmetic sequence?

4, 9, 14, 19, ... 94

EXAMPLE

A school play sold 120 tickets on opening night. Each following night, ticket sales increased by 25 tickets. After 10 nights, how many tickets were sold on the final night?