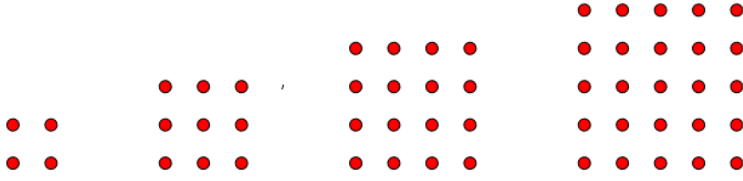
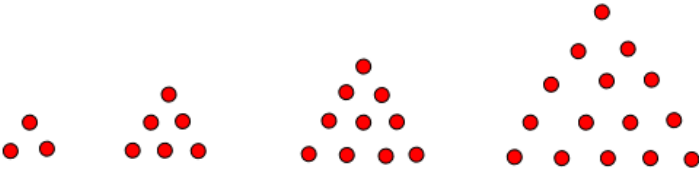


QUICK REVISION – ARITHMETIC SEQUENCES  
QUESTIONS

1	<p>Look at these squares made with dots .</p>  <p>a) Find the number of dots in each square ?</p> <p>b ) What is the algebraic form of the sequence of the number of dots obtained by continuing the process of making such squares ?</p>
2	<p>Look at these triangles made with dots .</p>  <p>a) Find the number of dots in each triangle ?</p> <p>b ) What is the algebraic form of the sequence of the number of dots obtained by continuing the process of making such triangles?</p>
3	<p>a) Write the sequence of natural numbers which are multiplied by 3 and added to 1 ?</p> <p>b) Check whether this sequence is an arithmetic sequence or not ?</p>
4	<p>Consider the arithmetic sequence 6, 10, 14, ..... .</p> <p>a) What is its common difference ?</p> <p>b) What is its 10<sup>th</sup> term?</p> <p>c) What is its algebraic form ?</p>
5	<p>Consider the arithmetic sequence 1, 6, 11, ..... .</p> <p>a) What is its common difference ?</p> <p>b) What is its 20<sup>th</sup> term ?</p> <p>c) What is its algebraic form ?</p>

6	<p>The algebraic form of an arithmetic sequence is <math>4n+1</math> .</p> <p>a) What is its common difference ?</p> <p>b) What is its first term ?</p> <p>c) What is the remainder when each term of this sequence is divided by 4 ?</p>
7	<p>The algebraic form of an arithmetic sequence is <math>7n-3</math> .</p> <p>a) What is its common difference ?</p> <p>b) What is its first term ?</p> <p>c) What is the remainder when each term of this sequence is divided by 7 ?</p>
8	<p>a) Write down an arithmetic sequence with common difference 3 ?</p> <p>b) Can the difference of any two terms of this sequence be 30 ? Why ?</p>
9	<p>a) Write down an arithmetic sequence with common difference 8 ?</p> <p>b) Can the difference between any two terms of this sequence be 70 ? Why ?</p>
10	<p>Consider the arithmetic sequence <math>7, 10, 13, \dots</math> .</p> <p>a) What is its common difference ?</p> <p>b) Is 90 a term of this sequence ? Why ?</p>
11	<p>Consider the arithmetic sequence <math>2, 11, 20, \dots</math> .</p> <p>a) What is its common difference ?</p> <p>b) Is 101 a term of this sequence ? Why ?</p>
12	<p><math>5^{\text{th}}</math> term of an arithmetic sequence is 17 and its <math>10^{\text{th}}</math> term is 32 .</p> <p>a) What is its common difference ?</p> <p>b) What is its first term ?</p> <p>c) Find the position of 92 in this sequence ?</p>

13	<p><math>4^{\text{th}}</math> term of an arithmetic sequence is 23 and its <math>11^{\text{th}}</math> term 65 .</p> <p>a) What is its common difference ?</p> <p>b) What is its first term ?</p> <p>c) Find the position of 299 in this sequence ?</p>
14	<p>Consider the arithmetic sequence 5,9,13,..... .</p> <p>a) What is its common difference ?</p> <p>b) What is its algebraic form ?</p> <p>c) Check whether the square of any term is a term of this sequence or not ?</p>
15	<p>Consider the arithmetic sequence 2,12,22,..... .</p> <p>a) What is its common difference ?</p> <p>b) Write down the next three terms of this sequence ?</p> <p>c) Is there any perfect square term in this sequence ? Justify your answer ?</p> <p>d) What is the algebraic form of this sequence ?</p>
16	<p>Consider the arithmetic sequence 3,8,13,..... .</p> <p>a) What is its common difference ?</p> <p>b) Write down the next three terms of this sequence ?</p> <p>c) Is there any perfect square term in this sequence ? Justify your answer ?</p> <p>d) What is the algebraic form of this sequence ?</p>
17	<p>Consider the arithmetic sequence 71,68,65,..... .</p> <p>a) What is its common difference ?</p> <p>b) What is the algebraic form of this sequence ?</p> <p>c) Is 0 a term of this sequence ?</p> <p>d) How many positive numbers are in this sequence ?</p> <p>e) Which is the largest negative number in this sequence ?</p>

18	<p>Consider the arithmetic sequence <math>-172, -165, -158, \dots</math> .</p> <p>a) What is its common difference ?</p> <p>b) What is the algebraic form of this sequence ?</p> <p>c) Is 0 a term of this sequence ?</p> <p>d) How many negative numbers are in this sequence ?</p> <p>e) Which is the smallest positive number in this sequence ?</p>
19	<p>Find the following sums ?</p> <p>a) <math>1+2+3+4+5+\dots+100</math></p> <p>b) <math>3+6+9+12+15+\dots+300</math></p>
20	<p>Find the following sums ?.</p> <p>a) <math>1+2+3+4+5+\dots+50</math></p> <p>b) <math>7+14+21+28+35+\dots+350</math></p>
21	<p>Find the following sums ?</p> <p>a) <math>1+2+3+4+5+\dots+20</math></p> <p>b) <math>5+10+15+20+25+\dots+100</math></p> <p>c) <math>7+12+17+22+27+\dots+102</math></p>
22	<p>Find the following sums ?</p> <p>a) <math>1+2+3+4+5+\dots+40</math></p> <p>b) <math>4+8+12+16+20+\dots+160</math></p> <p>c) <math>3+7+11+15+19+\dots+159</math></p>
23	<p>Consider the arithmetic sequence <math>8, 14, 20, \dots</math></p> <p>a) What is its common difference ?</p> <p>b) What is its algebraic form ?</p> <p>c) Find the position of 62 in this sequence ?</p> <p>d) What is the sum of first 10 terms of this sequence ?</p>

24	<p>Consider the arithmetic sequence 5,8,11,..... .</p> <p>a) What is its common difference ?</p> <p>b) What is its algebraic form ?</p> <p>c) Find the position of the term obtained by adding 60 to its 30<sup>th</sup> term ?</p>
25	<p>Consider the arithmetic sequence 2,6,10,..... .</p> <p>a) What is its common difference ?</p> <p>b) What is its algebraic form ?</p> <p>c) Find the position of the term obtained by subtracting 80 from its 50<sup>th</sup> term ?</p>
26	<p>The algebraic form of an arithmetic sequence is <math>4n+3</math> .</p> <p>a) What is its common difference ?</p> <p>b) What is the sum of its first and 20<sup>th</sup> terms ?</p> <p>c) What is the sum of first 20 terms of this sequence ?</p>
27	<p>The sum of first 5 terms of an arithmetic sequence is 35 and the sum of first 9 terms is 99</p> <p>a) What is its third term ?</p> <p>b) What is its common difference ?</p> <p>c) What is the algebraic form of this sequence ?</p>
28	<p>The sum of first 7 terms of an arithmetic sequence is 119 and the sum of first 20 terms is 860.</p> <p>a) What is its fourth term ?</p> <p>b) What is its 17<sup>th</sup> term ?</p> <p>c) What is the algebraic form of this sequence ?</p>
29	<p>The sum of first 4 terms of an arithmetic sequence is 64 and the sum of first 10 terms is 340 .</p> <p>a) What is the sum of first and fourth terms of this sequence ?</p> <p>b) What is its common difference ?</p> <p>c) Write down the sequence ?</p>

