MATHS

BOOKS - OSWAAL PUBLICATION

MATHS (KANNADA ENGLISH)

ARITHMETIC PROGRESSIONS

Multiple Choice Questions

1. Sum of all first n terms of even natural number is 2, 4,.....2n:

A. $n(n+1)$

B. $n(n+2)$

C. n^2

D. $2n^2$

Answer: A

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2. IF a,b and c are in arithmetic progression, then $\frac{b-a}{c-b}$ is equal to:

A. $\frac{b}{a}$

B. 0

C. 1

D. 2a

Answer: C

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3. 15^{th} terms of the A.P x-7,x-2,x+3..... Is:

A. $x + 73$

B. $x + 63$

C. $x + 83$

D. $x + 53$

Answer: B

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4. The value of $\sum 18 + \sum 19$ is:

A. 324

B. 361

C. 703

D. 743

Answer: B

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5. IF an A.P., if $S_5 = 35$ and $S_4 = 22$, then the 5^{th} term is:

A. 35

B. 10

C. 13

D. 22

Answer: C

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6. The n^{th} term of 3,7,11,15,..... is:

A. $4n - 1$

B. $4n + 1$

C. $4n + 3$

D. $3n + 4$

Answer: A

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7. In a sequence, if $T_{n+1} = 4n + 5$, then T_n is:

A. $4n - 5$

B. $4n - 1$

C. $4n + 1$

D. $4n + 5$

Answer: C

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8. In an arithmetic Sequence, if $T_4 = 8 \& a = 2$, then is common difference is:

A. 6

B. 4

C. 2

D. 10

Answer: C

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9. In the A.P., the common difference is 3, first term is 1, then its tenth term is:

A. 27

B. 29

C. 30

D. 28

Answer: B

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10. In the arithmetic progression $T_{n+5} = 35$ and $T_{n+1} = 23$, then common difference=

A. 3

B. 2

C. 3n

D. 2n

Answer: A

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11. In an arithmetic Progression $T_n = 3n - 1$, then common difference is:

A. 1

B. 2

C. 3

D. 4

Answer: C

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12. Ramu marked a dot in first square, 2 dots in second square, 3 dots in the third square and so on. Then the total number of squares required to mark a total of 55 dots is equal to:

A. 55

B. 11

C. 9

D. 10

Answer: B

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13. Among the following, Arithmetic Progression is:

A. 1,4,6.....

B. 10,12,14,.....

C. 35,30,25,.....

D. 8,13,19,.....

Answer: B

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14. In an arithmetic Progression the correct relation is:

A. $T_{n-5} = T_{n-4} + d$

B. $T_{n-5} = T_{n-6} + d$

C. $T_{n-5} = T_n + d$

D. $T_{n-5} = T_n - d$

Answer: A

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15. The sum of an arithmetic series with 15 terms is 180. Then the 8^{th} term is:

A. 8

B. 12

C. 15

D. 18

Answer: B

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16. IF $2x+1, 4x, 13-x$ are in Arithmetic Progression, then x is equal to:

A. 2

B. 3

C. 4

D. 5

Answer: C

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17. A person continuously places 3 marbles in first box, 5 in second box,7 in third box, etc. The number of marbles that he places in sixteenth box is:

A. 66

B. 33

C. 31

D. 35

Answer: C

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18. In the first minute Geeta climbs 15 steps of a building. After that she climbs 3 steps less than in the previous minute. The total number of steps climbed by Geeta in 5 minutes is:

A. 75

B. 105

C. 45

D. 50

Answer: D

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19. In a Progression if $T_n = 2n - 1$ the fourth term is :

A. 23

B. 9

C. 5

D. 7

Answer: D

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20. The value of $\sum_{n=1}^{10} n$ is:

A. 10

B. 11

C. 55

D. 110

Answer: C

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21. IF 1+2+3+.....+n=78, then the value of n is:

A. 13

B. 12

C. 11

D. 16

Answer: B

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Very Short Answer Type Question

1. What is the common difference between the consecutive terms of an A.P.

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2. If there an p terms in A.P. then what is the n^{th} term from the end.

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3. IF a,a+d,a+2d.....l is an A.P., then find the n^{th} terms from the end l.

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4. IF the sum of three consecutive terms of an A.P. is 21, then first the first term.

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5. IF m^{th} term of an A.P. is n and n^{th} term is m, then find p^{th} term?

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6. Find the sum of first n odd natural numbers.

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7. Find the sum of first n even natural numbers.

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8. IF $T_n = 5n - 2$, then find S_4.

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Short Answer Type Question

1. How many two digit numbers are divisible by 3?

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2. Find the sum of the series 3+7+11+.....to 10 terms.

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3. Find the sum of all natural numbers between 1 and 201 which are divisible by 5.

