MATHS

BOOKS - S CHAND MATHS (ENGLISH)

SEQUENCES AND SERIES

Example

1. If the sum of n terms of a sequence is given by

$S_n = 3n^2 - 2n \, \forall n \in N$, then its 10th term is

A. (a) 55

B. (b) 60

C. (c) 65

D. (d) 59

Answer: A

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2. If $\log_{10} 2$, $\log_{10}(2^x - 1)$ and $\log_{10}(2^x + 3)$ are in

A.P then the value of x is

A. A. $\log_5 2$

B. B. $\log_2 5$

C. C. $\log_2 3$

D. D. $\log_3 2$

Answer: B

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3. A sum of Rs. 6240 is paid off in 30 instalments such each instalments is Rs. 10 more than the preceding instalment. The value of the first instalments is

A. Rs. 64

B. Rs. 65

C. Rs. 63

D. Rs. 62

Answer: C

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4. The sum of terms of a G.P if $a_1 = 3$, $a_n = 96$ and $S_n = 189$ is

A. 5

B. 6

C. 7

D. 8

Answer: B

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5. If

$$x = 1 + a + a^2 + \ldots \ldots \infty, y = 1 + b + b^2 \ldots \ldots \infty$$

then

$$1 + ab + a^2b^2 + \ldots \ldots \ldots \infty, |a| < 1, |b| < 1 \text{ is}$$

A. A. $\dfrac{x + y}{xy - 1}$

B. B. $\dfrac{x - y}{xy + 1}$

C. C. $\dfrac{xy}{x + y - 1}$

D. D. $\dfrac{xy}{x - y + 1}$

Answer: C

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6. The minimum value of $3^x + 3^{1-x}$, $x \in R$

A. 0

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

C. 3

D. $2\sqrt{3}$

Answer: D

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7. If the ratio of AM to GM of two positive numbers

a and b is 5:3, then a:b is

    A. (a) $3:5$

    B. (b) $2:9$

    C. (c) $9:1$

    D. (d) $5:3$

Answer: C

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8. If A_1, A_2 are two A.M.'s and G_1, G_2 be two G.M.'s between two positive numbers a and b, then $\frac{A_1 + A_2}{G_1 G_2}$ is equal to

(i) $\frac{a + b}{ab}$

(ii) $\frac{a + b}{2}$

(iii) $\frac{a +}{a - b}$

(iv) None of these

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

B. $\dfrac{a+b}{2}$

C. $\dfrac{a+}{a-b}$

D. None of these

Answer: A

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9. If a,b,c are in A.P. as well as is G.P. then the value

of $a^{b-c} + b^{c-a} + c^{a-b}$ is

(i) 1

(ii) 3

(iii) 6

(iv) None of these

A. 1

B. 3

C. 6

D. None of these

Answer: B

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10. If $1 + 2 + 3 + \ldots\ldots + n = 28$, then the value

of $1^2 + 2^2 + 3^2 + \ldots\ldots\ldots + n^2$ is

(i) 560

(ii) 280

(iii) 140

(iv) None of these

    A. 560

    B. 280

    C. 140

    D. None of these

Answer: C

Multiple Choice Questions

1. If for n sequences $S_n = 2(3^n - 1)$, then the third

term is

    A. A. 18

    B. B. 14

    C. C. 36

    D. D. 48

Answer: C

2. The number of integers between 100 and 1000 that are not divisible by 7 is

(i) 128

(ii) 899

(iii) 771

(iv) 772

    A. 128

    B. 899

C. 771

D. 772

Answer: C

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3. In an AP the pth term is q and the $(p+q)$th term is zero, then the qth term is (i) $-p$ (ii) p (iii) $p+q$ (iv) $p-q$

A. $-p$

B. p

C. $p + q$

D. $p - q$

Answer: B

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4. The 10th common terms between the series