30	<p>The sum of <math>5^{\text{th}}</math> and <math>16^{\text{th}}</math> terms of an arithmetic sequence is 67 .</p> <p>a) What is the sum of first and <math>20^{\text{th}}</math> terms of this sequence ?</p> <p>b) If the <math>10^{\text{th}}</math> term is 32 , what is its <math>11^{\text{th}}</math> term ?</p> <p>c) What is the sum of first 20 terms of this sequence ?</p>
31	<p>The sum of <math>6^{\text{th}}</math> and <math>10^{\text{th}}</math> terms of an arithmetic sequence is 66 .</p> <p>a) What is the sum of first and <math>15^{\text{th}}</math> terms of this sequence ?</p> <p>b) What is its <math>8^{\text{th}}</math> term ?</p> <p>c) What is the sum of first 15 terms of this sequence ?</p>
32	<p><math>11^{\text{th}}</math> term of an arithmetic sequence is 26 .</p> <p>a) What is the sum of first and <math>21^{\text{st}}</math> terms of this sequence ?</p> <p>b) What is the sum of first 21 terms of this sequence ?</p>
33	<p>The sum of <math>6^{\text{th}}</math> and <math>8^{\text{th}}</math> terms of an arithmetic sequence is 64 .</p> <p>a) What is the sum of first and <math>13^{\text{th}}</math> terms of this sequence ?</p> <p>b) What is its <math>7^{\text{th}}</math> term ?</p> <p>c) What is the sum of first 13 terms of this sequence ?</p>
34	<p>Consider the sequence of three digit numbers which leave a remainder 1 on divisible by 3</p> <p>a) What is its common difference ?</p> <p>b) Which is the smallest number in this sequence ?</p> <p>c) How many three digit numbers are there ,which leave a remainder 1 on divisible by 3?</p> <p>d) What is the sum of such numbers ?</p>
35	<p>The sum of <math>10^{\text{th}}</math> and <math>11^{\text{th}}</math> terms of an arithmetic sequence is 65 .</p> <p>a) What is the sum of its first and <math>20^{\text{th}}</math> terms ?</p> <p>b) What is the sum of first 20 terms of this sequence ?</p> <p>c) If the <math>4^{\text{th}}</math> term of this sequence is 13 , what is its <math>17^{\text{th}}</math> term ?</p> <p>d) What is the common difference of this sequence ?</p> <p>e) What is the algebraic form of this sequence ?</p>

36	<p>Consider the arithmetic sequence 4,12,20,..... .</p> <p>a) What is the common difference of this sequence ?</p> <p>b) What is the sum of first 4 terms of this sequence ?</p> <p>c) Can the sum of any 25 terms of this sequence be 1090 ? Why ?</p>
37	<p>Consider the arithmetic sequence 6,15,24,.....</p> <p>a) What is the common difference of this sequence ?</p> <p>b) What is the remainder when each term of this sequence is divided by 3 ?</p> <p>c) Can the sum of any 30 terms of this sequence be 500 ? Why ?</p>
38	<p>Consider the arithmetic sequence 5,9,13,..... .</p> <p>a) What is the common difference of this sequence ?</p> <p>b) Write down the next three terms of this sequence ?</p> <p>c) Can the sum of any 15 terms of this sequence be 500 ? Why ?</p>
39	<p>Consider the arithmetic sequence 7,13,19,..... .</p> <p>a) What is the common difference of this sequence ?</p> <p>b) What is its 10<sup>th</sup> term ?</p> <p>c) Can the sum of any two terms be a term of this sequence ?</p>
40	<p>Consider the arithmetic sequence 5,9,13,..... .</p> <p>a) What is the common difference of this sequence ?</p> <p>b) What is the algebraic form of the sum of this sequence ?</p>
41	<p>Consider the arithmetic sequence 1,7,13,..... .</p> <p>a) What is the common difference of this sequence ?</p> <p>b) What is the algebraic form of the sum of this sequence ?</p>

42	<p>The algebraic form of an arithmetic sequence is <math>2n+1</math> .</p> <p>a) What is the common difference of this sequence ?</p> <p>b) What is the sum of first 9 terms of this sequence ?</p> <p>c) What is the algebraic form of the sum of this sequence ?</p>
43	<p>The algebraic form of an arithmetic sequence is <math>6n-5</math> .</p> <p>a) What is the common difference of this sequence ?</p> <p>b) What is the sum of first 15 terms of this sequence ?</p> <p>c) What is the algebraic form of the sum of this sequence ?</p>
44	<p>The sum of first <math>n</math> terms of an arithmetic sequence is <math>n^2+4n</math> .</p> <p>a) What is its first term ?</p> <p>b) What is the common difference of this sequence ?</p> <p>c) What is the algebraic form of this sequence ?</p>
45	<p>The sum of first <math>n</math> terms of an arithmetic sequence is <math>4n^2-3n</math> .</p> <p>a) What is its first term ?</p> <p>b) What is the common difference of this sequence ?</p> <p>c) What is the algebraic form of this sequence ?</p>
46	<p>Consider the arithmetic sequence <math>5, 7, 9, \dots</math> .</p> <p>a) What is its first term ?</p> <p>b) What number will you get if 4 is added to the sum of first 3 terms of this sequence ?</p> <p>c) Prove that the sum of any number of terms of this sequence starting from the first added to 4 gives a perfect square ??</p>
47	<p>a) What is the common difference of the arithmetic sequence <math>7, 11, 15, \dots</math> ?</p> <p>b) What is the common difference of the arithmetic sequence <math>10, 14, 18, \dots</math> ?</p> <p>c) What is the difference between the sum of first 30 terms of these sequences ?</p>

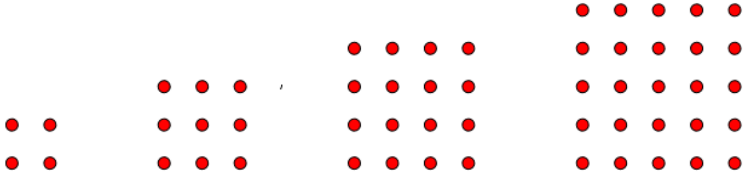
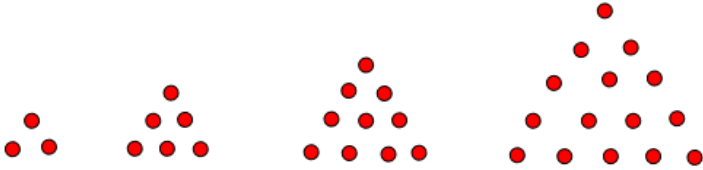


48	<p>a) What is the common difference of the arithmetic sequence <math>5, 8, 11, \dots</math> ?</p> <p>b) What is the common difference of the arithmetic sequence <math>9, 12, 15, \dots</math> ?</p> <p>c) What is the difference between the sum of first 50 terms of these sequences ?</p>
49	<p>Consider the arithmetic sequence <math>7, 12, 17, \dots</math> .</p> <p>a) What is the common difference of this sequence ?</p> <p>b) What is the difference between the sum of first 20 terms and the sum of next 20 terms ?</p>
50	<p>Consider the arithmetic sequence <math>1, 10, 19, \dots</math> .</p> <p>a) What is the common difference of this sequence ?</p> <p>b) What is the difference between the sum of first 30 terms and the sum of next 30 terms ?</p>
51	<p>The sum of first 13 terms of an arithmetic sequence and the sum of next 12 terms are equal . If its common difference is 3 ,</p> <p>a) How many times of the common difference will be the difference between <math>14^{\text{th}}</math> and first terms of this sequence ?</p> <p>b) What is the <math>13^{\text{th}}</math> term of this sequence ?</p> <p>c) What is the sum of first 25 terms of this sequence ?</p>
52	<p>The sum of first 9 terms of an arithmetic sequence and the sum of next 8 terms are equal. If its common difference is 5 .</p> <p>a) How many times of the common difference will be the difference between <math>10^{\text{th}}</math> and first terms of this sequence ?</p> <p>b) What is the <math>9^{\text{th}}</math> term of this sequence ?</p> <p>c) What is the sum of first 17 terms of this sequence ?</p>

53	<p><i>Look at the number pattern given below</i></p> <p>1</p> <p>2 3</p> <p>4 5 6</p> <p>7 8 9 10</p> <p>.....</p> <p>.....</p> <p><i>a) Write the next two more lines of this pattern ?</i></p> <p><i>b) How many numbers are there in the 9<sup>th</sup> line?</i></p> <p><i>c) What is the last number in the 10<sup>th</sup> line ?</i></p> <p><i>d) What is the sum of the numbers in the 10<sup>th</sup> line ?</i></p>
54	<p><i>Look at the number pattern given below</i></p> <p>6</p> <p>10 14</p> <p>18 22 26</p> <p>30 34 38 42</p> <p>.....</p> <p>.....</p> <p><i>a) Write the next two more lines of this pattern ?</i></p> <p><i>b) What is the last number of the 18<sup>th</sup> line?</i></p> <p><i>c) What is the the first number of the 20<sup>th</sup> line ?</i></p> <p><i>d) What is the sum of all numbers in the first 20 lines ?</i></p>

