

- Q1.** Which of the following are APs? If they form an AP, find the common difference d and write three more terms.

$$-\frac{1}{2}, -\frac{1}{2}, -\frac{1}{2}, -\frac{1}{2}, \dots$$

- Q2.** In the following APs, find the missing terms in the boxes: $2, \square, 26$

- Q3.** For the AP: $\frac{3}{2}, \frac{1}{2}, -\frac{1}{2}, -\frac{3}{2}, \dots$, write the first term a and the common difference d .

- Q4.** Find the 10th term of the AP: $2, 7, 12, \dots$

- Q5.** Check whether 301 is a term of the list of numbers $5, 11, 17, 23, \dots$.

- Q6.** Which term of the AP: $3, 8, 13, 18, \dots$, is 78?

- Q7.** Check whether -150 is a term of the AP: $11, 8, 5, 2, \dots$

- Q8.** The 17th term of an AP exceeds its 10th term by 7. Find the common difference.

- Q9.** Find the 20th term from the last term of the AP: $3, 8, 13, \dots, 253$.

- Q10.** Which term of the AP: $121, 117, 113, \dots$, is its first negative term?

[Hint: Find n for $a_n < 0$]

- Q11.** Which of the following list of numbers form an AP? If they form an AP, write the next two terms:

$$-2, 2, -2, 2, -2, \dots$$

- Q12.** In which of the following situations, does the list of numbers involved make an arithmetic progression, and why?

The taxi fare after each km when the fare is Rs. 15 for the first km and Rs. 8 for each additional km.

- Q13.** Which of the following list of numbers form an AP? If they form an AP, write the next two terms:

$$1, 1, 1, 2, 2, 2, 3, 3, 3, \dots$$

- Q14.** In which of the following situations, does the list of numbers involved make an arithmetic progression, and why?

The amount of air present in a cylinder when a vacuum pump removes $\frac{1}{4}$ of the air remaining in the cylinder at a time.

- Q15.** For the following APs, write the first term and the common difference:

$$\frac{1}{3}, \frac{5}{3}, \frac{9}{3}, \frac{13}{3}, \dots$$

- Q16.** For the following APs, write the first term and the common difference: $-5, -1, 3, 7, \dots$

- Q17.** For the following APs, write the first term and the common difference: $3, 1, -1, -3$

- Q18.** In which of the following situations, does the list of numbers involved make an arithmetic progression, and why?

The amount of money in the account every year, when Rs. 10000 is deposited at compound interest at 8% per annum.

Q19. In which of the following situations, does the list of numbers involved make an arithmetic progression, and why?

The cost of digging a well after every metre of digging, when it costs Rs. 150 for the first metre and rises by Rs. 50 for each subsequent metre.

Q20. For the following APs, write the first term and the common difference: 0.6, 1.7, 2.8, 3.9, ...

Q21. Which of the following are APs? If they form an AP, find the common difference d and write three more terms. -1.2, -3.2, -5.2, -7.2

Q22. Which of the following are APs? If they form an AP, find the common difference d and write three more terms.

$$3, 3 + \sqrt{2}, 3 + 2\sqrt{2}, 3 + 3\sqrt{2}, \dots$$

Q23. Which of the following are APs? If they form an AP, find the common difference d and write three more terms.

(i) 0.2, 0.22, 0.222, 0.2222, ... (ii) 1, 3, 9, 27

Q24. Which of the following are APs? If they form an AP, find the common difference d and write three more terms.

$$\sqrt{2}, \sqrt{8}, \sqrt{18}, \sqrt{32}, \dots$$

Q25. Which of the following are APs? If they form an AP, find the common difference d and write three more terms.

$$1^2, 5^2, 7^2, 73, \dots$$

Q26. Choose the correct choice in the following and justify:

11th term of the AP : - 3, $-\frac{1}{2}$, 2, ..., is

(a) 28 (b) 22 (c) - 38 (d) $-48\frac{1}{2}$

Q27. Choose the correct choice in the following and justify:

30th term of the AP : 10, 7, 4, ..., is

(a) 97 (b) 77 (c) -77 (d) -87

Q28. Fill in the blanks in the following table, given that a is the first term, d the common difference and a_n the n^{th} term of the AP:

	a	d	n	a_n
(i)	- 18.9	2.5	.....	3.6
(ii)	3.5	0	105	.....