$3 + 7 + 11 + \ldots$ And $1 + 6 + 11 + \ldots$ is

(i) 191

(ii) 193

(iii) 211

(iv) None of these

A. 191

B. 193

C. 211

D. None of these

Answer: A

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5. If the sum of n terms of an A,Pis given by $S_n = 3n + 2n^2$ then the common difference of the A.P. is

A. A. 3

B. B. 2

C. C. 6

D. D. 4

Answer: D

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6. If 9 times the 9th term of an A.P. is equal to 13 times the 13 term, then the 22nd term of the A.P. is

(i) 0

(ii) 22

(iii) 220

(iv) 198

A. 0

B. 22

C. 220

D. 198

Answer: A

7. If T_r be the rth term of an A.P. with first term a and common difference d, $T_m = \dfrac{1}{n}$ and $T_n = \dfrac{1}{m}$ then $a - d$ equals

A. (a) $\dfrac{1}{mn}$

B. (b) 1

C. (c) 0

D. (d) $\dfrac{1}{m} + \dfrac{1}{n}$

Answer: C

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8. The sum of all odd numbers between 1 and 1000 which are divisible by 3, is

    A. 90000

    B. 83667

    C. 93660

    D. None of these

Answer: B

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9. The sum of all two digit numbers which when divided by 4 leave 1 as remainder is

    A. 1210

    B. 1120

    C. 1021

    D. 1102

Answer: A

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10. If $\log_3 2$, $\log_3(2^x - 5)$ and $\log_3\left(2^x - \dfrac{7}{2}\right)$ are in

A.P., then x is equal to

    A. 2

    B. 3

    C. 4

    D. 2.3

Answer: B

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11. Let a,b,c be in A.P. If p is the A.M. between a and b and q is the A.M between b and c, then b is equal to

A. A. $\dfrac{p+q}{2}$

B. B. $\dfrac{p-q}{2}$

C. C. $\dfrac{pq}{2}$

D. D. None of these

Answer: A

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12. If the ratio of second to seventh of n A.M.'s between -7 and 65 is 1:7, then n is equal to (i) 10 (ii) 11 (iii) 12 (iv) 13

A. 10

B. 11

C. 12

D. 13

Answer: B

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13. In a G.P first term is $\dfrac{3}{4}$, common ratio is 2 and the last term is 384 , the number of terms of G.P. is

(i) 8 (ii) 9 (iii) 10 (iv) 11

A. 8

B. 9

C. 10

D. 11

Answer: C

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14. The first and second terms of a G.P are x^{-4} and x^m respectively. If its 8th term is x^{52}, then the value of m is

A. A. 8

B. B. 6

C. C. 4

D. D. 2

Answer: C

15. If the first term of a G.P is 27 and 8th term is $\dfrac{1}{81}$, then the sum of its first 10 terms is (i) $\dfrac{27}{2}\left(1 - \dfrac{1}{3^{10}}\right)$ (ii) $\dfrac{81}{2}\left(\dfrac{1}{3^{10}} - 1\right)$ (iii) $\dfrac{27}{2}\left(\dfrac{1}{3^{10}} - 1\right)$ (iv) $\dfrac{81}{2}\left(1 - \dfrac{1}{3^{10}}\right)$

A. $\dfrac{27}{2}\left(1 - \dfrac{1}{3^{10}}\right)$

B. $\dfrac{81}{2}\left(\dfrac{1}{3^{10}} - 1\right)$

C. $\dfrac{27}{2}\left(\dfrac{1}{3^{10}} - 1\right)$

D. $\dfrac{81}{2}\left(1 - \dfrac{1}{3^{10}}\right)$

Answer: D

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16. The product of 5 terms of G.P. whose 3rd term is

2 is

    A. A. 5^2

    B. B. 2^5

    C. C. 3^2

    D. D. 3^5

Answer: B

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17. If 3rd, 8th and 13th terms of a G.P are p ,q and r respectively, then which one of the following is correct? (i) $q^2 = pr$ (ii) $r^2 = pq$ (iii) $pqr = 1$ (iv) $2q = p + r$

A. $q^2 = pr$

B. $r^2 = pq$

C. $pqr = 1$

D. $2q = p + r$

Answer: A

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18. Let a,b,c are in A.P and $k \neq 0$ be a real number which of the following is/ are correct?