55	<p><i>Look at the number pattern given below.</i></p> <p>1</p> <p>2   3   4</p> <p>5   6   7   8   9</p> <p>10   11   12   13   14   15   16</p> <p>.....</p> <p>.....</p> <p><i>a) Write the next two more lines of this pattern ?</i></p> <p><i>b) How many numbers are there in the 9<sup>th</sup> line?</i></p> <p><i>c) What is the last number in the 9<sup>th</sup> line ?</i></p> <p><i>d) What is the the first term in the 11<sup>th</sup> line ?</i></p>
56	<p><i>Look at the number pattern given below</i></p> <p>5</p> <p>8   11   14</p> <p>17   20   23   26   29</p> <p>32   35   38   41   44   47   50</p> <p>.....</p> <p>.....</p> <p><i>a) Write the next two more lines of this pattern ?</i></p> <p><i>b) How many numbers are there in the 10<sup>th</sup> line ?</i></p> <p><i>c) What is the last number in the 10<sup>h</sup> line ?</i></p> <p><i>d) What is the the first term in the 12<sup>th</sup> line ?</i></p>

QUICK REVISION – ARITHMETIC SEQUENCES  
ANSWERS

<p>1</p>	<p>Look at these squares made with dots .</p>  <p>a) Find the number of dots in each square ?</p> <p>b ) What is the algebraic form of the sequence of the number of dots obtained by continuing the process of making such squares ?</p> <p><u>Answer .</u></p> <p>a) 4,9,16,25</p> <p>b) <math>(n+1)^2</math></p>
<p>2</p>	<p>Look at these triangles made with dots .</p>  <p>a) Find the number of dots in each triangle ?</p> <p>b ) What is the algebraic form of the sequence of the number of dots obtained by continuing the process of making such triangles?</p> <p><u>Answer .</u></p> <p>a) 3,6,10,15</p> <p>b) <math>1+2+3+4+\dots+(n+1) = \frac{(n+1)(n+2)}{2}</math></p>
<p>3</p>	<p>a) Write the sequence of natural numbers which are multiplied by 3 and added to 1 ?</p> <p>b) Check whether this sequence is an arithmetic sequence or not ?</p>

	<p><u>Answer .</u></p> <p>a) <math>3 \times 1 + 1, 3 \times 2 + 1, 3 \times 3 + 1, 3 \times 4 + 1, 3 \times 5 + 1, \dots</math></p> <p><math>= 4, 7, 10, 13, 16, \dots</math></p> <p>b) <math>x_2 - x_1 = 7 - 4 = 3</math></p> <p><math>x_3 - x_2 = 10 - 7 = 3</math></p> <p><math>x_4 - x_3 = 13 - 10 = 3</math></p> <p><math>x_5 - x_4 = 16 - 13 = 3</math></p> <p><i>Since the difference between any two consecutive terms is a constant , it is an arithmetic sequence.</i></p>
4	<p>Consider the arithmetic sequence <math>6, 10, 14, \dots</math> .</p> <p>a) What is its common difference ?</p> <p>b) What is its <math>10^{\text{th}}</math> term?</p> <p>c) What is its algebraic form ?</p> <p><u>Answer .</u></p> <p>a) <math>10 - 6 = 4</math></p> <p>b) <math>4 \times 10 + 2 = 40 + 2 = 42</math></p> <p>c) <math>4n + 2</math></p>
5	<p>Consider the arithmetic sequence <math>1, 6, 11, \dots</math> .</p> <p>a) What is its common difference ?</p> <p>b) What is its <math>20^{\text{th}}</math> term ?</p> <p>c) What is its algebraic form ?</p> <p><u>Answer .</u></p> <p>a) <math>6 - 1 = 5</math></p> <p>b) <math>5 \times 20 - 4 = 100 - 4 = 96</math></p> <p>c) <math>5n - 4</math></p>

6	<p>The algebraic form of an arithmetic sequence is <math>4n+1</math> .</p> <p>a) What is its common difference ?</p> <p>b) What is its first term ?</p> <p>c) What is the remainder when each term of this sequence is divided by 4 ?</p> <p><u>Answer .</u></p> <p>a) 4</p> <p>b) <math>4 \times 1 + 1 = 4 + 1 = 5</math></p> <p>c) 1</p> <p style="text-align: right;">Sequence = 5, 9, 13, .....</p>
7	<p>The algebraic form of an arithmetic sequence is <math>7n-3</math> .</p> <p>a) What is its common difference ?</p> <p>b) What is its first term ?</p> <p>c) What is the remainder when each term of this sequence is divided by 7 ?</p> <p><u>Answer .</u></p> <p>a) 7</p> <p>b) <math>7 \times 1 - 3 = 7 - 3 = 4</math></p> <p>c) 4</p> <p style="text-align: right;">Sequence = 4, 11, 18, .....</p>
8	<p>a) Write down an arithmetic sequence with common difference 3 ?</p> <p>b) Can the difference of any two terms of this sequence be 30 ? Why ?</p> <p><u>Answer.</u></p> <p>a) 3, 6, 9, ..... ( or 1, 4, 7, 10, ..... or 2, 5, 8, 11, ..... )</p> <p>b) Yes . The term difference is a multiple of the common difference ( <math>30 = 10 \times 3</math> )</p>
9	<p>a) Write down an arithmetic sequence with common difference 8 ?</p> <p>b) Can the difference between any two terms of this sequence be 70 ? Why ?</p> <p><u>Answer.</u></p> <p>a) 8, 16, 24, ..... ( or 1, 9, 17, 25, ..... or 10, 18, 26, ..... , ..... )</p>

	<p>b.) No. The term difference is not a multiple of the common difference. ( 70 is not a multiple of 8 )</p>
10	<p>Consider the arithmetic sequence 7, 10, 13, ..... .</p> <p>a) What is its common difference ?</p> <p>b) Is 90 a term of this sequence ? Why ?</p> <p><u>Answer.</u></p> <p>a) <math>10 - 7 = 3</math></p> <p>b) Term difference = <math>90 - 7 = 83</math></p> <p>83 is not a multiple of 3 <math>\Rightarrow</math> The term difference is not a multiple of the common difference.</p> <p><math>\Rightarrow</math> 90 is not a term of this sequence.</p>
11	<p>Consider the arithmetic sequence 2, 11, 20, ..... .</p> <p>a) What is its common difference ?</p> <p>b) Is 101 a term of this sequence ? Why ?</p> <p><u>Answer.</u></p> <p>a) <math>11 - 2 = 9</math></p> <p>b) Term difference = <math>101 - 2 = 99 = 11 \times 9</math></p> <p><math>\Rightarrow</math> The term difference is a multiple of the common difference</p> <p><math>\Rightarrow</math> 101 is a term of this sequence.</p>
12	<p>5<sup>th</sup> term of an arithmetic sequence is 17 and its 10<sup>th</sup> term is 32.</p> <p>a) What is its common difference ?</p> <p>b) What is its first term ?</p> <p>c) Find the position of 92 in this sequence ?</p>

	<p><u>Answer.</u></p> <p>a) Common difference = <math>\frac{\text{Term difference}}{\text{Position difference}} = \frac{x_{10} - x_5}{10 - 5} = \frac{32 - 17}{5} = \frac{15}{5} = 3</math></p> <p>b) <math>x_1 = x_5 - 4d = 17 - 4 \times 3 = 17 - 12 = 5</math></p> <p>c) <math>x_n = 92 \implies 3n + 2 = 92</math>  <math>3n = 92 - 2 \implies 3n = 90</math>  <math>\implies n = \frac{90}{3} = 30</math></p> <div style="border-left: 1px solid black; padding-left: 10px; margin-left: 20px;"> <p>Sequence = 5, 8, 11, .....</p> <p>Algebraic form, <math>x_n = 3n + 2</math></p> </div>
13	<p>4<sup>th</sup> term of an arithmetic sequence is 23 and its 11<sup>th</sup> term 65 .</p> <p>a) What is its common difference ?</p> <p>b) What is its first term ?</p> <p>c) Find the position of 299 in this sequence ?</p> <p><u>Answer.</u></p> <p>a) . Common difference = <math>\frac{\text{Term difference}}{\text{Position difference}} = \frac{x_{11} - x_4}{11 - 4} = \frac{65 - 23}{7} = \frac{42}{7} = 6</math></p> <p>b) <math>x_1 = x_4 - 3d = 23 - 3 \times 6 = 23 - 18 = 5</math></p> <p>c) <math>x_n = 299 \implies 6n - 1 = 299</math>  <math>6n = 299 + 1 \implies 6n = 300 \implies n = \frac{300}{6} = 50</math></p> <div style="border-left: 1px solid black; padding-left: 10px; margin-left: 20px;"> <p>Sequence = 5, 11, 17, .....</p> <p>Algebraic form, <math>x_n = 6n - 1</math></p> </div>
14	<p>Consider the arithmetic sequence 5, 9, 13, ..... .</p> <p>a) What is its common difference ?</p> <p>b) What is its algebraic form ?</p> <p>c) Check whether the square of any term is a term of this sequence or not ?</p> <p><u>Answer.</u></p> <p>a) <math>9 - 5 = 4</math></p> <p>b) <math>x_n = 4n + 1</math></p> <p>c) <math>(x_n)^2 = (4n + 1)^2 = 16n^2 + 8n + 1</math></p>



