11.2 Arithmetic Sequences

std. 22.0

ex. 1 **Given the sequence 1, 5, 9, 13, . . .**

+4 +4 +4 common difference $d = 4$

Find a rule for the *n*th term.

$a_1 = 1$

$a_2 = 1 + 1 \cdot 4$

$a_3 = 1 + 2 \cdot 4$

$a_4 = 1 + 3 \cdot 4$

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

$a_{1000} = 1 + (999)4 = 3997$

***n*th term of an arithmetic sequence:** $a_n = a_1 + (n-1)d$

---

ex. 2 **Given the sequence 77, 62, 47, 32, . . .**

(a_1; -15)

a) find the 300th term

$d = -15$

$a_{300} = 77 + (300 - 1)(-15)$ (n)

$-4{,}408$

b) Write a rule for the *n*th term

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

$a_n = 77 + (n-1)(-15)$

$a_n = -15n + 92$

---

ex. 3 **There are 21 seats in the bottom row of an amphitheater. Each row contains 2 more seats than the row below it. How many seats in the 35th row?** = 89 seats

$a_{35} = 21 + (34)2$

21, 23, 25 . . . a_{35}

a_1 a_2 a_3

ex. 4

Write a rule for an arithmetic sequence if $a_8 = 50$ and $d = 0.25$.

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

$50 = a_1 + (8-1)(.25)$

$48.25 = a_1$

$a_n = 48.25 + (n-1)(.25)$

$a_n = 48 + .25n$

ex. 5

Write a rule for an arithmetic sequence if $a_5 = 10$ and $a_{30} = 110$.

$a_n = -6 + (n-1)4$

$a_n = -10 + 4n$

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

$10 = a_1 + (5-1)d$

$110 = a_1 + (30-1)d$

$110 = a_1 + 29d$

$-\ 10 = a_1 + 4d$

$100 = 25d$

$d = 4$

$10 = a_1 + 16$

$a_1 = -6$