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4. Find the sum of all even natural numbers from 2 to 40 by using the formula.

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5. IF a,A,b are in Arithmetic progression, then prove that $A = \frac{a+b}{2}$.

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6. In an Arithmetic Progression, $T_{10} = 175$ and $T_{20} = 475$. Find the Arithmetic Progression.

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7. A person deposits Rs 1000 in the first month. Then every month he increases the monthly deposit by Rs 60. Use the principle of progression and calculate his total investment at the end of two years.

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8. Check whether 301 is a term in the A.P. 5,11,17,23....

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9. If 2,(x-1),4 are in Arithmetic Progression. Find the value of x.

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10. IF 7 times the 7^{th} term of A.P. is equal to 11 times the 11^{th} term, prove that 18^{th} term is equal to zero.

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11. There are 10 boxes on a table. Ramu places 4 marbles in the first box, 7 marbles in the second box, 10 marbles in the third box and so on. Find the total number of marbles placed in all the boxes.

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12. Find the sum of natural odd numbers from 1 to 100.

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13. The sum of n terms of an Arithmetic progression is $S_n = 2n^2 + 6n$. Find the first term and the common difference.

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14. The middle term of an Arithmetic series consisting of 25 terms is 20. Find the sum of the series.

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15. In an Arithmetic progression, $T_n = 10 - 3n$. Find S_{40}

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Long Answer Type Question I

1. Find the sum of all natural numbers between 200 and 300 which are divisible by 6.

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2. The fourth and eight terms of an A.P. are in the ratio of $1:2$ and tenth term is 30. Find the common difference.

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3. The ratio of 7^{th} to 3^{rd} term of an A.P. is $12:5$. Find the ratio of 13^{th} to 4^{th} term.

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4. In the p^{th} term of an A.P. is q and q^{th} term is p, prove that the n^{th} term is equal to p+q-n.

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5. Find the four numbers in A.P. such that the sum of 2^{nd} and 3^{rd} terms is 22 and the product of 1^{st} and 4^{th} terms is 85.

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6. Find the first four terms of a sequence of which sum of n terms is $\frac{1}{2}n(7n-1)$.

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7. The sum of 6 terms which form an A.P. is 345. The difference between the first and last term is 55. Find the terms.

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8. A man deposited Rs 10000 in a bank at the rate of 5% simple interest annually. Find the amount in 15^{th} year since he deposited the amount and also calculate the total amount after 20 years.

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9. In an A.P.

(a) IF a=-7,d=5 find T_{12}

(b) IF a=-1 , d=-3 find T_{50}

(c) IF a=12,d=4 $T_n = 76$ find n

(d) IF d=-2 $T_{22} = -39$ find a.

(e) IF a=13 $T_{15} = 55$ find d.

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10. Find the sum of

(b) -3,1,5.....to 17 terms.

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11. The angles of a triangle are in A.P. The smallest angle is 30°. Show that the triangle is a right angled triangle.

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Long Answer Type Questions Ii

1. The sum of four consecutive terms which are in an arithmetic progression is 32 and the ratio of the product of the first and the last

term to the product to two middle terms is $7:15$. Find the number.

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2. In an arithmetic progression of 50 terms, the sum of first ten terms is 210 and the sum of last fifteen terms is 2565. Find the arithmetic progression.

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3. Five positive integers are in A.P. The sum of 3 middle terms is 24 and product of first and fifth term is 48. Find the terms of A.P.

4. Find three consecutive terms in an arithmetic progression whose sum is 18 and sum of their square is 140.

5. The sum of three consecutive terms in an arithmetic progression is 6 and their product is 120. Find the three numbers.

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6. In an A.P. if the 12^{th} term is -13 and the sum of the first four terms is 24, what is the sum of the first 10 terms?

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7. The sum of three terms of an AP is 21 and the product of first and third term exceeds the second term by 6. Find three terms.

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8. In an A.P. whose first term is 2,the sum of first five terms in one fourth the sum of the next five terms.

Show that $T_{20} = -112$. Also, find S_{20}.

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9. The third term of an A.P. is 8. and the ninth term of the A.P. exceeds three times the third term by 2. Find the sum of its first 19 terms.

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10. The third term of an AP is 7 and the 7^{th} term exceeds 3 times the third term by 2. Find the first term and the common difference and the sum of first 20 terms.

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11. The interior angles of a polygon are in A.P .The smallest angle is 120° and common difference is 5° . Find the number of the polygon.

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12. An aritmetic progression consists of three terms whose sum is 15 and sum of the squares of extremes is 58. Find the terms of progression.

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13. IF a A.P. if $T_n = 4n + 3$. Find S_{13}.

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Textbook Corner Exercise 1 1

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

(i)The taxi fare after each km when the fare is

Rs 15 for the first km and Rs 8 for additional km.