	<p><i>Term difference</i> = <math>(x_n)^2 - x_1 = (x_n)^2 - 5 = 16n^2 + 8n + 1 - 5</math></p> <p>= <math>16n^2 + 8n - 4</math></p> <p>= <math>4(4n^2 + 2n - 1) \implies (x_n)^2 - 5</math> is a multiple of 4</p> <p><math>\implies</math> <i>Term difference is a multiple of the common difference.</i></p> <p><math>\implies (x_n)^2</math> is a term of this sequence.</p> <p><math>\implies</math> <i>The square of any term of this sequence is a term in this sequence.</i></p>
15	<p>Consider the arithmetic sequence 2, 12, 22, ..... .</p> <p>a) What is its common difference ?</p> <p>b) Write down the next three terms of this sequence ?</p> <p>c) Is there any perfect square term in this sequence ? Justify your answer ?</p> <p>d) What is the algebraic form of this sequence ?</p> <p><u>Answer.</u></p> <p>a) <math>12 - 2 = 10</math></p> <p>b) 32, 42, 52</p> <p>c) No. In any perfect squares, the digit in the unit place can not be 2 .</p> <p>( The digits in the unit place of the numbers of this sequence is 2 )</p> <p>d) Algebraic form = <math>10n + 2</math></p>
16	<p>Consider the arithmetic sequence 3, 8, 13, ..... .</p> <p>a) What is its common difference ?</p> <p>b) Write down the next three terms of this sequence ?</p> <p>c) Is there any perfect square term in this sequence ? Justify your answer ?</p> <p>d) What is the algebraic form of this sequence ?</p>

	<p><u>Answer.</u></p> <p>a) <math>8 - 3 = 5</math></p> <p>b) 18, 23, 28</p> <p>c) No. In any perfect squares, the digit in the unit place can not be 3 and 8 . ( The digits in the unit place of the numbers of this sequence are 3 and 8 )</p> <p>d) Algebraic form = <math>5n - 2</math></p>
17	<p>Consider the arithmetic sequence 71, 68, 65, ..... .</p> <p>a) What is its common difference ?</p> <p>b) What is the algebraic form of this sequence ?</p> <p>c) Is 0 a term of this sequence ?</p> <p>d) How many positive numbers are in this sequence ?</p> <p>e) Which is the largest negative number in this sequence ?</p> <p><u>Answer.</u></p> <p>a) <math>68 - 71 = -3</math></p> <p>b) Algebraic form = <math>74 - 3n</math></p> <p>c) No.</p> <p>d) 24</p> <p>e) <math>x_{25} = 74 - 3 \times 25 = 74 - 75 = -1</math></p> <div style="border-left: 1px solid black; padding-left: 10px; margin-left: 20px;"> <p>If <math>x_n = 0</math> ,</p> <p><math>74 - 3n = 0 \implies n = \frac{74}{3} = 24\frac{2}{3}</math></p> </div>
18	<p>Consider the arithmetic sequence -172, -165, -158, ..... .</p> <p>a) What is its common difference ?</p> <p>b) What is the algebraic form of this sequence ?</p> <p>c) Is 0 a term of this sequence ?</p> <p>d) How many negative numbers are in this sequence ?</p> <p>e) Which is the smallest positive number in this sequence ?</p>

	<p><u>Answer.</u></p> <p>a) <math>-165 - (-172) = -165 + 172 = 7</math></p> <p>b) Algebraic form = <math>7n - 179</math></p> <p>c) No.</p> <p>d) 25</p> <p>e) <math>x_{26} = 7 \times 26 - 179 = 182 - 179 = 3</math></p> <div style="border-left: 1px solid black; padding-left: 10px; margin-left: 20px;"> <p>If <math>x_n = 0</math> ,</p> <p><math>7n - 179 = 0 \implies n = \frac{179}{7} = 25 \frac{4}{7}</math></p> </div>
19	<p><i>Find the following sums ?</i></p> <p>a) <math>1+2+3+4+5+\dots\dots\dots+100</math></p> <p>b) <math>3+6+9+12+15+\dots\dots\dots+300</math></p>
	<p><u>Answer.</u></p> <p>a) <math>1+2+3+4+5+\dots\dots\dots+100 = \frac{100 \times 101}{2} = 5050</math></p> <p>b) <math>3+6+9+12+15+\dots\dots\dots+300 = 3(1+2+3+4+5+\dots\dots\dots+100) = 3 \times 5050 = 15150</math></p>
20	<p><i>Find the following sums ?.</i></p> <p>a) <math>1+2+3+4+5+\dots\dots\dots+50</math></p> <p>b) <math>7+14+21+28+35+\dots\dots\dots+350</math></p>
	<p><u>Answer.</u></p> <p>a) <math>1+2+3+4+5+\dots\dots\dots+50 = \frac{50 \times 51}{2} = 1275</math></p> <p>b) <math>7+14+21+28+35+\dots\dots\dots+350 = 7(1+2+3+4+5+\dots\dots\dots+50) = 7 \times 1275 = 8925</math></p>
21	<p><i>Find the following sums ?</i></p> <p>a) <math>1+2+3+4+5+\dots\dots\dots+20</math></p> <p>b) <math>5+10+15+20+25+\dots\dots\dots+100</math></p> <p>c) <math>7+12+17+22+27+\dots\dots\dots+102</math></p>

	<p><u>Answer.</u></p> <p>a) <math>1+2+3+4+5+\dots\dots\dots+20 = \frac{20 \times 21}{2} = 210</math></p> <p>b) <math>5+10+15+20+25+\dots\dots\dots+100 = 5(1+2+3+4+5+\dots\dots\dots+20) = 5 \times 210 = 1050</math></p> <p>c) <math>7+12+17+22+27+\dots\dots\dots+102 = 1050+20 \times 2 = 1090</math></p>
	<p><b>NB:</b></p> <p><i>The algebraic form of the arithmetic sequence 7,12,17..... = <math>5n+2</math></i></p> <p><i>2 is added to each term of the sequence 5,10,15,... gets the terms of the sequence 7,12,17,.... .</i></p> <p><math>7+12+17+\dots\dots\dots+102 = (5+10+15+\dots\dots\dots+100) + \underbrace{2+2+2+\dots\dots\dots+2}_{20 \text{ no.s}} = 1050+20 \times 2</math></p>
22	<p><i>Find the following sums ?</i></p> <p>a) <math>1+2+3+4+5+\dots\dots\dots+40</math></p> <p>b) <math>4+8+12+16+20+\dots\dots\dots+160</math></p> <p>c) <math>3+7+11+15+19+\dots\dots\dots+159</math></p>
	<p><u>Answer.</u></p> <p>a) <math>1+2+3+4+5+\dots\dots\dots+40 = \frac{40 \times 41}{2} = 820</math></p> <p>b) <math>4+8+12+16+20+\dots\dots\dots+160 = 4(1+2+3+4+5+\dots\dots\dots+40) = 4 \times 820 = 3280</math></p> <p>c) <math>3+7+11+15+19+\dots\dots\dots+159 = 3280 - 40 \times 1 = 3240</math> <span style="border-left: 1px solid black; padding-left: 10px;"><math>x_n = 4n - 1</math></span></p>
23	<p><i>Consider the arithmetic sequence 8,14,20,.....</i></p> <p>a) <i>What is its common difference ?</i></p> <p>b) <i>What is its algebraic form ?</i></p> <p>c) <i>Find the position of 62 in this sequence ?</i></p> <p>d) <i>What is the sum of first 10 terms of this sequence ?</i></p>