Q29. Find the sum: $7 + 10\frac{1}{2} + 14 + \dots + 84$

Q30. Find the sum of the following APs. $\frac{1}{15}, \frac{1}{12}, \frac{1}{10}, \dots$, to 11 terms.

Q31. Find the sum of the following APs. 0.6, 1.7, 2.8, ..., to 100 terms.

Q32. Find the sum of the following APs. - 37, - 33, - 29, ..., to 12 terms.

Q33. Find the sum of the following APs. 2, 7, 12, ..., to 10 terms.

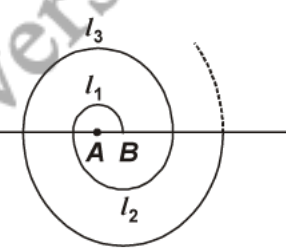
Q34. Find the number of terms in each of the following APs: $18, 15\frac{1}{2}, 13, \dots, - 47$

Q35. Find the number of terms in each of the following APs: 7, 13, 19, ..., 205

Q36. In the following APs, find the missing terms in the boxes: $\square, 13, \square, 3$

- Q37.** Find the sum: $34 + 32 + 30 + \dots + 10$
- Q38.** Find the sum: $-5 + (-8) + (-11) + \dots + (-230)$
- Q39.** In an AP: given $a_3 = 15$, $S_{10} = 125$, find d and a_{10} .
- Q40.** In an AP: given $d = 5$, $S_9 = 75$, find a and a_9 .
- Q41.** In an AP: given $a = 3$, $n = 8$, $S = 192$, find d .
- Q42.** Which term of the AP : $21, 18, 15, \dots$ is -81 ? Also, is any term 0? Give reason for your answer.
- Q43.** Determine the AP whose 3rd term is 5 and the 7th term is 9.
- Q44.** How many two-digits numbers are divisible by 3?
- Q45.** Find the 11th term from the last term (towards the first term) of the AP : $10, 7, 4, \dots - 62$.
- Q46.** A sum of Rs. 1000 is invested at 8% simple interest per year. Calculate the interest at the end of each year. Do these interests form an AP? If so, find the interest at the end of 30 years making use of this fact.
- Q47.** Find the sum of first 24 terms of the list of numbers whose n^{th} term is given by

$$a_n = 3 + 2n.$$
- Q48.** How many terms of the AP : $24, 21, 18, \dots$ must be taken so that their sum is 78?
- Q49.** If the sum of the first 14 terms of an AP is 1050 and its first term is 10, find the 20th term.
- Q50.** Find the sum of the first 22 terms of the AP : $8, 3, -2, \dots$
- Q51.** In a flower bed, there are 23 rose plants in the first row, 21 in the second, 19 in the third, and so on. There are 5 rose plants in the last row. How many rows are there in the flower bed?
- Q52.** Find the 31st term of an AP whose 11th term is 38 and the 16th term is 73.
- Q53.** Which term of the AP : $3, 15, 27, 39, \dots$ will be 132 more than its 54th term?
- Q54.** If the 3rd and the 9th term of an AP are 4 and -8 respectively, which term of this AP is zero?
- Q55.** An AP consists of 50 terms of which 3rd term is 12 and the last term is 106. Find the 29th term.
- Q56.** Two APs have the same common difference. The difference between their 100th terms is 100, what is the difference between their 1000th terms?
- Q57.** How many three-digit numbers are divisible by 7?
- Q58.** How many multiples of 4 lie between 10 and 250?
- Q59.** Ramkali saved Rs. 5 in the first week of a year and then increased her weekly savings by Rs. 1.75. If in the n^{th} week, her weekly savings become Rs. 20.75, find n .
- Q60.** Subha Rao started work in 1995 at an annual salary of Rs. 5000 and received an increment of Rs. 200 each year. In which year did his income reach Rs. 7000?
- Q61.** Determine the AP whose third term is 16 and the 7th term exceeds the 5th terms by 12.
- Q62.** For what value of n , are the n^{th} terms of two APs : $63, 65, 67, \dots$ and $3, 10, 17, \dots$ equal?
- Q63.** The sum of the 4th and 8th terms of an AP is 24 and the sum of the 6th and 10th terms is 44. Find the first three terms of the AP.

