MATHS

BOOKS - FULL MARKS MATHS (TAMIL ENGLISH)

NUMBERS AND SEQUENCES

Progress Check

1. Find q and r for the following pairs of integers a and b satisfying $a = bq + r$.

$a = 13, b = 3$

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2. Euclid's division algorithm is a repeated application of division lemma until we get remainder as :

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3. The H.C.F of two equal positive integers k, k is :

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4. Every natural number except ..... can be expressed as .....

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5. In how many ways a composite number can be written as product of power of primes ?

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6. The number of divisors of any prime number is .....

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7. Let m divides n . Then G.C.D and L.C.M. of m,n are ..... and .....

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8. The HCF of numbers of the form 2^m and 3^n is ___.

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9. Two integers a and b are congruent modulo n if .....

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10. The set of all positive integers which leave remainder 5 when divided by 7 are .....

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11. The positive values of k such that $(k-3) \equiv 5 \pmod{11}$ are ....

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12. If $59 \equiv 3 \pmod{7}$,$46 \equiv 4 \pmod{7}$ then $105 \equiv$ .... (mod 7), $13 \equiv \ldots.$ (mod 7) , $413 \equiv \ldots\ldots$ (mod 7) , $368 \equiv \ldots..$ (mod 7).

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13. The remainder when $7 \times 13 \times 19 \times 23 \times 29 \times 31$ is divided by 6 is :

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14. Fill in the blanks for the following sequences

$7, 13, 19, \ldots$

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15. A sequence is a function defined on the set of___.

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16. The n^{th} term of the sequence $0, 2, 6, 12, 20, ...$ Can be expressed as .....

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17. Say True or False

All sequences are functions .

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18. The difference between any two consecutive terms of an A.P. is ....

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19. If a and d are the first term and common difference of an A.P. then the 8^{th} term is .....

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20. If $t_n \ \text{is the} \ n^{th}$ term of an A.P., then $t_{2n} - t_n$ is .....

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21. The common difference of a constant A.P. is .....

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22. If a and l are first and last terms of an A.P. then the number of terms is ....

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23. If every term of an A.P. is multiplied by 3, then the common difference of the new A.P. is .....

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24. Three numbers a, b and c will be in A.P. if and only if ____.

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25. The sum of terms of a sequence is called .....

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26. A series have finite number of terms then it is called .....

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27. A series whose terms are in ..... is called Arithmetic series.

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28. If the first and last terms of an A.P. are given, then the formula to find the sum is .....

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29. State True or False Justify.

(i) The n^{th} term of any A.P. is of the form pn + q where p and q

are some constants.

(ii) The sum to nth term of any A.P. is of the form $pn^2 + qn + r$,

where p,q,r are some constants.

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30. A G.P. is obtained by multiplying ..... to the preceding term.

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31. The ratio between any two consecutive terms of the G.P. is .....

and it is called .....

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32. Fill in the blanks, if the term are in G.P. $\frac{1}{8}, \frac{3}{4}, \frac{9}{2}, \ldots$

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33. If first term = a, common ratio = r, then find the value of t_9 and t_{27}.

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34. If G.P if $t_1 = \frac{1}{5}$ and $t_2 = \frac{1}{25}$ then the common ratio is ___.

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35. A series whose terms are in Geometric progression is called .....

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36. When $r = 1$, the formula for finding sum to n terms of a G.P. is .....

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37. When $r \neq 1$, the formula for finding sum to n terms of a G.P. is .....

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38. Sum to infinite number of terms of a G.P. is ....

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39. For what values of r, does the formula for infinite G.P. valid ?

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40. Is the series $3 + 33 + 333 +$ ....a Geometric series ?

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41. The value of r, such that $1 + r + r^2 + r^3 \ldots = \frac{3}{4}$ is ...

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42. The sum of cubes of first n natural numbers is .....of the first n natural numbers.

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43. The average of first 100 natural number is ___.

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44. The sum of first n odd natural numbers is always an odd number.

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Exercise 2 1

1. Find all positive integers which when divided by 3 leaves remainder 2.

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2. A man has 532 flower pots. He wants to arrange them the rows such that each row contains 21 flowers pots. Find the number of completed rows and how many flower pots are left over.

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3. Prove that the product of two consecutive positive integers is divisible by 2.