	<p><u>Answer.</u></p> <p>a) <math>14 - 8 = 6</math></p> <p>b) <math>6n + 2</math></p> <p>c) <math>6n + 2 = 62 \implies 6n = 62 - 2 = 60 \implies n = \frac{60}{6} = 10</math></p> <p>d) <math>Sum = \frac{10}{2}(x_1 + x_{10}) = \frac{10}{2}(8 + 62) = 5 \times 70 = 350</math></p>
24	<p>Consider the arithmetic sequence 5, 8, 11, ..... .</p> <p>a) What is its common difference ?</p> <p>b) What is its algebraic form ?</p> <p>c) Find the position of the term obtained by adding 60 to its 30<sup>th</sup> term ?</p> <p><u>Answer.</u></p> <p>a) <math>8 - 5 = 3</math></p> <p>b) <math>3n + 2</math></p> <p>c) <math>3n + 2 = x_{30} + 60 \implies 3n + 2 = 92 + 60 \implies 3n + 2 = 152</math> <span style="border-left: 1px solid black; padding-left: 10px;"><math>x_{30} = 3 \times 30 + 2 = 92</math></span></p> <p><math>3n = 152 - 2 = 150 \implies n = \frac{150}{3} = 50</math></p>
25	<p>Consider the arithmetic sequence 2, 6, 10, ..... .</p> <p>a) What is its common difference ?</p> <p>b) What is its algebraic form ?</p> <p>c) Find the position of the term obtained by subtracting 80 from its 50<sup>th</sup> term ?</p> <p><u>Answer.</u></p> <p>a) <math>6 - 2 = 4</math></p> <p>b) <math>4n - 2</math></p> <p>c) <math>4n - 2 = x_{50} - 80 \implies 4n - 2 = 198 - 80</math> <span style="border-left: 1px solid black; padding-left: 10px;"><math>x_{50} = 4 \times 50 - 2 = 198</math></span></p> <p><math>\implies 4n - 2 = 118 \implies 4n = 118 + 2 = 120 \implies n = \frac{120}{4} = 30</math></p>

26	<p>The algebraic form of an arithmetic sequence is <math>4n+3</math>.</p> <p>a) What is its common difference ?</p> <p>b) What is the sum of its first and 20<sup>th</sup> terms ?</p> <p>c) What is the sum of first 20 terms of this sequence ?</p>
	<p><u>Answer.</u></p> <p>a) 4</p> <p>b) <math>x_1 + x_{20} = 7 + 83 = 90</math></p> <p>c) <math>Sum = \frac{20}{2}(x_1 + x_{20}) = \frac{20}{2}(7 + 83) = 10 \times 90 = 900</math></p> <div style="border-left: 1px solid black; padding-left: 10px; margin-left: 20px;"> <math>x_1 = 4 \times 1 + 3 = 7</math>  <math>x_{20} = 4 \times 20 + 3 = 83</math> </div>
27	<p>The sum of first 5 terms of an arithmetic sequence is 35 and the sum of the first 9 terms is 99.</p> <p>a) What is its third term ?</p> <p>b) What is its common difference ?</p> <p>c) What is the algebraic form of this sequence ?</p> <p><u>Answer.</u></p> <p>a) sum of first 5 terms = 35 <math>\implies 5 \times \text{Mid term} = 35</math></p> <p style="text-align: right;"><math>5 \times x_3 = 35 \implies x_3 = \frac{35}{5} = 7</math></p> <p>b) Sum of first 9 terms = 99 <math>\implies 9 \times \text{Mid term} = 99</math></p> <p style="text-align: right;"><math>9 \times x_5 = 99 \implies x_5 = \frac{99}{9} = 11</math></p> <p style="text-align: center;">Common difference = <math>\frac{\text{Term difference}}{\text{Position difference}} = \frac{x_5 - x_3}{5 - 3} = \frac{11 - 7}{2} = \frac{4}{2} = 2</math></p> <p>c)</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <p>Algebraic form = <math>2n+1</math></p> </div> <div style="width: 35%; border-left: 1px solid black; padding-left: 10px;"> <p><math>x_1 = x_3 - 2d</math></p> <p style="text-align: center;"><math>= 7 - 2 \times 2 = 3</math></p> <p>Sequence = 3, 5, 7, .....</p> </div> </div>

28	<p>The sum of first 7 terms of an arithmetic sequence is 119 and the sum of first 20 terms is 860.</p> <p>a) What is its fourth term ?</p> <p>b) What is its 17<sup>th</sup> term ?</p> <p>c) What is the algebraic form of this sequence ?</p> <hr/> <p><u>Answer.</u></p> <p>a) Sum of the first 7 terms = 119 <math>\implies 7 \times \text{mid term} = 119</math></p> $7 \times x_4 = 119 \implies x_4 = \frac{119}{7} = 17$ <p>b) <math>x_4 + x_{17} = 86</math></p> $17 + x_{17} = 86$ $x_{17} = 86 - 17 = 69$ <p>Common difference = <math>\frac{\text{Term difference}}{\text{Position difference}} = \frac{x_{17} - x_4}{17 - 4} = \frac{69 - 17}{13} = \frac{52}{13} = 4</math></p> <p>c) Algebraic form = <math>4n + 1</math></p> $x_1 = x_4 - 3d = 17 - 3 \times 4 = 17 - 12 = 5$ <p>Sequence = 5, 9, 13, .....</p>
29	<p>The sum of first 4 terms of an arithmetic sequence is 64 and the sum of first 10 terms is 340 .</p> <p>a) What is the sum of first and fourth terms of this sequence ?</p> <p>b) What is its common difference ?</p> <p>c) Write down the sequence ?</p> <hr/> <p><u>Answer.</u></p> <p>a) Sum of the first 4 terms = 64 <math>\implies x_1 + x_4 = \frac{64}{2} = 32</math></p>

	<p>Sum of the first 10 terms = 340 <math>\Rightarrow x_1 + x_{10} = \frac{340}{5} = 68</math></p> $\begin{array}{r} x_1 + x_{10} = 68 \text{ ---} \\ x_1 + x_4 = 32 \\ \hline 0 + 6d = 36 \end{array}$ <p>b) <math>d = \frac{36}{6} = 6</math></p> <p>c) <math>x_1 + x_4 = 32 \Rightarrow x_1 + (x_1 + 3d) = 32 \Rightarrow 2x_1 + 3d = 32</math></p> $2x_1 + 3 \times 6 = 32 \Rightarrow 2x_1 = 32 - 18 \Rightarrow x_1 = \frac{14}{2} = 7$ <p>Sequence = 7, 13, 19, .....</p>		
30	<p>The sum of 5<sup>th</sup> and 16<sup>th</sup> terms of an arithmetic sequence is 67 .</p> <p>a) What is the sum of first and 20<sup>th</sup> terms of this sequence ?</p> <p>b) If the 10<sup>th</sup> term is 32 , what is its 11<sup>th</sup> term ?</p> <p>c) What is the sum of first 20 terms of this sequence ?</p> <p><u>Answer.</u></p> <table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> <p>a) <math>x_1 + x_{20} = 67</math></p> <p>b) <math>x_{10} + x_{11} = 67 \Rightarrow 32 + x_{11} = 67 \Rightarrow x_{11} = 67 - 32 = 35</math></p> <p>c) Sum of first 20 terms = <math>10 \times 67 = 670</math></p> </td><td style="width: 50%; vertical-align: top;"> <math display="block">x_1 + x_{20} = x_2 + x_{19} = \dots = x_5 + x_{16} = \dots</math> <math display="block">S_{20} = \frac{20}{2} (x_1 + x_{20})</math> </td></tr> </table>	<p>a) <math>x_1 + x_{20} = 67</math></p> <p>b) <math>x_{10} + x_{11} = 67 \Rightarrow 32 + x_{11} = 67 \Rightarrow x_{11} = 67 - 32 = 35</math></p> <p>c) Sum of first 20 terms = <math>10 \times 67 = 670</math></p>	$x_1 + x_{20} = x_2 + x_{19} = \dots = x_5 + x_{16} = \dots$ $S_{20} = \frac{20}{2} (x_1 + x_{20})$
<p>a) <math>x_1 + x_{20} = 67</math></p> <p>b) <math>x_{10} + x_{11} = 67 \Rightarrow 32 + x_{11} = 67 \Rightarrow x_{11} = 67 - 32 = 35</math></p> <p>c) Sum of first 20 terms = <math>10 \times 67 = 670</math></p>	$x_1 + x_{20} = x_2 + x_{19} = \dots = x_5 + x_{16} = \dots$ $S_{20} = \frac{20}{2} (x_1 + x_{20})$		
31	<p>The sum of 6<sup>th</sup> and 10<sup>th</sup> terms of an arithmetic sequence is 66 .</p> <p>a) What is the sum of first and 15<sup>th</sup> terms of this sequence ?</p> <p>b) What is its 8<sup>th</sup> term ?</p> <p>c) What is the sum of first 15 terms of this sequence ?</p> <p><u>Answer.</u></p> <table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> <p>a) <math>x_1 + x_{15} = 66</math></p> <p>b) <math>x_8 = \frac{66}{2} = 33</math></p> <p>c) Sum of 15 terms = <math>15 \times \text{Mid term} = 15 \times x_8 = 15 \times 33 = 495</math></p> </td><td style="width: 50%; vertical-align: top;"> <math display="block">x_1 + x_{15} = x_2 + x_{14} = \dots = x_6 + x_{10} = \dots</math> <math display="block">x_1 + x_{15} = 2 \times x_8</math> </td></tr> </table>	<p>a) <math>x_1 + x_{15} = 66</math></p> <p>b) <math>x_8 = \frac{66}{2} = 33</math></p> <p>c) Sum of 15 terms = <math>15 \times \text{Mid term} = 15 \times x_8 = 15 \times 33 = 495</math></p>	$x_1 + x_{15} = x_2 + x_{14} = \dots = x_6 + x_{10} = \dots$ $x_1 + x_{15} = 2 \times x_8$
<p>a) <math>x_1 + x_{15} = 66</math></p> <p>b) <math>x_8 = \frac{66}{2} = 33</math></p> <p>c) Sum of 15 terms = <math>15 \times \text{Mid term} = 15 \times x_8 = 15 \times 33 = 495</math></p>	$x_1 + x_{15} = x_2 + x_{14} = \dots = x_6 + x_{10} = \dots$ $x_1 + x_{15} = 2 \times x_8$		