(ii) The amount of air present in a cylinder when a vacuum pump removes $\left(\frac{1}{4}\right)^{th}$ of the air remaining in the cylinder at a time.

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

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

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2. Write first four terms of the AP, when the first term a and the common difference d are give as follows:

(i) $a = 10, d = 10$

(ii) $a = -2, d = 0$

(iii) $a = 4, d = -3$

(iv) $a = -1, d = \frac{1}{2}$

(v) $a = -1.25, d = -0.25$

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3. For the following A.P.s, write the first term and the common difference.

i] $3, 1, -1, -3, \ldots$

ii] $-5, -1, 3, 7, \ldots$

iii] $\frac{1}{3}, \frac{5}{3}, \frac{9}{3}, \frac{13}{3}, \ldots.$

iv] $0.6, 1.7, 2.8, 3.9, \ldots$

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4. Write of the following are Aps? IF they form an AP, find the common difference d and write three more terms.

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

(iii) $-1.2, \ -3.2, \ -5.2, \ -7.2 \ldots.$

$(iv) \ -10, \ -6, \ -2, 2 \ldots.$

(v) $3, 3+\sqrt{2}, 3+2\sqrt{2}, 3+3\sqrt{2} \ldots.$

$(vi) 0.2, 0.22, 0.222, 0.2222 \ldots$

(vii) $0, \ -4, \ -8, \ -12 \ldots$

(viii) $-\frac{1}{2}, \ -\frac{1}{2}, \ -\frac{1}{2}, \ -\frac{1}{2} \ldots.$

$(ix) 1, 3, 9, 27 \ldots$

(x) $a, 2a, 3a, 4a$

(x i) $a, a^2, a^3, a^4 \ldots . .$

$(xii) \sqrt{2}, \sqrt{8}, \sqrt{18}, \sqrt{32} \ldots.$

$(xiii) \sqrt{3}, \sqrt{6}, \sqrt{9}, \sqrt{12} \ldots$

(x iv) $1^2, 3^2, 5^2, 7^2, \ldots$

$(xv) = 1^2, 5^2, 7^2, 73, \ldots.$

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Textbook Corner Exercise 1 2

1. Fill in the blanks in the following , given that a is the first term, d the common difference and a_n the nth term of the A.P.

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2. 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

Answer: C

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3. 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. $-48\frac{1}{2}$

Answer: B

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4. In the following AP's find the missing terms in the boxes.

(i) 2._____,26

Let the missing term bex.

(ii) _____13, _____,3.

(iii) 5,_____,_____,$9\frac{1}{2}$

(iv) -4,_____,_____,_____,_____,6.`

(v) _____,38,_____,_____,_____-22.

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5. Which term of the AP : 3,8,13,18,... is 78 ?

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6. Find the number of terms in each of the following APs :

7,13,19,...205

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7. Check whether -150 is a term of the AP : 11, 8, 5, 2

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8. Find the 31st term of an AP whose 11th term is 38 and the 16th term is 73.

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9. An AP consists of 50 terms of which 3rd term is 12 and the last term is 106. Find the 29th term.

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10. If the 3^{rd} and the 9^{th} terms of an AP are 4 and -8 respectively, which term of this AP is zero ?

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

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12. Which term of the AP : 3, 15, 27, 39, ... Will be 132 more than its 54^{th} term ?

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13. Two APs have the same common difference. The difference between their 100^{th} terms is 100, what is the difference between their 1000^{th} terms ?

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14. How many three digit numbers are divisible by 7?

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15. How many multiples of 4 lie between 10 and 250 ?

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16. For what value of n, are the n^{th} terms of two APs : 63, 65, 67,... and 3, 10, 17,... equal ?

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17. Determine the AP whose third term is 16 and the 7th term exceeds the 5th term by 12.

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18. Find the 20^{th} term from end of the sequence 3,8,13 ..... 253.

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19. The sum of the 4^{th} and 8^{th} terms of an AP is 24 and the sum of the 6^{th} and 10^{th} terms is 44. Find the first three terms of the AP.

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20. Subba Rao started work in 1995 at an annual salary of Rs.5000 and received an increment of Rs. 200 cash year. In which year did this income reach Rs. 7000 ?

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21. 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.

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Textbook Corner Exercise 1 3

1. Find the sum of the following APs :

2,7,12,...to 10^{th} terms.

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2. Find the sums given below :

(i) $7 + 10\frac{1}{2} + 14 + \ldots\ldots\ldots + 84$

(ii) $34 + 32 + 30 + \ldots\ldots + 10$

(iii)

$-5 + (-8) + (-11) + \ldots\ldots\ldots + (-230)$

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3. In an AP:

(i) given a=5, d=3, $a_n = 50$, find n and S_n.