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4. When the positive integers be a, b and c divided by 13, the respective remainders are 9, 7 and 10. Show that $a+b+c$ is divided by 13.

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5. Prove that the square of any integer leaves the remainder either 0 or 1 when divided by 4.

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6. Use Euclid Division Algorithm to find the Highest Common Factor (H.C.F) of

340 and 412

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7. Find th largest number which divides 1230 and 1926 leaving remainder 12 in each case.

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8. If d is the Highest Common Factor of 32 and 60, find x and y satisfying $d = 32x + 60y$.

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9. A positive integer when divided by 88 gives the remainder 61. What will be the remainder when the same number is divided by 11?

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10. Prove that two consecutive positive integers are always coprime.

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Exercise 2 2

1. For what values of natural number n, 4^n can end with the digit 6?

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2. If m, n are natural numbers, for what values of m, does $2^n \times 5^m$ ends in 5?

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3. Find the H.C.F of 252525 and 363636.

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4. If $13824 = 2^a \times 3^b$ then find a and b.

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5. If $p_1^{x_1} \times p_2^{x_2} \times p_3^{x_3} \times p_4^{x_4} = 11340$ where p_1, p_2, p_3, p_4 are primes in ascending order and x_1, x_2, x_3, x_4 are integers, find the value of p_1, p_2, p_3, p_4 and x_1, x_2, x_3, x_4.

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6. Find the L.C.M. and H.C.F. of 408 and 170 by applying the fundamental theoram of arithmetic.

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7. Find the greatest number consisting of 6 digits which is exactly divisible by 24, 15, 36?

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8. What is the smallest number that when divided by three numbers such as 35, 56 and 51 leaves remainder 7 in each case?

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Exercise 2 3

1. Find the least positive value of x such that

$89 \equiv (x + 3) \pmod 4$

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2. If x s congruent to 13 modulo 17 then $7x - 3$ is congruent to which number modulo 17?

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3. Solve $5x = 4$ (mod 6)

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4. Solve $3x - 2 = 0$ (mod 11)

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5. What is the time 100 hours after 7 a.m.?

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6. What is the time 15 hours before 11 p.m.?

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7. Today is Tuesday. My uncle will come after 45 days. In which day my uncle will be coming?

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8. Prove the $2^n + 6 \times 9^n$ is always divisible by 7 for any positive integer n.

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9. Find the remainder when 2^{81} is divided by 17.

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10. The duration of flight travel from Chennai to London through British Airlines is approximately 11 hours. The airplanes begin its journey on Sunday at 23:30 hours. If the time at Chennai is four and half hours ahead to that of London's time, then find the time at London,when will the flight lands at London Airport.

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Exercise 2 4

1. Find the next terms of the following sequence.

8, 24, 72, ...

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2. Find the first four terms of the sequences whose nth terms are given by

$a_n = n^3 - 2$

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3. Find the nth terms of the following sequences

2, 5, 10, 17, ...

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4. Find the indicated terms of the sequences whose nth terms are given by

$a_n = \frac{5n}{n+2}, a_6 \text{ and } a_{13}$

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5. Find the a_8 and a_{15} whose nth term is

$$a_n = \begin{cases} \frac{n^2-1}{n+3}, \text{ n is even}, n \in N \\ \frac{n^2}{2n+1}, \text{ n is odd}, n \in N \end{cases}$$

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6. If $a_1 = 1, a_2 = 1$ and $a_n = 2a_{n-1} + a_{n-2}, n \geq 3, n \in N,$ then find the first six terms of the sequence.

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Exercise 2 5

1. Check whether the following sequences are in A.P.

$a-3, a-5, a-7, \ldots$

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2. First term a and common difference d are given below. Find the corresponding A.P.,

$a=5, d=6$

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3. Find the first term and common difference of the Arithmetic Progressions whose nth terms are given below

$t_n = -3+2n$

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4. Find the 9th term of A.P. $-11, \ -15, \ -19, \ldots$

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5. Which term of an A.P. $16, 11, 6, 1, \ldots.$ is -54?

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6. Find the middle term(s) of an A.P. $9, 15, 21, 27, \ldots, 183$

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7. If nine times ninth term is equal to the fifeen times fifteenth term, show that six times twenty fourth is zero.

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8. If $3+k, 18-k, 5k+1$ are in A.P. then find k,

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9. Find the x, y, and z, given that the number x, 10, y, 24, z are in A.P.