32	<p><i>11<sup>th</sup> term of an arithmetic sequence is 26 .</i></p> <p><i>a) What is the sum of first and 21<sup>st</sup> terms of this sequence ?</i></p> <p><i>b) What is the sum of first 21 terms of this sequence ?</i></p> <p><u>Answer.</u></p> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="width: 45%;"> <p>a) <math>x_1 + x_{21} = 2 \times 26 = 52</math></p> <p>b) Sum of the first 21 terms = <math>21 \times \text{Mid term} = 21 \times x_{11} = 21 \times 26 = 546</math></p> </div> <div style="width: 50%; border-left: 1px solid black; padding-left: 10px;"> <math display="block">x_1 + x_{21} = x_2 + x_{20} = \dots \dots = 2 \times x_{11}</math> </div> </div>
33	<p><i>The sum of 6<sup>th</sup> and 8<sup>th</sup> terms of an arithmetic sequence is 64 .</i></p> <p><i>a) What is the sum of first and 13<sup>th</sup> terms of this sequence ?</i></p> <p><i>b) What is its 7<sup>th</sup> term ?</i></p> <p><i>c) What is the sum of first 13 terms of this sequence ?</i></p> <p><u>Answer.</u></p> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="width: 45%;"> <p>a) <math>x_1 + x_{13} = 64</math></p> <p>b) <math>x_7 = \frac{64}{2} = 32</math></p> <p>c) Sum of first 13 terms = <math>13 \times \text{Mid term} = 13 \times x_7 = 13 \times 32 = 416</math></p> </div> <div style="width: 50%; border-left: 1px solid black; padding-left: 10px;"> <math display="block">x_1 + x_{13} = x_2 + x_{12} = x_3 + x_{11} = \dots \dots x_6 + x_8 = \dots</math> <math display="block">x_1 + x_{13} = 2 \times x_7</math> </div> </div>
34	<p><i>Consider the sequence of three digit numbers which leave a remainder 1 on divisible by 3 .</i></p> <p><i>a) What is its common difference ?</i></p> <p><i>b) Which is the smallest number in this sequence ?</i></p> <p><i>c) How many three digit numbers are there ,which leave a remainder 1 on divisible by 3?</i></p> <p><i>d) What is the sum of such numbers ?</i></p> <p><u>Answer.</u></p> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="width: 45%;"> <p>a) 3</p> <p>b) 100</p> <p>c) Last three digit number = 997 <math>\Rightarrow x_n = 997</math></p> </div> <div style="width: 50%; border-left: 1px solid black; padding-left: 10px;"> <math display="block">x_n = 3n + 97</math> <p>sequence = 100, 103, 106, 109, .....</p> </div> </div>

	$3n+97=997 \implies 3n=997-97$ $3n=900 \implies n=\frac{900}{3}=300$ <p>d) <math>Sum = \frac{300}{2}(x_1+x_{300}) = \frac{300}{2}(100+997) = 150 \times 1097 = 164550</math></p>
35	<p>The sum of 10<sup>th</sup> and 11<sup>th</sup> terms of an arithmetic sequence is 65 .</p> <p>a) What is the sum of its first and 20<sup>th</sup> terms ?</p> <p>b) What is the sum of first 20 terms of this sequence ?</p> <p>c) If the 4<sup>th</sup> term of this sequence is 13 , what is its 17<sup>th</sup> term ?</p> <p>d) What is the common difference of this sequence ?</p> <p>e) What is the algebraic form of this sequence ?</p> <p><u>Answer.</u></p> <p>a) <math>x_1+x_{20}=65</math> <span style="border-left: 1px solid black; padding-left: 10px;"><math>x_1+x_{20} = x_2+x_{19} = \dots\dots\dots = x_{10}+x_{11} = \dots\dots</math></span></p> <p>b) <math>Sum = \frac{20}{2}(x_1+x_{20}) = 10 \times 65 = 650</math></p> <p>c) <math>x_4+x_{17}=65 \implies 13+x_{17}=65 \implies x_{17}=65-13 = 52</math></p> <p>d) <math>Common\ difference = \frac{Term\ difference}{Position\ difference} = \frac{x_{17}-x_4}{17-4} = \frac{52-13}{13} = \frac{39}{13}=3</math></p> <p>e) <math>x_1=x_4-3d = 13-3 \times 3 = 13-9 = 4</math></p> <p style="text-align: center;"><math>Algebraic\ form = 3n+1</math> <span style="border-left: 1px solid black; padding-left: 10px;"><math>Sequence = 4, 7, 10, \dots\dots\dots</math></span></p>
36	<p>Consider the arithmetic sequence 4,12,20,..... .</p> <p>a) What is the common difference of this sequence ?</p> <p>b) What is the sum of first 4 terms of this sequence ?</p> <p>c) Can the sum of any 25 terms of this sequence be 1090 ? Why ?</p>

	<p><u>Answer.</u></p> <p>a) <math>12 - 4 = 8</math></p> <p>b) <math>4 + 12 + 20 + 28 = 64</math></p> <p>c) No. 1090 is not a multiple of 4 .(Each term of this sequence is a multiple of 4. So their sum is also a multiple of 4 )</p>
37	<p>Consider the arithmetic sequence 6,15,24,.....</p> <p>a) What is the common difference of this sequence ?</p> <p>b) What is the remainder when each term of this sequence is divided by 3 ?</p> <p>c) Can the sum of any 30 terms of this sequence be 500 ? Why ?</p>
	<p><u>Answer.</u></p> <p>a) <math>15 - 6 = 9</math></p> <p>b) 0</p> <p>c) No. 500 is not a multiple of 3. (Each term of this sequence is a multiple of 3 . So their sum is also a multiple of 3</p>
38	<p>Consider the arithmetic sequence 5,9,13,..... .</p> <p>a) What is the common difference of this sequence ?</p> <p>b) Write down the next three terms of this sequence ?</p> <p>c) Can the sum of any 15 terms of this sequence be 500 ? Why ?</p>
	<p><u>Answer.</u></p> <p>a) <math>9 - 5 = 4</math></p> <p>b) 17,21,25</p> <p>c) No. Sum of 15 odd numbers is an odd number. (500 is even and each term of this sequence is odd )</p>