- Q64.** How many terms of the AP : 9, 17, 25, ... must be taken to give a sum of 636?
- Q65.** Find the sum of first 22 terms of an AP in which $d = 7$ and 22 term is 149.
- Q66.** The first and the last terms of an AP are 17 and 350 respectively. If the common difference is 9, how many terms are there and what is their sum?
- Q67.** The first term of an AP is 5, the last term is 45 and the sum is 400. Find the number of terms and the common difference.
- Q68.** Find the sum of first 51 terms of an AP whose second and third terms are 14 and 18 respectively.
- Q69.** If the sum of first 7 terms of an AP is 49 and that of 17 terms is 289, find the sum of first n terms.
- Q70.** Find the sum of the first 40 positive integers divisible by 6.
- Q71.** Find the sum of the odd numbers between 0 and 50.
- Q72.** Find the sum of the first 15 multiples of 8.
- Q73.** In a school, students thought of planting trees in and around the school to reduce air pollution. It was decided that the number of trees, that each section of each class will plant, will be the same as the class, in which they are studying, *e.g.*, a section of Class I will plant 1 tree, a section of Class II will plant 2 trees and so on till Class XII. There are three sections of each class. How many trees will be planted by the students?
- Q74.** A sum of Rs. 700 is to be used to give seven cash prizes to students of a school for their overall academic performance. If each prize is Rs. 20 less than its preceding prize, find the value of each of the prizes.
- Q75.** A contract on construction job specifies a penalty for delay of completion beyond a certain date as follows: Rs. 200 for the first day, Rs. 250 for the second day Rs. 300 for the third day, etc., the penalty for each succeeding day being Rs. 50 more than for the preceding day. How much money the contractor has to pay as penalty, if he has delayed the work by 30 days?
- Q76.** A spiral is made up of successive semicircles, with centres alternately at A and B, starting with centre at A, of radii 0.5 cm, 1.0 cm, 1.5 cm, 2.0 cm ... as shown in figure. What is the total length of such a spiral made up of thirteen consecutive semicircles? (Take $\pi = \frac{22}{7}$)
 [Hint: Length of successive semicircles is $l_1, l_2, l_3, l_4, \dots$ with centres at A, B, A, B, ... respectively]
- 
- Q77.** Find the sum of first 1000 positive integers.
- Q78.** Which of the following list of numbers form an AP? If they form an AP, write the next two terms:
 1, -1, -3, -5, ...
- Q79.** The sum of the third and the seventh terms of an AP is 6 and their product is 8. Find the sum of first sixteen terms of the AP.
- Q80.** Which of the following list of numbers form an AP? If they form an AP, write the next two terms:
 4, 10, 16, 22, ...
- Q81.** Write first four terms of the AP, when the first term a and the common difference d are given as follows: $a = 10, d = 10$
- Q82.** Find the sum of first n positive integers.
- Q83.** Write first four terms of the AP, when the first term a and the common difference d are given as follows: $a = -2, d = 0$

Q84. Which of the following are APs? If they form an AP, find the common difference d and write three more terms.

(i) $\sqrt{3}, \sqrt{6}, \sqrt{9}, \sqrt{12}, \dots$ (ii) $1^2, 3^2, 5^2, 7^2, \dots$

Q85. Which of the following are APs? If they form an AP, find the common difference d and write three more terms.

(i) $a, 2a, 3a, 4a, \dots$ (ii) a, a^2, a^3, a^4, \dots

Q86. Write first four terms of the AP, when the first term a and the common difference d are given as follows: $a = -1.25, d = -0.25$

Q87. Write first four terms of the AP, when the first term a and the common difference d are given as follows: $a = -1, d = \frac{1}{2}$

Q88. Write first four terms of the AP, when the first term a and the common difference d are given as follows: $a = 4, d = -3$

Q89. In an AP: given $a_n = 2, d = 8, S_n = 90$, find n and a_n .