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10. In a threatre, there are 20 seats in the front row and 30 rows were alloted. Each successive row contains two additional seats than its front row. How many seats are there in the last row?

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11. The sum of the three consecutive terms that are in A.P. is 27 and their product is 288. Find the three terms.

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12. The ratio of 6th and 8th term of an A.P. is 7.9. Find the ratio of 9th to 13th term.

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13. In a winter season let us take the temperature of Ooty from Monday to Friday to be in A.P. The sum of temperature from Monday to Wednesday is $0^{\circ}C$ and the sum of the temperature from Wednesday to Friday is $18^{\circ}C$. Find the temperature on each of the five days.

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14. Priya earned ₹15,000 in the first month. Therefore her salary inceased by ₹1500 per year. Her expenses are ₹13,000 during the first year and the expenses inceases by ₹900 per year. How long will it take for her to save ₹20,000 per month.

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Exercise 2 6

1. Find the sum of the following

$3, 7, 11, \ldots$ upto to 40 terms.

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2. How many consecutive odd integers beginning with 5 will sum to 480?

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3. Find the sum of the first 28 terms of an A.P. whose nth term is 4n-3.

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4. The sum of first n terms of a certain series is given as $2n^2 - 3n$. Show that the series is an A.P.

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5. The 104th term and 4th term of an A.P. are 125 and 0. Find the sum of first 35 terms.

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6. Find the sum of all odd integers less than 450.

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7. Find the sum of all natural numbers between 602 and 902 which are not divisible by 4.

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8. Raghu wish to buy a laptop. He can buy it by paying ₹40,000 cash or by giving it in 10 installments as ₹4800 in the first month, ₹4750 in the second month, ₹4700 in the third month and so on. If he pays the money inn this fashion, find

total amount paid in 10 installments.

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9. A man repays a loan of ₹65,000 by paying ₹400 in the first month and then inceasing the payment by ₹300 every month.

How long will it take for him to clear the loan?

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10. A brick staircase has a total of 30 steps. The bottom step requires 100 bricks. Each successive step requires two bricks less than the previous step.

How many bricks are required to build the stair case?

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11. If $S_1, S_2, S_3, \ldots, S_m$ are the sums of n terms of m A.P.'s whose first terms are 1, 2, 4, ..., m and whose common differences are 1, 3, 5, ..., (2m-1) repectively, then show that

$$S_1 + S_2 + S_3 + \ldots + S_n = \frac{1}{2}mn(mn+1)$$

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12. Find the sum $\left[\frac{a-b}{a+b}+\frac{3a-2b}{a+b}+\frac{5a-3b}{a+b}+\ldots+\text{to 12 terms}\right]$

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Exercise 2 7

1. Which of following sequences are in G.P.

$1, -5, 25, -125, \ldots$

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2. Write the first three terms of the G.P. whose first term and the common ratio are given below.

$a = 6, r = 3$

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3. In a G.P. 729, 243, 81, ... find t_7

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4. Find x so that $x + 6, x + 12$ and $x + 15$ are consecutive terms of Geometric Progressions.

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5. Find the number of terms in the following G.P.

$\frac{1}{3}, \frac{1}{9}, \frac{1}{27}, \ldots, \frac{1}{2187}$

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6. In a G.P. the 9th term is 32805 and 6th term is 1215. Find the 12th term.

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7. Find the 10th term of G.P. whose 8th term is 768 and the common ratio is 2.

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8. If a, b, c are in A.P. then show that 3^a, 3^b, 3^c are in G.P.

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9. In a G.P. the product of three consecutive term is 27 and the sum of the product of two terms taken at a time is $\frac{57}{2}$. Find the three terms.

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10. A man joined a company as Assistant Manager. The company gave him a starting salary of ₹60,000 and agreed to incease his salary 5% annually. What will be his salary after 5 years.

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11. Sivamani is attending an interview for a job and the company gave two offers to him Offer A: ₹20,000 to start with followed by a guaranted annual increase of 6% for the first 5 years.

Offer B: ₹22,000 to start with followed by a guaranteed annual increase of 3% for the first 5 years.

what is this salary in the 4th year with respect to the Offer A and B?