39	<p>Consider the arithmetic sequence 7,13,19,..... .</p> <p>a) What is the common difference of this sequence ?</p> <p>b) What is its 10<sup>th</sup> term ?</p> <p>c) Can the sum of any two terms be a term of this sequence ?</p> <p><u>Answer.</u></p> <p>a) <math>13-7=6</math></p> <p>b) <math>6 \times 10 + 1 = 61</math> <span style="float: right;"><math>x_n = 6n + 1</math></span></p> <p>c) No. Sum of two odd numbers is an even number. ( Each term of this sequence is odd )</p>
40	<p>Consider the arithmetic sequence 5,9,13,..... .</p> <p>a) What is the common difference of this sequence ?</p> <p>b) What is the algebraic form of the sum of this sequence ?</p> <p><u>Answer.</u></p> <p>a) 4</p> <p>b) <math>S_n = 2n^2 + 3n</math> <span style="float: right;"><math>x_n = 4n + 1</math></span></p>
NB:	<p>Algebraic form of an arithmetic sequence = <math>dn+b</math> == &gt;</p> <p>Algebraic form of its sum= <math>pn^2+qn</math> <span style="float: right;"><math>\left[ p=\frac{d}{2}, q=\frac{d}{2}+b \right]</math></span></p> <div style="border: 1px solid black; padding: 5px; text-align: center; margin-top: 10px;">       Algebraic form of the sum = Sum of the first n terms.     </div>
41	<p>Consider the arithmetic sequence 1,7,13,..... .</p> <p>a) What is the common difference of this sequence ?</p> <p>b) What is the algebraic form of the sum of this sequence ?</p> <p><u>Answer.</u></p> <p>a) 6</p> <p>b) <math>S_n = 3n^2 - 2n</math> <span style="float: right;"><math>x_n = 6n - 5</math></span></p>

42	<p>The algebraic form of an arithmetic sequence is <math>2n+1</math> .</p> <p>a) What is the common difference of this sequence ?</p> <p>b) What is the sum of first 9 terms of this sequence ?</p> <p>c) What is the algebraic form of the sum of this sequence ?</p>
	<p><u>Answer.</u></p> <p>a) 2 <span style="float: right;"><math>x_5 = 2 \times 5 + 1 = 11</math></span></p> <p>b) sum of first 9 terms = <math>9 \times \text{Mid term} = 9 \times x_5 = 9 \times 11 = 99</math></p> <p>c) <math>S_n = n^2 + 2n</math></p>
43	<p>The algebraic form of an arithmetic sequence is <math>6n-5</math> .</p> <p>a) What is the common difference of this sequence ?</p> <p>b) What is the sum of first 15 terms of this sequence ?</p> <p>c) What is the algebraic form of the sum of this sequence ?</p>
	<p><u>Answer.</u></p> <p>a) 6 <span style="float: right;"><math>x_8 = 6 \times 8 - 5 = 43</math></span></p> <p>b) Sum of 15 terms = <math>15 \times \text{Mid term} = 15 \times x_8 = 15 \times 43 = 645</math></p> <p>c) <math>S_n = 3n^2 - 2n</math></p>
44	<p>The sum of first <math>n</math> terms of an arithmetic sequence is <math>n^2 + 4n</math> .</p> <p>a) What is its first term ?</p> <p>b) What is the common difference of this sequence ?</p> <p>c) What is the algebraic form of this sequence ?</p> <p><u>Answer.</u></p> <p>a) <math>1^2 + 4 \times 1 = 1 + 4 = 5</math></p> <p>b) <math>d = 2 \times 1 = 2</math></p> <p>c) <math>x_n = 2n + 3</math></p>

45	<p>The sum of first <math>n</math> terms of an arithmetic sequence is <math>4n^2 - 3n</math>.</p> <p>a) What is its first term ?</p> <p>b) What is the common difference of this sequence ?</p> <p>c) What is the algebraic form of this sequence ?</p> <p><u>Answer.</u></p> <p>a) <math>4 \times 1^2 - 3 \times 1 = 4 - 3 = 1</math></p> <p>b) <math>d = 2 \times 4 = 8</math></p> <p>c) <math>x_n = 8n - 7</math></p>
46	<p>Consider the arithmetic sequence <math>5, 7, 9, \dots</math>.</p> <p>a) What is its first term ?</p> <p>b) What number will get if 4 is added to the sum of first 3 terms of this sequence ?</p> <p>c) Prove that the sum of any number of terms of this sequence starting from the first added to 4 gives a perfect square ?</p> <p><u>Answer.</u></p> <p>a) <math>d = 7 - 5 = 2</math></p> <p>b) <math>(5 + 7 + 9) + 4 = 25</math></p> <p>c) Sum of first <math>n</math> terms <math>= n^2 + 4n</math> <span style="float: right;"><math>x_n = 2n + 3</math></span></p> <p>Sum of first <math>n</math> terms + 4 <math>= n^2 + 4n + 4 = n^2 + 2 \times 2n + 2^2 = (n + 2)^2</math></p> <p><math>\Rightarrow</math> Sum of any number of terms from the first + 4 is a perfect square</p>
47	<p>a) What is the common difference of the arithmetic sequence <math>7, 11, 15, \dots</math> ?</p> <p>b) What is the common difference of the arithmetic sequence <math>10, 14, 18, \dots</math> ?</p> <p>c) What is the difference between the sum of first 30 terms of these sequences ?</p>

Answer.

a) Common difference =  $11 - 7 = 4$

b) Common difference =  $14 - 10 = 4$

c) Difference between the sums =  $30 \times \text{Difference of the first terms} = 30(10 - 7)$   
 $= 30 \times 3 = 90$

**NB:**

*Difference between the sum of first 30 terms of two arithmetic sequences with same common difference*

$x_1, x_2, x_3, \dots$  and  $y_1, y_2, y_3, \dots$  are two arithmetic sequences with same common difference.

Difference of the first 30 terms of these sequences =  $x_1 + x_2 + x_3 + \dots + x_{30} - (y_1 + y_2 + y_3 + \dots + y_{30})$

If we take the common difference as 'd', we will get ,

$$\begin{array}{ccccccc} x_2 = x_1 + d & - & x_3 = x_2 + d & - & x_4 = x_3 + d & - & x_5 = x_4 + d \\ \frac{y_2 = y_1 + d}{x_2 - y_2 = x_1 - y_1} & , & \frac{y_3 = y_2 + d}{x_3 - y_3 = x_2 - y_2} & , & \frac{y_4 = y_3 + d}{x_4 - y_4 = x_3 - y_3} & , & \frac{y_5 = y_4 + d}{x_5 - y_5 = x_4 - y_4} , \dots \end{array}$$

Hence  $x_1 - y_1 = x_2 - y_2 = x_3 - y_3 = \dots = x_{30} - y_{30}$

$$\begin{aligned} x_1 + x_2 + x_3 + \dots + x_{30} - (y_1 + y_2 + y_3 + \dots + y_{30}) &= (x_1 - y_1) + (x_2 - y_2) + (x_3 - y_3) + \dots + (x_{30} - y_{30}) \\ &= 30(x_1 - y_1) \end{aligned}$$

*Difference between the sum first n terms of two arithmetic sequences with the same common difference is n times the difference of their the first terms.*

48

a) What is the common difference of the arithmetic sequence 5, 8, 11, ..... ?

b) What is the common difference of the arithmetic sequence 9, 12, 15, ..... ?

c) What is the difference between the sum of first 50 terms of these sequences ?

Answer.

a) Common difference =  $8 - 5 = 3$

b) Common difference =  $12 - 9 = 3$

c) Difference of sums =  $50 \times \text{difference of the first terms} = 50(9 - 5)$   
 $= 50 \times 4 = 200$

NB:

*Difference between the sum of first 20 terms and the sum of next 20 terms  
of an arithmetic sequence.*

Let the common difference of the arithmetic sequence  $x_1, x_2, x_3, \dots$  be ' $d$ '.

Sum of first 20 terms =  $x_1 + x_2 + x_3 + \dots + x_{20}$

Sum of next 20 terms =  $x_{21} + x_{22} + x_{23} + \dots + x_{40}$

Difference of sums =  $x_{21} + x_{22} + x_{23} + \dots + x_{40} - (x_1 + x_2 + x_3 + \dots + x_{20})$   
 $= (x_{21} - x_1) + (x_{22} - x_2) + (x_{23} - x_3) + \dots + (x_{40} - x_{20})$   
 $= 20 \times d + 20 \times d + 20 \times d + \dots + 20 \times d$   
 $\quad \quad \quad \leftarrow \quad \quad \quad \xrightarrow{\quad \quad \quad 20 \text{ no.s} \quad \quad \quad}$   
 $= 20 \times 20 \times d = 20^2 d$

*Difference between the sum of first ' $n$ ' terms and the sum of next ' $n$ ' terms  
of an arithmetic sequence is  $n^2 d$ .*

49

Consider the arithmetic sequence 7, 12, 17, ..... .

a) What is the common difference of this sequence ?

b) What is the difference between the sum of first 20 terms and the sum of next 20 terms ?

