11.2 Arithmetic Sequences

std. 22.0

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

common difference

$d = 4$

Find a rule for the *n*th term.

$a_1 = 1$

$a_2 = 1 + (1)4$

$a_3 = 1 + 2(4)$

$a_4 = 1 + 3(4)$

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

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

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

$d = -15$

a) find the 300th term

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

$a_{300} = 77 + (299)(-15) = -4408$

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

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

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

$a_n = 92 - 15n$

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

21, 23, 25, . . . $a_{35} = 21 + (34)2$

ex. 4

Write a rule for an arithmetic sequence if $a_8 = 50$ and $d = .25$.

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

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

$48.25 = a_1$

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

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

$a_n = 48 + .25n$

ex. 5

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

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

$a_n = -10 + 4n$

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

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

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

$10 = a_1 + 4d$

$110 = a_1 + 29d$

$100 = 25d$

$d = 4, \; a_1 = -6$