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12. If a, b, c are three consecutive terms of an A.P. and x, y, z are three consecutive terms of a G.P. then prove that $x^{b-c} \times y^{c-a} \times z^{a-b} = 1$

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Exercise 2 8

1. Find the sum of first n terms of the G.P.

$5, \ -3, \frac{9}{5}, \ -\frac{27}{25}, \ldots$

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2. Find the sum of first six terms of the G.P. 5, 15, 45, ...

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3. Find the first term of the G.P. whose common ratio 5 and whose sum to the 6 terms is 46872.

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4. Find the sum of infinity of

$21 + 14 + \frac{28}{3} + \ldots$

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5. If the first term of an infinite G.P. is 8 and its sum to infinity is $\frac{32}{3}$ then find the common ratio.

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6. Find the sum to n terms of the series

$0.4 + 0.44 + 0.444 + \ldots$.to n terms.

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7. Find the sum of the Geometric series $3 + 6 + 12 + \ldots 1536$.

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8. Kumar writes a letter to four of his friends. He asks each one of them to copy the letter and mail to four different persons with the instruction that they continue the process similarly. Assuming that the process is unaltered and it costs ₹2 to mail one letter, find the amount spent on postage when 8th set of letters is mailed.

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9. Find the rational form of the number $\overline{0.123}$.

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10. If

$S_n = (x+y) + \left(x^2 + xy + y^2\right) + \left(x^3 + x^2y + y^2x + y^3\right) + \ldots n$

terms then prove that

$(x-y)S_n = \left[\frac{x^2(x^n-1)}{x-1} - \frac{y^2y^n - 1}{y-1}\right].$

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Exercise 2 9

1. Find the sum of the following series

$1 + 2 + 3 + \ldots + 60$

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2. If $1+2+3+\ldots+k=325$, then find $1^3+2^3+3^3+\ldots+k^3$.

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3. If $1^3+2^3+3^3+\ldots+k^3=44100$ then find $1+2+3+\ldots+k$.

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4. How many terms of the series $1^3+2^3+3^3+\ldots$ should be taken to get the sum 14400?

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5. The sum of the squares of the first n natural numbers is 285, while the sum of their cubes is 2025. Find the values of n.

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6. Rakha has 15 square colour papers of sizes 10cm, 11cm, 12cm... 24 cm. How much area can be decorated with these colour papers?

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7. Find the sum of the series $(2^3 - 1^3) + (4^3 - 3^3) + (6^3 - 5^3) + \ldots$ to n terms

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Exercise 2 10

1. Euclid's division lemma states that for positive integers a and b, there exist unique integers q and r such that $a = bq + r$, where r must satisfy.

A. $1 < r < b$

B. $0 < r < b$

C. $0 \leq r < b$

D. $0 < r \leq b$

Answer: C

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2. Using Euclid's division lemma, if the cube of any positive integers is divided by 9 then the possible remainders are ___.

A. 0,1,8

B. 1,4,8

C. 0,1,3

D. 1,3,5

Answer: A

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3. If the H.C.F. of 65 and 117 is expressible in the form of $65m - 117$, then the value of m is

A. 4

B. 2

C. 1

D. 3

Answer: B

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4. The sum of the exponents of the prime factors in the prime factorization of 1729 is :

A. 1

B. 2

C. 3

D. 4

Answer: C

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5. The least number that is divisible by all the numbers from 1 to 10 (both inclusive) is

A. 2025

B. 5220

C. 5025

D. 2520

Answer: D

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6. $7^{4k} =\_\ \_ \pmod{100}$

A. 1

B. 2

C. 3

D. 4

Answer: A

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7. Given $F_1 = 1, F_2 = 3$ and $F_n = F_{n-1} + F_{n-2}$ then F_5 is

A. 3

B. 5

C. 8

D. 11

Answer: D

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8. The common difference of a constant A.P. is .....

A. 4551

B. 10091

C. 7881

D. 13531

Answer: C

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9. If 6 times of 6th term of an A.P. is equal to 7 times term, then the 13th term of the A.P. is

A. 0

B. 6

C. 7

D. 13

Answer: A

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10. An A.P. consists of 31 terms. If its 16th terms is m, then the sum of all the terms of this A.P. is

A. 16 m

B. 62 m

C. 31 m

D. $\frac{31}{2}$ m

Answer: C

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11. In an A.P., the first terms is 1 and the the common difference is 4. How many terms of the A.P. must be taken for their sum to be equal to 120?