Q90. In the following APs, find the missing terms in the boxes: $-4, \square, \square, \square, \square, 6$

Q91. In the following APs, find the missing terms in the boxes: $5, \square, \square, 9\frac{1}{2}$,

Q92. In an AP: given $a = 5, d = 3, a_n = 50$, find n and S_n .

Q93. In an AP: given $a_{12} = 37, d = 3$, find a and S_{12} .

Q94. Fill in the blanks in the following table, given that a is the first term, d the common difference and a_n the n^{th} term of the AP:

	a	d	n	a_n
(i)	7	3	8	.....
(ii)	-18	.....	10	0
(iii)	.....	-3	18	-5

Q95. Show that $a_1, a_2, \dots, a_n, \dots$ form an AP where a_n is defined as below:

$$a_n = 9 - 5n$$

Also, find the sum of the first 15 terms in each case.

Q96. Show that $a_1, a_2, \dots, a_n, \dots$ form an AP where a_n is defined as below:

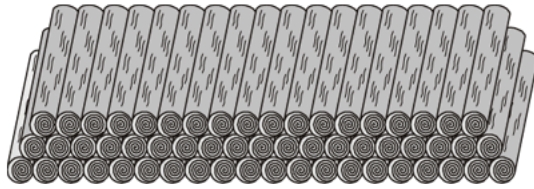
$$a_n = 3 + 4n$$

Also, find the sum of the first 15 terms in each case.

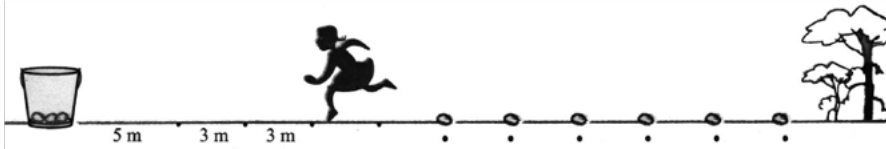
Q97. A manufacturer of TV sets produced 600 sets in the third year and 700 sets in the seventh year. Assuming that the production increases uniformly by a fixed number every year, find:

- (i) the production in the 1st year (ii) the production in the 10th year
 (iii) the total production in first 7 years

- Q98.** 200 logs are stacked in the following manner : 20 logs in the bottom row, 19 in the next row, 18 in the row next to it and so on (see figure). In how many rows are the 200 logs placed and how many logs are in the top row?



- Q99.** In a potato race, a bucket is placed at the starting point, which is 5 m from the first potato, and the other potatoes are placed 3 m apart in a straight line. There are ten potatoes in the line (see figure).



A competitor starts from the bucket, picks up the nearest potato, runs back with it, drops it in the bucket, runs back to pick up the next potato, runs to the bucket to drop it in, and she continues in the same way until all the potatoes are in the bucket. What is the total distance the competitor has to run?

[Hint: To pick up the first potato and the second potato, the total distance (in metres) run by a competitor is $2 \times 5 + 2 \times (5 + 3)$.]

- Q100** In the following APs, find the missing terms in the boxes: $\square, 38, \square, \square, \square, -22$

- Q101** Which of the following are APs? If they form an AP, find the common difference d and write three more terms.

(i) $-10, -6, -2, 2, \dots$ (ii) $0, -4, -8, -12, \dots$

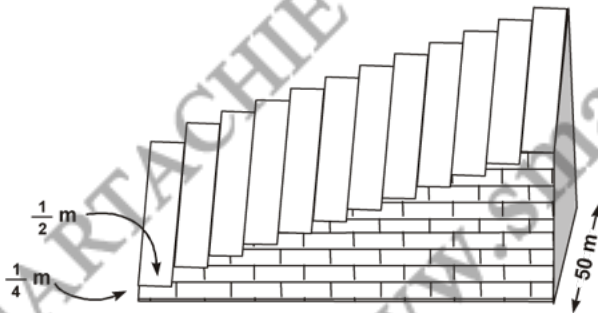
- Q102** Which of the following are APs? If they form an AP, find the common difference d and write three more terms.