(ii) given $a = 7, a_{13} = 35,$ find d and S_{13}

(iii) given $a_{12} = 37, d = 3$, find a and S_{12}

(iv) given $a_3 = 15, S_{10} = 125$, find and a_{10}.

(v) given d=5, $S_9 = 75$ and a and a_9.

(vi) given $a = 2, d = 8, S_n = 90$, find n and a_n

.

(vii) given $a = 8, a_n = 62, S_n = 210.$ find n and d.

(viii) given $a_n = 4, d = 2, S_n = -14,$ find n and a.

(ix) given $a_n = 3, n = 8, S_n = 192,$ find d.

(x) Given $l = 28, s = 144$ and there are total 9 terms find a.

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4. How many terms of the AP:9,17,2.... Must be taken to give a sum of 636.

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5. The first of an A.P is 5, the last term is 45 and the sum is 400. Find the number of terms and the common difference.

6. The first and the last terms of an A.P are 17 and 350 respectively. If the common difference is 9, how many terms are there and what is their sum ?

7. Find the sum of first 22 terms of an A.P in which d = 7 and 22nd term is 149.

8. Find the sum of first 51 terms of an AP whose second and third term are 14 and 18 respectively.

9. If the sum of first 7 terms of an A.P is 49 and that of 17 terms is 289, find the sum of first n terms.

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10. Show that $a_1, a_2, \ldots, a_n, \ldots$ form an A.P where an is defined as below : (i) $a_n = 3 + 4n$ (ii) $a_n = 9 - 5n$.

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

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11. 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 nth terms?

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12. Find the sum of the first 40 positive integers divisible by 6.

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13. Find the sum of the first 15 multiples of 8.

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14. Find the sum of the odd numbers between 0 and 50.

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15. A contract on construction job specific 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 ?

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16. A sum of Rs. 700 to be used to give seven cash prizes to students of a school for thir overall academic performance. If each prize is Rs. 20 less than its preceding prize, find the value of each of the prizes.

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17. In a scholl students thought of planting trees in and around the school to reduce air pollution. It was decided that the number of tress, 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 with plant I tree, a section of Class II will plant 2 trees and so on till Class XII. Three are three sections of each class. How many tress will be planted by the students ?

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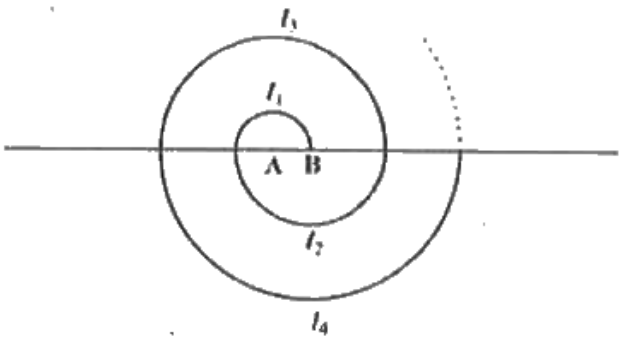
18. A spiral is made up of successive semicircles, with centres alternately at A and B, starting with centre at A, of radii 0.5 cm , 1.0

cm, 1.5 cm, 2.0 cm,... as shown in Fig. 54. What is the total length of such a spiral made up to thirteen consecutive semicircles ? (Take $\pi = \frac{22}{7}$)



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19. 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. In how many rows are the 200 logs placed and how many logs are in the top row ?

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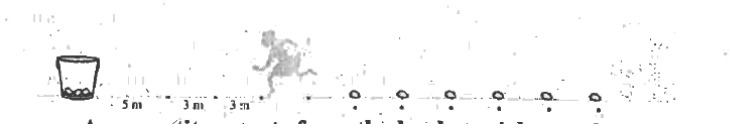
20. In a potato race, a bucket is placed at the starting point, which is 5m from the first potato, and the other potatoes are placed 3m apart in a straight line. There are ten potatoes in the line (fig.).



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 nest 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 $2 \times 5 + 2 \times (5 + 3)$]

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Textbook Corner Exercise 1 4

1. Which term of the AP: 121,117,113..... is its first negative term?

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2. If the sum of first term of an A.P is 49 and that of 17 terms is 289. Find the sum of first "n" terms.

OR

The sum of the third and seyenth terms of an

AP is 6 and their product is 8. find the sum of first sixteen terms of the A.P.

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3. A tadcler has rungs 25 cm apart . The rungs decrease uniformly in length from 45cm at the bottom to 25 cm at the top . If the top and the bottom runs are $2\frac{1}{2}$ m apart , what is length of the wood required for the rungs ?

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4. The houses of a row are numbered consectively from 1 to 49. show that there is a value of x such that the sum 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.

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

Each stop has a rise of $1/2$ m and a tread of $1/2$m calculate the total volume of concrete required to build the terrace.

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