A. 6

B. 7

C. 8

D. 9

Answer: C

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12. If $A = 2^{65}$ and $B = 2^{64} + 2^{63} + 2^{62} + \ldots + 2^{0}$ which of the following is true?

A. B is 2^{64} more than A

B. A and B are equal

C. B is larger than A by 1

D. A is larger than B by 1

Answer: D

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13. The next term of the sequences $\frac{3}{16}, \frac{1}{8}, \frac{1}{12}, \frac{1}{18}, \ldots$

A. $\frac{1}{24}$

B. $\frac{1}{27}$

C. $\frac{2}{3}$

D. $\frac{1}{81}$

Answer: B

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14. If the sequence $t_1, t_2, t_3, \ldots$ are in A.P. then the sequence $t_6, t_{12}, t_{18}, \ldots$ is

A. a Geometric progression

B. an Arithmetic progression

C. neither an Arithmetic progression nor a Geometric progression

D. a constant sequence.

Answer: B

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15. The value of $\left(1^3+2^3+3^3+\ldots+15^3\right)-(1+2+3+\ldots+15)$ is

A. 14400

B. 14200

C. 14280

D. 14520

Answer: C

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Unit Exercise

1. Prove that $n^2 - n$ divisible by 2 for every positive integer n.

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2. A milk man has 175 litres of cow's milk and 105 litres of buffalow's milk. He wishes to sell the milk by filling the two type of milk is cans of equal capacity. Calculate the following

Capacity of a can.

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3. When the positive integer a, b, c and are divided by 13 the respective remainders are 9, 7 and 10. Find the remainder when $a + 2b + 3c$ is divided by 13.

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4. Show that 107 is of the form 4q+3 for any integer q.

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5. If (m+1)th term of an A.P. is twice the (n+1)th term, then prove that (3m+1)th term is twice the (m+n+1)th term

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6. Find the 12th term from the last term of the $A.P. -2, -4, -6, \ldots, -100.$

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7. Two A.P.'s have the same common difference. The first term of one A.P. is 2 and that of the other is 7. Show that the difference between their 10th terms is the same as the difference between their 21th terms, which is the same as the difference between any two corresponding terms.

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8. Find the G.P. in which the 2nd term is $\sqrt{6}$ and the 6th term is $9\sqrt{6}$?

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9. The value of a motor cycle depreciates at the rate of 15% per year. What will be the value of the motor cycle 3 year hence, which is now purchased for ₹45,000?

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10. The value of a motor cycle depreciates at the rate of 15% per year. What will be the value of the motor cycle 3 year hence, which is now purchased for ₹45,000?

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Additional Question Solved

1. The sum of the exponents of the prime factors in the prime factorisation of 504 is .....

A. 3

B. 2

C. 1

D. 6

Answer: D

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2. If two positive integers a and b are expressible in the form $a = pq^2$ and $b = p^3q$, p, q, being prime numbers, then L.C.M. of (a, b) is .....

A. pq

B. p^2q^2

C. p^3q^3

D. p^3q^2

Answer: D

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3. If n is a natural number then $7^{3n} - 4^{3n}$ is always divisible by .....

A. 11

B. 3

C. 33

D. both 11 and 3

Answer: D

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4. The value of x when $200 \equiv x \pmod 7$ is .....

A. 3

B. 4

C. 54

D. 12

Answer:

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5. The common difference of the A.P. $\frac{1}{2b}, \frac{1-6b}{2b}, \frac{1-2b}{2b}$ is.....

A. 2b

B. $-2b$

C. 3

D. -3

Answer: D

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6. Which one of the following is not true?

A. A sequence is a real valued function defined on N.

B. Every function represents a sequence.

C. A sequence may have infinitely many terms.

D. A sequence may have a finite number of terms

Answer: B

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7. The 8th term of the sequence 1,1,2,3,..... is .....

A. 25

B. 24

C. 23

D. 21

Answer: D

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8. The next term of $\frac{1}{20}$ in the sequence $\frac{1}{2}, \frac{1}{6}, \frac{1}{12}, \frac{1}{20}$ is.....

A. $\frac{1}{24}$

B. $\frac{1}{22}$

C. $\frac{1}{30}$

D. $\frac{1}{18}$

Answer: C

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9. If a, b, c, l,m are in A.P, then the value of $a - 4b + 6c - 4l + m$ is.

