

Day 28

11.2 Arithmetic Sequences

Have a common difference (d)

Arithmetic Sequences: if #'s are increasing you are Adding (d is positive)

$$1, 3, 5, 7, 9, \dots \quad d = 2$$

If the #'s are decreasing, you are Subtracting (d is negative)

$$8, 5, 2, -1, \dots \quad d = -3$$

Arithmetic Sequence Formulas

- Recursive: $a_n = a_{n-1} + d$
- Explicit: $a_n = a_1 + d(n-1)$

Arithmetic Mean: Average of 2 #'s

$$a_n = \left(\frac{a_{n-1} + a_{n+1}}{2} \right)$$

ex $25, \square, -10$

a_{n-1} a_{n+1}

$25, 7.5, -10$

$$\frac{25 + (-10)}{2} = \frac{15}{2} = 7.5$$

p. 608 Is the sequence arithmetic?
If so, find the common difference.

3. 1, 1, 2, 3, 5, 8, ... NO

5. -21, -18, -15, -12, ... yes, $d=3$
 \checkmark \checkmark \checkmark
 +3 +3 +3

Find the 32nd term. Explicit Formula

11. 34, 37, 40, 43, ... $a_n = a_1 + d(n-1)$

\checkmark \checkmark \checkmark
+3
 $a_{32} = 34 + 3(32-1)$

$a_{32} = 127$

⑬ 0.1, 0.5, 0.9, 1.3, ... $d=0.4$

1st Find the common difference

$a_{32} = 0.1 + 0.4(32-1)$
 \uparrow \uparrow \uparrow
 a_1 d n

$a_{32} = 12.5$

Find the missing term.

Find the arithmetic mean.

$$(25) \quad 101, \square, -115 \quad \frac{101 + (-115)}{2} = (-7)$$

$$(31) \quad a_{n-1} = 7, a_{n+1} = 1 \quad \frac{7 + 1}{2} = \frac{8}{2} = 4$$

$\swarrow \quad \searrow$
 $7, \square, 1$

$$(39) \quad a_{n-1} = r, a_{n+1} = s \quad \frac{r + s}{2}$$

$$(ex) \quad \frac{34}{4}, \square, \frac{55}{4} \quad \frac{\left(\frac{34}{4} + \frac{55}{4}\right)}{2} = \frac{\left(\frac{89}{4}\right)}{2}$$

$$= 11.125 \text{ or } \frac{89}{8}$$

Find the 17th term

$$(47) \quad \begin{array}{ccc} 16^{\text{th}} & 17^{\text{th}} & 18^{\text{th}} \\ 18 & (15) & \end{array} \quad d = -3$$

$$(49) \quad \begin{array}{ccc} & & 18 \\ & & \uparrow \\ & (22) & \end{array} \quad d = -4$$

\uparrow
 a_{18}

$$\textcircled{55} \quad -4, -8, -12, -16, -20, \dots$$

$$d = -4$$

$$\text{Recursive: } a_n = a_{n-1} + (-4)$$

$$\text{Explicit: } a_n = -4 + (-4)(n-1)$$

↑
 a_1