

Answer on Question #77254 – Math – Algebra
Question

a) Calculate the sum of all the even numbers from 2 to 100 inclusive
 $2 + 4 + 6 + \dots + 100$

Solution

We have the arithmetic progression: $a_1 = 2, d = 2, a_n = 100$

Recall that

$$a_n = a_1 + (n - 1)d$$
$$S_n = \frac{a_1 + a_n}{2} \cdot n$$

Find n

$$a_n = a_1 + (n - 1)d$$
$$100 = 2 + (n - 1)(2)$$
$$n - 1 = \frac{100 - 2}{2}$$

$$n = 50$$

Then

$$S_{50} = \frac{a_1 + a_{50}}{2} \cdot 50$$
$$S_{50} = \frac{2 + 100}{2} \cdot 50 = 2550$$

Answer: $S = 2550$.

Question

b) In the arithmetic series

$$k + 2k + 3k + \dots + 100$$

k is a positive integer and k is a factor of 100

i) Find in terms of k , an expression for the number of terms in the series

Solution

We have the arithmetic progression

$$a_1 = k, d = k, a_n = 100$$

Recall that

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

Find n

$$100 = k + (n - 1)k$$
$$n - 1 = \frac{100 - k}{k}$$
$$n = \frac{100}{k} - 1 + 1$$
$$n = \frac{100}{k}$$

The sum of series

$$S_n = \frac{k + 100}{2} \cdot \frac{100}{k} = 50 + \frac{5000}{k}$$

Answer: $n = \frac{100}{k}$, $S_n = 50 + \frac{5000}{k}$.