Answer.

a) Common difference =  $12 - 7 = 5$

b) Difference between the sum of first 20 terms and the sum of next 20

terms =  $20^2 d = 400 \times 5 = 2000$



50	<p>Consider the arithmetic sequence 1,10,19,..... .</p> <p>a) What is the common difference of this sequence ?</p> <p>b)What is the difference between the sum of first 30 terms and the sum of next 30terms ?</p> <p><u>Answer.</u></p> <p>a) Common difference = <math>10 - 1 = 9</math></p> <p>b)Difference between the sum of first30 terms and the sum of next 30 terms  <math display="block">= 30^2 d = 900 \times 9 = 8100</math></p>
NB:	<p><b><math>13^{\text{th}}</math> term of an arithmetic sequence in which the sum of first 13 terms and the sum of next 12 terms are equal</b></p> <hr/> <p>The sum of first 13 terms of an arithmetic sequence <math>x_1, x_2, x_3, \dots</math> and the sum of next 12 terms are equal.</p> <p>Sum of first13 terms = <math>x_1 + x_2 + x_3 + \dots + x_{13}</math></p> <p>Sum of next 12 terms = <math>x_{14} + x_{15} + x_{16} + \dots + x_{25}</math></p> <p><math>x_1 + x_2 + x_3 + \dots + x_{13} = x_{14} + x_{15} + x_{16} + \dots + x_{25}</math></p> <p><math>\Rightarrow x_{14} + x_{15} + x_{16} + \dots + x_{25} - (x_1 + x_2 + x_3 + \dots + x_{13}) = 0</math></p> $\frac{x_{14} + x_{15} + x_{16} + \dots + x_{25} - x_1 - x_2 - x_3 - \dots - x_{13}}{13d + 13d + 13d + \dots + 13d - x_{13}} \Rightarrow \frac{13d + 13d + 13d + \dots + 13d - x_{13}}{12 \text{ no.s}} = 0$ <p><math>\Rightarrow 12 \times 13 \times d - x_{13} = 0 \Rightarrow x_{13} = 12 \times 13d</math></p> <div style="border: 1px solid black; padding: 10px; margin-top: 10px;"> <p>If the sum of first <math>n</math> terms is equal to the sum of next <math>n-1</math> terms of an arithmetic sequence , then its <math>n^{\text{th}}</math> term = <math>(n-1)n \times d</math></p> </div>
51	<p>The sum of first 13 terms and the sum of next 12 terms of an arithmetic sequence are equal . If its common difference is 3 ,</p> <p>a) How many times of the common difference will be the difference between <math>14^{\text{th}}</math> and first terms of this sequence ?</p>

	<p>b) What is the 13<sup>th</sup> term of this sequence ?</p> <p>c) What is the sum of first 25 terms of this sequence ?</p>
	<p><u>Answer.</u></p> <p>a) 13 times</p> <p>b) <math>x_{13} = 12 \times 13 \times d = 12 \times 13 \times 3 = 468</math></p> <p>c) Sum of first 25 terms = <math>25 \times \text{Mid term} = 25 \times x_{13} = 25 \times 468 = 11700</math></p>
52	<p>The sum of first 9 terms and the sum of next 8 terms of an arithmetic sequence are equal . If its common difference is 5 .</p> <p>a) How many times of the common difference will be the difference between 10<sup>th</sup> and first terms of this sequence ?</p> <p>b) What is the 9<sup>th</sup> term of this sequence ?</p> <p>c) What is the sum of first 17 terms of this sequence ?</p>
	<p><u>Answer.</u></p> <p>a) 9 times</p> <p>b) <math>x_9 = 8 \times 9 \times d = 8 \times 9 \times 5 = 360</math></p> <p>c) Sum of first 17 terms = <math>17 \times \text{Mid term} = 17 \times x_9 = 17 \times 360 = 6120</math></p>
53	<p>Look at the number pattern given below</p> <p>1</p> <p>2 3</p> <p>4 5 6</p> <p>7 8 9 10</p> <p>.....</p> <p>.....</p> <p>a) Write the next two more line of this pattern ?</p>

- b) How many numbers are there in the 9<sup>th</sup> line?
- c) What is the last number in the 10<sup>th</sup> line ?
- d) What is the sum of the numbers in the 10<sup>th</sup> line ?

Answer.

a) 11 12 13 14 15

16 17 18 19 20 21

b) 9

c) Last number of the 10<sup>th</sup> line =  $\frac{10 \times 11}{2} = \frac{110}{2} = 55$

d)  $Sum = \frac{10}{2}(x_1 + x_{10}) = \frac{10}{2}(46 + 55)$   
 $= 5 \times 101 = 505$

Last number of the 9<sup>th</sup> line =  $\frac{9 \times 10}{2} = 45$   
 First number of the 10<sup>th</sup> line = 46  
 Last number of the 10<sup>th</sup> line =  $\frac{10 \times 11}{2} = 55$

**NB :**

In this number pattern , first line contains **one** number , second line contains **two** numbers , third line contains **three** numbers , ..... , **n<sup>th</sup>** line contains ' **n** ' numbers .

There are  $1+2+3+\dots+n = \frac{n(n+1)}{2}$  numbers in all .

Last number of the **n<sup>th</sup>** line =  $\frac{n(n+1)}{2}$  .

54 Look at the number pattern given below

6

10 14

18 22 26

30 34 38 42

.....

.....

a) Write the next two more lines of this pattern ?

b) What is the last number of the 18<sup>th</sup> line?  
 c) What is the the first number of the 20<sup>th</sup> line ?  
 d) What is the sum of all numbers in the first 20 lines ?

Answer.

a) 46 50 54 58 62  
 66 70 74 78 82 86

b) Last number of the 18<sup>th</sup> line  $= 4\left(\frac{18 \times 19}{2}\right) + 2 = 4 \times 171 + 2 = 686$

c) Last number of the 19<sup>th</sup> line  $= 4\left(\frac{19 \times 20}{2}\right) + 2 = 4 \times 190 + 2 = 762$   
 First number of the 20<sup>th</sup> line  $= 762 + 4 = 766$

d) Last number of the 20<sup>th</sup> line  $= 4\left(\frac{20 \times 21}{2}\right) + 2 = 4 \times 210 + 2 = 842$

Total number of numbers in all 20 lines  $= \frac{20 \times 21}{2} = 210$

Sum of numbers in all 20 lines  $= \frac{210}{2}(6 + 842) = 105 \times 848 = 89040$

**NB:**  
 The terms of the sequence 1,2,3,4,5,..... multiplied by 4 and added to 2 get the terms of the sequence 6,10,14,18,22,.....

55 Look at the number pattern given below

1  
 2 3 4  
 5 6 7 8 9  
 10 11 12 13 14 15 16  
 .....  
 .....

- a) Write the next two more lines of this pattern ?
- b) How many numbers are there in the 9<sup>th</sup> line?
- c) What is the last number in the 9<sup>th</sup> line ?
- d) What is the the first term in the 11<sup>th</sup> line ?

Answer.

a) 17 18 19 20 21 22 23 24 25

26 27 28 29 30 31 32 33 34 35 36

b)  $2 \times 9 - 1 = 18 - 1 = 17$

c) Last term of the 9<sup>th</sup> line  $= 9^2 = 81$

d) First number of the 10<sup>th</sup> line  $= 10^2 = 100$

First number of the 11<sup>th</sup> line  $= 101$

**NB:**

In this number pattern , last number of the first line is **1** , last number of the second line is **4** , last number of the third line is **9** ,.....last number of the **n<sup>th</sup>** line is **n<sup>2</sup>**

Also first line contains **one** number . Second line contains **three** numbers , third line contains **five** numbers .....**n<sup>th</sup>** line contains  $(2n-1)$  numbers .

There are  $1+3+5+\dots+(2n-1) = n^2$  numbers in all .

Last number of the **n<sup>th</sup>** line  $= n^2$

56 Look at the number pattern given below

5

8 11 14

17 20 23 26 29

32 35 38 41 44 47 50

.....

.....

- a) Write the next two more lines of this pattern ?
- b) How many numbers are there in the 10<sup>th</sup> line ?
- c) What is the last number in the 10<sup>th</sup> line ?
- d) What is the first term in the 12<sup>th</sup> line ?

Answer.

- a) 53 56 59 62 65 68 71 74 77  
80 83 86 89 92 95 98 101 104 107 110
- b)  $2 \times 10 - 1 = 20 - 1 = 19$
- c) Last number in the 10<sup>th</sup> line =  $3 \times 10^2 + 2 = 3 \times 100 + 2 = 302$
- d) Last number in the 11<sup>th</sup> line =  $3 \times 11^2 + 2 = 3 \times 121 + 2 = 365$   
First number in the 12<sup>th</sup> line =  $365 + 3 = 368$

**NB:**

The terms of the sequence 1,2,3,4,5,..... multiplied by 3 and added to 2 get the terms of the sequence 5,8,11,14,17,.....