(i) $2, 4, 8, 16, \dots$ (ii) $2, \frac{5}{2}, 3, \frac{7}{2}, \dots$

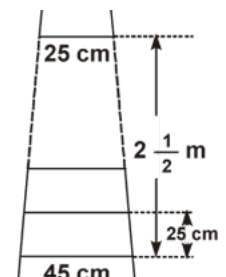
- Q103** A small terrace at a football ground comprises of 15 steps each of which is 50 m long and built of solid concrete.

Each step has a rise of $\frac{1}{4}$ m and a tread of $\frac{1}{2}$ m (see figure). Calculate the total volume of concrete required to build the terrace.

[Hint: Volume of concrete required to build the first step = $\frac{1}{4} \times \frac{1}{2} \times 50 \text{ m}^2$]



- Q104** A ladder has rungs 25 cm apart. (see figure). The rungs decrease uniformly in length from 45 cm at the bottom to 25 cm at the top. If the top and the bottom rungs are $2\frac{1}{2}$ m apart, what is the length of the wood required for the rungs?



[Hint: Number of rungs = $\frac{250}{25} + 1$]

Q105 The houses of a row are numbered consecutively from 1 to 49. Show that there is a value of x such that the sum of the numbers of the houses preceding the house numbered x is equal to the sum of the numbers of the houses following it. Find this value of x .

[Hint $S_{x-1} = S_{49} - S_x$]

Q106 If the sum of the first n terms of an AP is $4n - n^2$, what is the first term (that is S_1)? What is the sum of first two terms? What is the second term? Similarly, find the 3rd, the 10th and the n^{th} terms.

SMARTACHIEVERS LEARNING Pvt. Ltd.
www.smartachievers.in

S1. Yes. $d = 0; -\frac{1}{2}, -\frac{1}{2}, -\frac{1}{2}$

S2. $\boxed{14}$

S3. $a = \frac{3}{2}, d = -1.$

S4. 47.

S5. 301 is not a term of given list.**S6.** 16th term.**S7.** No.**S8.** 1.**S9.** 20th term from the last term is 158.**S10.** 32nd term.**S11.** Not possible**S12.** Yes. 15, 23, 31, ..., forms an AP as each succeeding term is obtained by adding 8 in its preceding term.**S13.** Not possible**S14.** No. Volume are $V, \frac{3V}{4}, \left(\frac{3}{4}\right)^2 V, \dots$

S15. $a = \frac{1}{3}, d = \frac{4}{3}$

S16. $a = -5, d = 4$

S17. $a = 3, d = -2$

S18. No. Amounts are $10000\left(1 + \frac{8}{100}\right), 10000\left(1 + \frac{8}{100}\right)^2, 10000\left(1 + \frac{8}{100}\right)^3, \dots$ **S19.** Yes. 150, 200, 250, ... form an AP.

S20. $a = 0.6, d = 1.1$

S21. Yes. $d = -2; -9.2, -11.2, -13.2$ **S22.** Yes. $d = \sqrt{2}; 3 + 4\sqrt{2}, 3 + 5\sqrt{2}, 3 + 6\sqrt{2}$ **S23.** (i) No. (ii) No.**S24.** Yes. $d = \sqrt{2}; \sqrt{50}, \sqrt{72}, \sqrt{98}$

S25. Yes. $d = 24$; 97, 121, 145

S26. B

S27. C

S28. (i) $n = 10$ (ii) $a_n = 3.5$

S29. $1046 \frac{1}{2}$

S30. $\frac{33}{20}$

S31. 5505

S32. - 180

S33. 245

S34. 27

S35. 34

S36. $\boxed{18}$, $\boxed{8}$

S37. 286

S38. - 8930

S39. $d = -1$, $a_{10} = 8$

S40. $a = -\frac{35}{3}$, $a_9 = \frac{85}{3}$

S41. $d = 6$

S42. The eight term is 0.

S43. 3, 4, 5, 6, 7, ...

