Review Exercise Set 25

Exercise 1: Write the first five terms of the arithmetic sequence that has the given first term and common difference.

$a_1 = 120$ and $d = -20$

Exercise 2: Find the indicated term of the arithmetic sequence that has the given first term and common difference.

$a_7 = ?$; $a_1 = 8$; $d = 9$

Exercise 3: Write the formula for the general term of the given arithmetic sequence. Find the 15th term.

-7, -4, -1, 2, ...

Exercise 4: Find the sum of the first fifteen terms of the given arithmetic sequence.

3, 1, -1, -3, ...

Exercise 5: Find the sum of the first 20 negative even integers.

Review Exercise Set 25 Answer Key

Exercise 1: Write the first five terms of the arithmetic sequence that has the given first term and common difference.

$a_1 = 120$ and $d = -20$

Substitute the a_1 and d to find the equation for the general term of the sequence

$a_n = a_1 + (n - 1)d$
$a_n = 120 + (n - 1)(-20)$
$a_n = 120 - 20n + 20$
$a_n = -20n + 140$

Substitute 1 through 5 for n

$a_1 = -20(1) + 140$
$a_1 = -20 + 140$
$a_1 = 120$

$a_2 = -20(2) + 140$
$a_2 = -40 + 140$
$a_2 = 100$

$a_3 = -20(3) + 140$
$a_3 = -60 + 140$
$a_3 = 80$

$a_4 = -20(4) + 140$
$a_4 = -80 + 140$
$a_4 = 60$

$a_5 = -20(5) + 140$
$a_5 = -100 + 140$
$a_5 = 40$

The first five terms of the arithmetic sequence are 120, 100, 80, 60, and 40.

Exercise 2: Find the indicated term of the arithmetic sequence that has the given first term and common difference.

$a_7 = ?$; $a_1 = 8$; $d = 9$

Find the equation for the general term

$a_n = a_1 + (n - 1)d$
$a_n = 8 + (n - 1)(9)$
$a_n = 8 + 9n - 9$
$a_n = 9n - 1$

Substitute 7 for n to find a_7

$a_n = 9n - 1$
$a_7 = 9(7) - 1$
$a_7 = 63 - 1$
$a_7 = 62$

Exercise 3: Write the formula for the general term of the given arithmetic sequence. Find the 15th term.

-7, -4, -1, 2, ...

Find the common difference

$a_2 - a_1 = -4 - (-7) = -4 + 7 = 3$
$a_3 - a_2 = -1 - (-4) = -1 + 4 = 3$
$a_4 - a_3 = 2 - (-1) = 2 + 1 = 3$

$d = 3$

Find the equation of the general term

$a_n = a_1 + (n - 1)d$
$a_n = -7 + (n - 1)(3)$
$a_n = -7 + 3n - 3$
$a_n = 3n - 10$

Find the 15th term by substituting 15 for n

$a_n = 3n - 10$
$a_{15} = 3(15) - 10$
$a_{15} = 45 - 10$
$a_{15} = 35$

Exercise 4: Find the sum of the first fifteen terms of the given arithmetic sequence.

3, 1, -1, -3, ...

Find the common difference

$a_2 - a_1 = 1 - 3 = -2$
$a_3 - a_2 = -1 - 1 = -2$
$a_4 - a_3 = -3 - (-1) = -3 + 1 = -2$

$d = -2$

Find the equation of the general term

$a_n = a_1 + (n - 1)d$
$a_n = 3 + (n - 1)(-2)$
$a_n = 3 - 2n + 2$
$a_n = -2n + 5$

Exercise 4 (Continued):

Find the 15th term by substituting 15 for n

$a_n = -2n + 5$
$a_{15} = -2(15) + 5$
$a_{15} = -30 + 5$
$a_{15} = -25$

Find the sum of the first fifteen terms

$S_n = \frac{n}{2}(a_1 + a_n)$
$S_{15} = \frac{15}{2}(a_1 + a_{15})$
$S_{15} = \frac{15}{2}(3 + (-25))$
$S_{15} = \frac{15}{2}(-22)$
$S_{15} = 15(-11)$
$S_{15} = -165$

Exercise 5: Find the sum of the first 20 negative even integers.

Identify the first term and common difference

The negative even integers are -2, -4, -6, -8, ...

so $a_1 = -2$

The difference between each even integer is

$a_2 - a_1 = -4 - (-2) = -4 + 2 = -2$
$a_3 - a_2 = -6 - (-4) = -6 + 4 = -2$
$a_4 - a_3 = -8 - (-6) = -8 + 6 = -2$

$d = -2$

Find the equation of the general term

$a_n = a_1 + (n - 1)d$
$a_n = -2 + (n - 1)(-2)$
$a_n = -2 - 2n + 2$
$a_n = -2n$

Exercise 5 (Continued):

Find the 20th negative even integer by substituting 20 for n

$a_n = -2n$
$a_{20} = -2(20)$
$a_{20} = -40$

Find the sum of the first 20 terms

$S_n = \frac{n}{2}(a_1 + a_n)$
$S_{20} = \frac{20}{2}(a_1 + a_{20})$
$S_{20} = 10(-2 + (-40))$
$S_{20} = 10(-42)$
$S_{20} = -420$