A. 1

B. 2

C. 3

D. 0

Answer: D

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10. If a,b,c are in A.P. then $\frac{a-b}{b-c}$ is equal to .....

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

B. $\frac{b}{c}$

C. $\frac{a}{c}$

D. 1

Answer: D

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11. If the n^{th} term of a sequence is 100n + 10, then the sequence i s .....

A. an A.P.

B. a G.P.

C. a constant sequence

D. neither A.P. nor G.P.

Answer: A

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12. If $a_1, a_2, a_3, \ldots\ldots\ldots$ Are in A.P. such that $\frac{a_4}{a_7} = \frac{3}{2}$, then the 13^{th} term of the A.P. is $\ldots\ldots\ldots\ldots$

A. $\frac{3}{2}$

B. 0

C. $12a_1$

D. $14a_1$

Answer: B

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13. If the sequence $a_1, a_2, a_3, \ldots\ldots\ldots$ Is an A.P., then the sequence $a_5, a_{10}, a_{15}, \ldots\ldots\ldots$ Is $\ldots\ldots\ldots\ldots$

A. a G.P.

B. an A.P.

C. neither A.P. nor G.P.

D. a constant sequence.

Answer: B

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14. If k + 2 ,4k - 6, 3k - 2 are the 3 consecutive terms of an A.P, then the value of k i s .....

A. 2

B. 3

C. 4

D. 5

Answer: B

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15. If a, b, c, I, m, n are in A.P, then 3a + 7, 3b + 7, 3c + 7, 3l + 7, 3m + 7, 3n + 7 form .....

A. a G.P.

B. an A.P.

C. a constant sequence

D. neither A.P. nor G.P.

Answer: A::B

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16. If the third term of a G.P. is 2, then the product of first 5 terms i s .....

A. 5^2

B. 2^5

C. 10

D. 15

Answer: B

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17. If a,b,c are in G.P. then $\frac{a-b}{b-c}$ is equal to .....

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

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

C. $\frac{a}{c}$

D. $\frac{c}{b}$

Answer: A

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18. If x, 2x + 2, 3x + 3, are in G.P., then 5x, l0x + 10, 15x + 15, form ....

A. an A.P.

B. a G.P.

C. a constant sequence

D. neither A.P. nor G.P.

Answer: B

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19. The sequence, $-3, \ -3, \ -3,$ ..... Is.....

A. an A.P. Only

B. a G.P. only

C. neither A.P. nor G.P.

D. both A.P. and G.P.

Answer: D

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20. If the product of the first four consecutive terms of a G.P is 256 and if the common ratio is 4 and the first term is positive, then its 3rd term i s .....

A. 8

B. $\frac{1}{16}$

C. $\frac{1}{32}$

D. 16

Answer: A

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21. In a G.P.$t_2 = \frac{3}{5}$ and $t_3 = \frac{1}{5}$. The the common ratio is ___.

A. $\frac{1}{5}$

B. $\frac{1}{3}$

C. 1

D. 5

Answer: B

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22. If $x \neq 0$, then 1+ secx + $\sec^2 x + \sec^3 x + \sec^4 x + \sec^5 x$ is equal to .....

A. $(1 + \sec x)\left(\sec^2 x + \sec^3 x + \sec^4 x\right)$

B. $(1 + \sec x)\left(1 + \sec^2 x + \sec^4 x\right)$

C. $(1 - \sec x)\left(\sec x + \sec^3 x + \sec^5 x\right)$

D. $(1 + \sec x)\left(1 + \sec^3 x + \sec^4 x\right)$

Answer: B

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23. If the nth term of an A.P. is $t_n = 3 - 5n$, then the sum of the first n terms is .....

A. $\frac{n}{2}[1 - 5n]$

B. $n(1 - 5n)$

C. $\frac{n}{2}(1 + 5n)$

D. $\frac{n}{2}(1 + n)$

Answer: A

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24. The common ratio of the G.P. a^{m-n}, a^m, a^{m+n} is .....

A. a^m

B. a^{-m}

C. a^n

D. a^{-n}

Answer: C

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25. If $1 + 2 + 3 + \ldots . + n$ = k then $1^3 + 2^3 + \ldots . + n^3$ is equal to.....