S44. There are 30 two-digits numbers divisible by 3.

S45. The 11th term from the last term of given AP is - 32.

S46. The interest at the end of 1st year, 2nd year, 3rd yearand so on are 80, 160, 240,

It is an A.P has the difference between the consecutive terms in the list is 80.

The interest at the end of 30 years will be Rs. 2400.

S47. The sum of first 24 terms of the list of numbers is 672.

S48. The number of terms is either 4 or 13.

S49. 200.

S50. - 979.

S51. 10 rows in the flower bed.

S52. 178

S53. 65th term.

S54. 5th term.

S55. 64.

S56. 100.

S57. 128.

S58. 60.

S59. 10.

S60. 11th year.

S61. 4, 10, 16, 22, ...

S62. 13.

S63. -13, -8, -3.

S64. 12. By putting $a = 9$, $d = 8$, $S = 636$ in the formula $S = \frac{n}{2} [2a + (n - 1)d]$, we get a quadratic equation $4n^2 + 5n - 636 = 0$. On solving, we get $n = -\frac{53}{4}$, 12. Out of these two roots only one root 12 is admissible.

S65. Sum = 1661.

S66. $n = 38$, $S = 6973$.

S67. $n = 16$, $d = \frac{8}{3}$.

S68. $S_{51} = 5610$.

S69. n^2 .

S70. 4920.

S71. 625.

S72. 960.

S73. 234.

S74. Values of the prizes (in Rs.) are 160, 140, 120, 100, 80, 60, 40.

S75. Rs. 27,750.

S76. 143 cm.

S77. 500500

S78. -7, -9

S79. $S_{16} = 20, 76$.

S80. 28, 34

S81. 10, 20, 30, 40

S82. $S_n = \frac{n(n+1)}{2}$

S83. -2, -2, -2, -2,

S84. (i) No. (ii) No.

S85. (i) Yes. $d = a$; $5a, 6a, 7a$ (ii) No.

S86. -1.25, -1.50, -1.75, -2.0

S87. $-1, -\frac{1}{2}, 0, \frac{1}{2}$

S88. 4, 1, -2, -5

S89. $n = 7, a = -8$

S90. $\boxed{-2}, \boxed{0}, \boxed{2}, \boxed{4}$

S91. $\boxed{6\frac{1}{2}}, \boxed{8}$

S92. $n = 16, S_n = 440$

S93. $a = 4, S_{12} = 246$

S94. (i) $a_n = 28$ (ii) $d = 2$ (iii) $a = 46$

S95. $S_{15} = -465$.

S96. $S_{15} = 525$.

S97. (i) The production of TV sets in the first year is 550.
(ii) Production of TV sets in the 10th year is 775.
(iii) The total production of TV sets in first 7 years is 4375.

S98. 16 rows, 5 logs are placed in the top row. By putting $S = 200, a = 20, d = -1$ in the formula $S = \frac{n}{2} [2a + (n-1)d]$, we get $41n - n^2 = 400$. On solving, $n = 16, 25$. Therefore, the number of rows is either 16 or 25. $a_{25} = a + 24, d = -4$.

i.e., number of logs in 25th row is -4 which is not possible. Therefore, $n = 25$ is not possible. For $n = 16, a_{16} = 5$. Therefore, there are 16 rows and 5 logs placed in the top row.

S99. 370 m.

S100. $\boxed{53}, \boxed{23}, \boxed{8}, \boxed{-7}$

S101. (i) Yes. $d = 4$; 6, 10, 14 (ii) Yes. $d = -4$; -16, -20, -24

S102. (i) No. (ii) Yes. $d = \frac{1}{2}$; $4, \frac{9}{2}, 5$

S103. 750 m^3 .

S104 385 cm.

S105 35

S106 $S_1 = 3, S_2 = 4; a_2 = S_2 - S_1 = 1; S_3 = 3, a_3 = S_3 - S_2 = -1,$
 $a_{10} = S_{10} - S_9 = -15; a_n = S_n - S_{n-1} = 5 - 2n.$

SMARTACHIEVERS LEARNING Pvt. Ltd.
www.smartachievers.in