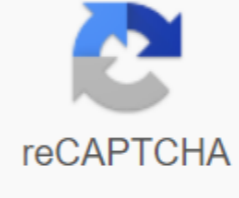




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## Arithmetic and geometric sequences problems with answers pdf

Arithmetic sequences are used in all mathematics and apply to engineering, science, computer science, biology and financial problems. Presented a set of problems and exercises associated with arithmetic sequences, as well as detailed solutions and answers. OVERVIEW ARITHMETIC SEQUENCES Formula  $n$  y term arithmetic sequence with a common difference  $d$  and the first term  $a_1$  is given  $No\ a_n$  and  $a_1(n-1) + d$   $s_n = \frac{n}{2}(2a_1 + (n-1)d)$   $a_n = a_1 + (n-1)d$  An online calculator to calculate the amount of terms in arithmetic sequence. Problem 1 The first term of the arithmetic sequence is 6, and the total difference is 3. Find the formula for the term  $n$  and the meaning of the 50th term Problem Solution 1: Use the meaning of the total difference  $d$  No. 3 and the first term  $a_1$  No. 6 in the formula for  $n$  th term, given above  $(a_n - a_1) / d = (n - 1) / d$   $6 + 3(n - 1) = a_n$   $6 + 3n - 3 = a_n$   $3n + 3 = a_n$   $a_{50} = 3(50) + 3 = 153$  - Problem 2 First term arithmetic sequence is 200, and the total difference is -10. Find the meaning of the 20th term Problem Solution 2: Use the value of the total difference  $d$  -10 and the first term  $a_1$  and 200 in the formula for  $n$  term, given above, and then apply it to the 20th term  $200 + 20(-10) = 20 - 10 = 10$  Problem 3 Arithmetic sequence has a total difference equal to 10 and its 6th term is 52. Find your 15th term. Problem Solution 3: We use the  $n$  th term formula for the 6th term, which is known to write 6 and 52  $y = 10(6 - 1) + a_1$   $52 = 50 + a_1$   $a_1 = 2$  Now that we know the first term and the overall difference, we use the formula  $n$  th term to find the 15th term as follows.  $a_{15} = 10(15 - 1) + 2 = 142$  Problem 4 Arithmetic sequence has its 5th term equal to 22 and its 15th term is 62. Find your 100th term. Problem Solution 4: We use the  $n$  th term formula for the 5th and 15th terms, to write  $5 - 1(5 - 1) + d = 22$   $a_1 + 4d = 22$   $15 - 1(15 - 1) + d = 62$   $a_1 + 14d = 62$  We get a system of 2 linear equations where the unknowns are  $a_1$  and  $d$ . Subtract the right and left terms of the two equations to get Solve for  $d$ . Now use the  $D$  value in one of the equations to find  $a_1$ .  $1st\ (5 - 1) + 4d = 22$   $4d = 18$   $d = 4.5$   $5 - 1(5 - 1) + 4(4.5) = a_1$   $5 - 4 + 18 = a_1$   $a_1 = 19$  Now that we have calculated  $a_1$  and  $d$ , we use them in formula  $n$  th term to find formula 100 th.  $100 \times 4.5 + 19 = a_{100}$   $450 + 19 = a_{100}$   $a_{100} = 469$  Problem 5 Find the sum of all integers from 1 to 1000. Problem Solution 5: A sequence of integrators ranging from 1 to 1000 is given 1, 2, 3, 4, ... 1000 Above sequence has 1000 terms. First term 1 and the term is 1000 and the total difference is 1. We have a formula that gives the amount of the first  $n$  terms of arithmetic, knowing the first and last term of the sequence and the number of terms (see the formula above).  $s_n = \frac{n}{2}(2a_1 + (n-1)d)$   $s_{1000} = \frac{1000}{2}(2(1) + (1000-1)(1)) = 500(2000 - 999) = 500(1001) = 500500$  Problem 6 Find the amount of the first 50 even positive integers. Problem Solution 6: The sequence of the first 50 even positive integers given the first term, equal to 2 and the total difference  $d$  No 2. We use the term  $n$  th formula to find 50 th term  $50$  and  $2(50 - 1) + 2 = 100$  We are now the first term and the last term and the number of terms in sequence, Now we find the sum of the first 50 terms  $s_{50} = \frac{50}{2}(2(2) + (50-1)(2)) = 25(4 + 98) = 25(102) = 2550$  Problem 7 Find the amount of all positive integers, from 5 to 1555 inclusive, which is divided into 5. Problem Solution 7: The first few terms of the sequence of positive integers divided into 5 given above the sequence has the first term equal to 5 and the total difference  $d$  No. 5. We need to know the rank of the term 1555. We use the formula for  $n$  y term as follows  $1555 - a_1(n-1) = d$  Replacement  $a_1$  and  $d$  their Solve values for  $n$  to get We now know that 1555 is 311th term, we can use the formula for the amount following  $s_n = \frac{n}{2}(2a_1 + (n-1)d)$   $s_{311} = \frac{311}{2}(2(5) + (311-1)(5)) = \frac{311}{2}(20 + 1555) = \frac{311}{2}(1575) = 244282.5$  Problem Solution 8: Let's first spread this amount as follows:  $(S_{10})_{n} = \sum_{k=1}^n (1/2)^k$  The term  $\sum_{k=1}^n (1/2)^k$  is the sum of the first 10 positive integers. The first 10 positive integers make arithmetic consistency since the first term is equal to 1. It has  $n$  10 terms and its 10th term is 10. This amount is obtained using the formula  $s_n = \frac{n}{2}(2a_1 + (n-1)d)$   $s_{10} = \frac{10}{2}(2(1) + (10-1)(1)) = 5(2 + 9) = 5(11) = 55$  Exercise To answer the following questions associated with arithmetic sequences: (a) Find 20, given that 3 and 9 and 8 and 24 b) Find 30, given that the first few terms of arithmetic sequence are given 6,12,18,... c) Find  $d$ , given that  $1 + 10 + 20 + y + 466 = 500$  Find  $s_{30}$ , given that  $10 \times 28 + 20 \times 58 = 500$  Find the amount of  $\{20\}$  sum.  $S_n$  determined  $S_n = \frac{n}{2}(2a_1 + (n-1)d)$   $s_{20} = \frac{20}{2}(2(20) + (20-1)(4)) = 10(40 + 76) = 10(116) = 1160$  Solutions above Exercise: a) 20 and 60 b) 30 30 1335 e) 1390 f) 286 More mathematical problems with detailed solutions on this site. The main page of Geometric Sequences are used in several branches of applied mathematics in engineering, science, computer science, biology, finance, ... Presented problems and exercises related to geometric sequences, as well as detailed solutions and answers. OVERVIEW GEOMETRIC SEQUENCES Sequence shown below  $2, 8, 32, 128, \dots$  received from the beginning of 2 multiply each term by 4. 2 is the first term of the sequence and 4 is the overall ratio.  $(8 - 2) \times 4 = 32 - 8$  times 4  $128 - 32$  times 4 (text and so on) Terms in sequence can also be written as follows:  $a_1 - 2, a_2 - 8, a_3 - 32, a_4 - 128, \dots$  The  $n$ -term can now be written as  $a_n = a_1 r^{n-1}$ , where  $a_1$  is the first term of the sequence and  $r$  is a total ratio that is equal to 4 in the above example. The sum of the first  $n$  terms of geometric sequence is given  $s_n = \frac{a_1(1-r^n)}{1-r}$   $s_{10} = \frac{2(1-4^{10})}{1-4} = \frac{2(1-1048576)}{-3} = \frac{2(-1048575)}{-3} = \frac{2097150}{3} = 699050$  Problem 1 Find terms  $a_2, a_3, a_4$  and  $a_5$  geometric sequence if  $a_1$  and 10 and the total  $r$  ratio is 1. Problem Solution 1: Use the definition of geometric sequence  $(a_2 - a_1) \times 10 = (a_3 - a_2) \times 10 = (a_4 - a_3) \times 10 = (a_5 - a_4) \times 10$   $a_2 - a_1 = a_3 - a_2 = a_4 - a_3 = a_5 - a_4 = 10$   $a_2 = a_1 + 10 = 20$   $a_3 = a_2 + 10 = 30$   $a_4 = a_3 + 10 = 40$   $a_5 = a_4 + 10 = 50$  Problem 2 Find 10th term geometric sequence, if  $a_1$  and 45 and total ratio  $r$  0.2. Problem solving 2: Use the  $a_n$  formula  $a_n = a_1 r^{n-1}$  time, which gives  $n$ -term, to find  $a_{10}$  as follows:  $(a_{10}) = 45 \times (0.2)^{10-1} = 45 \times (0.2)^9 = 45 \times 0.0000512 = 0.002304$  Problem 3 Find  $a_{20}$  geometric sequence if the first few terms of the sequence are given  $-1/2, 1/4, -1/8, 1/16, \dots$  Problem solving 3: We first use the first few terms to find the general ratio of  $r$   $(r = a_2 / a_1 = (1/4) / (-1/2))$  the question:  $a_3 / a_2 = (1/4) / (1/4) = 1$  Now we use formula  $a_n = a_1 r^{n-1}$  for  $n=1$  to find  $a_{20}$ .  $(a_{20}) = 1 \times 20 = 20$  Problem 4 Considering terms  $10/3, 5/12$  and  $15th\ 3/16384$  geometric sequence, find the exact meaning of the term 30 sequence. Problem solving 4: We first use the  $n$ -term formula to write  $a_{10}$  and  $a_{15}$  as follows:  $(a_{10}) = a_1 (1/4)^{10-1} = a_1 (1/4)^9 = a_1 / 262144$   $(a_{15}) = a_1 (1/4)^{15-1} = a_1 / 1048576$  Now we share the terms  $a_{10}$  and  $a_{15}$ , to write  $(a_{15}) / (a_{10}) = (a_1 / 1048576) / (a_1 / 262144) = 1/4$   $(a_{15}) = (a_{10}) / 4 = (10/3) / 4 = 10/12 = 5/6$  Another method is to first note that the conditions on which the amount is made are conditions of geometric sequence with  $a_1$  and  $r$  No. 3 using the formula  $a_n = a_1 r^{n-1}$  with  $n$  No. 6.  $s_6 = 1 + r + r^2 + r^3 + r^4 + r^5 = 6$  Problem 6 Find the amount,  $S_n = \frac{a_1(1-r^n)}{1-r}$   $s_{10} = \frac{1(1-10^{10})}{1-10} = \frac{1-10^{10}}{-9} = \frac{10^{10}-1}{9}$  Problem Solution 6: Exploring terms included in the amount of 8,  $8((1/4)^1 + (1/4)^2 + \dots + (1/4)^9)$  This is a geometric consistency conditions with  $a_1 = 8$  and  $r = 1/4$ , and so we can use the formula for the sum of terms geometric sequence  $s_{10} = \frac{8(1-(1/4)^{10})}{1-(1/4)} = \frac{8(1-1/4^{10})}{3/4} = \frac{8(1-1/4^{10}) \times 4}{3} = \frac{32(1-1/4^{10})}{3}$  Problem 7 Write a rational number 5.313131... Solution... Problem 7: First we write this rational number as an infinite amount as follows:  $5.313131... = 5 + 0.31 + 0.0031 + 0.000031 + \dots$  are those of geometric sequence with  $a_1$  and  $0.31$  and  $r$  0.01. Thus, the use of the formula for an infinite amount of geometric sequence  $S = \frac{a_1}{1-r} = \frac{0.31}{1-0.01} = \frac{0.31}{0.99} = \frac{31}{99}$  Now we write  $5.313131... = 5 + \frac{31}{99}$  As follows:  $5.313131... = 5 + \frac{31}{99} = \frac{509}{99}$  Exercises: Answer the following questions related to geometric sequences: a) Find 20, considering that 3 and  $1/2$  and 5 and 8 b) Find 30, given that the first few terms of geometric sequence are given  $-2, 1, -1/2, 1/4, \dots$  c) Find  $r$ , considering that 1 and 10 and 20 and 10 -18 d) write a rational number of  $0.9717171...$  in a ratio of two positive prices. Answers to the above Exercise: a)  $20 \times 2 = 40$  b)  $30 \times 1/2 = 15$  c)  $p = 0.1$  g)  $0.9717171... = \frac{481}{495}$  More math problems with detailed solutions on this site. Homepage to report this ad announcement arithmetic and geometric sequence problems with answers pdf. arithmetic and geometric sequences word problems with answers pdf. arithmetic and geometric sequences word problems with answers

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