A. k^2

B. k^3

C. $\frac{k(k+1)}{2}$

D. $(k+1)^3$

Answer: A

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Additional Question Solved Ii Answer The Following

1. Show that the square of any positive integer of the form 3m or 3m + 1 for some integer n.

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2. If the H.C.F. of 65 and 117 is expressible in the form of $65m - 117$, then the value of m is

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3. Compute x such that $5^4 \equiv x \pmod 8$

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4. The first term of an A.P. is 6 and the common difference is 5. Find the A.P. and its general term.

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5. Which term of the arithmetic sequence $24, 23\left(\frac{1}{4}\right), 21\left(\frac{3}{4}\right), \ldots\ldots$ is 3?

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6. Find n so that the nth terms of the following two A.P.'s are the same.

1,7,13, 19,..... And 100,95, 90,.....

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7. If a,b,c are in A.P., show that $(a-c)^2 = 4(b^2 - ac)$.

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8. Find the sum of the first 30 terms of an A.P. whose nth term is 3 + 2n.

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9. Find the sum of the firt 40 terms of the series $1^2 - 2^2 + 3^2 - 4^2$+.....

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10. The sum of first n terms of a certain series is given as $3n^2 - 2n$. Show that the series is an arithmetic series.

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11. If a clock strickes once at 1 o'clock, twice at 2o'clock, thrice at 3 o'clock and so on. How many times will it strikes in day?

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12. If the 4th and 7th term of Geometrics Progressions are 54 and 1458 respectively, find the Geometric Progression.

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13. Which term of the geometric sequence,

(i) $5, 2, \frac{4}{5}, \frac{8}{25}, \ldots\ldots$ Is $\frac{128}{15625}$?

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14. How many consecutive terms starting from the first term of the scries 2 + 6 + 18 + ... would sum to 728?

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15. A geometric series consists of four terms and has a positive common ratio. The sum of the first two terms is 9 and sum of the last two terms is 36. Find the series.

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16. Suppose that five people are ill during the first week of an epidemic and each sick person spreads the contagious disease to four other people by the end of the second week and so on. By the end of 15th week, how many people will be affected by the epidemic?

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17. A gardener wanted to reward a boy for his good deeds by giving some mangoes. He gave the boy two choices. He could either have 1000 mangoes at once or he could get 1 mango on the first day, 2 on the second day, 4 on the third day, 8 mangoes on the fourth day and so on for ten days. Which option should the boy choose to get the maximum number of mangoes?

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18. Find the value of k if

$1^3 + 2^3 + 3^3 + \ldots\ldots\ldots + k^3 = 2025$

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19. If $1^3 + 2^3 + 3^3 + \ldots\ldots\ldots + k^3 = 8281$, then find 1+2 + 3 + ... +k.

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20. Find the sum of all 11 term of an AP whose middle most term in 30.

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Additional Question Solved Iii Answer The Following

1. Use Euclid's division algorithim to find the HCF of 867 and 255.

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2. Find the least positive value of x if $5x \equiv 2(\text{mod } 13)$

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3. Find the 40th term of A.P. whose 9th term is 465 and 20th term is 388.

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4. Find the three consecutive terms in an A.P. whose sum is 18 and the sum of their squares is 140.

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5. If m times the m^{th} term of an A.P. is equal to n times its n^{th} term, then show that the (m + n)th term of the A.P. is zero.

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6. If a,b,c are in A.P., show that $(a-c)^2 = 4(b^2 - ac)$.

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7. The ratio of the sum of m and n terms of an A.P. is $m^2 : n^2$. Show that the ratio of m^{th} and n^{th} term is $2m - 1 : 2n - 1$.

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8. A construction company will be penalised each day for delay in construction of a bridge. The penalty will be Rs 4000 for the first day and will increase by Rs 1000 for each following day. Based on its budget, the company can afford to pay a maximum of Rs 1,65,000 towards penalty. Find the maximum number of days by which the construction of work can be delayed.

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9. If the product of three consecutive terms in G.P. is 216 and sum of their products in pairs is 156, find them.

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10. If a,b,c,d are in a geometric sequences, then show that $(a-b+c)(b+c+d) = ab + bc + cd$.

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11. Find the sum of the first n terms of the series $0.4 + 0.94 + 0.994 + \ldots$.

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12. Find the total area of 12 squares whose sides are 12 cm, 13 cm, ... 23 cm respectively.

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