(i) ka, kb, kc are in A.P

(ii) $k - a$, $k - b$, $k - c$ are in A.P.

(iii) $\dfrac{a}{k}$, $\dfrac{b}{k}$, $\dfrac{c}{k}$ are in A.P (a) i and ii only (b) ii and iii only (c) i and iii only (d) i, ii and iii

   A. i and ii only

   B. ii and iii only

   C. I and iii only

   D. I,ii and iii

Answer: D

19. How many two digit numbers are divisible by 4?

A. A. 21

B. B. 22

C. C. 24

D. D. 25

Answer: B

20. A G.P consists of 200 terms. If the sum of odd terms of G.P is m and sum of even terms of G.P. is n, then the comon ratio of G.P is

A. A. $\dfrac{m}{n}$

B. B. $\dfrac{n}{m}$

C. C. $m + \dfrac{n}{m}$

D. D. $n + \dfrac{m}{n}$

Answer: B

21. If an infinite G.P. has the first term a and the sum 5, then which one of the following is correct?

    A. A. $a < -10$

    B. B. $-10 < a < 0$

    C. C. $0 < a < 10$

    D. D. $a > 10$

Answer: C

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22. The value of

$2 \times 2^{1/2} \times 2^{1/4} \times 2^{1/8} \times \ldots \times \infty$ is

(i) 4

(ii) $\sqrt{2}$

(iii) $2\sqrt{2}$

(iv) 8

    A. 4

    B. $\sqrt{2}$

    C. $2\sqrt{2}$

    D. 8

Answer: A

23. If the second term of a G.P. is 2 and the sum of

its infinite terms is 8, then G.P. is

(i) $8, 2, \dfrac{1}{2}, \dfrac{1}{8}, .$

(ii) $10, 2, \dfrac{2}{5}, \dfrac{2}{25},$ "

(iii) $4, 2, 1, \dfrac{1}{2}, \dfrac{1}{4}.$

(iv) $6, 3, \dfrac{3}{2}, \dfrac{3}{4}, \ldots\ldots$

A. $8, 2, \dfrac{1}{2}, \dfrac{1}{8}, .$

B. $10, 2, \dfrac{2}{5}, \dfrac{2}{25},$ "

C. $4, 2, 1, \dfrac{1}{2}, \dfrac{1}{4}.$

D. $6, 3, \dfrac{3}{2}, \dfrac{3}{4}$,......

Answer: C

24. If x,y,z are positive integers, then the value of

the expression $(x + y)(y + z)(z + x)$ is

A. $a) = 8xyz$

B. b) >8xyz

C. c) $< 8xyz$

D. d) $= 4xyz$

25. In a G.P of positive terms if any term is equal to the sum of the next two terms, then the common ratio of the G.P is

A. $\sin 18°$

B. $2\cos 18°$

C. $\cos 18°$

D. $2\sin 18°$

Answer: D

26. If the sum of first two terms of an infinite G.P is

1 and every term is twice the sum of all the

successive terms then its first term is

A. $\dfrac{1}{3}$

B. $\dfrac{2}{3}$

C. $\dfrac{3}{4}$

D. $\dfrac{1}{4}$

Answer: C

27. If x,2y,3z are in A.P where the distinct numbers

x,y,z are in G.P then the common ratio of G.P is

A. 3

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

C. 2

D. 1

Answer: B

28. Let S_n denote the sum of the cubes of the first n natural numbers and s_n denote the sum of first n natural numbers then $\dfrac{S_n}{s_n}$ is equal to

(i) $\dfrac{n(n+1)(n+2)}{6}$

(ii) $\dfrac{n(n+1)}{2}$

(iii) $\dfrac{n^2+3n+2}{2}$

(iv) $\dfrac{2n+1}{3}$

A. $\dfrac{n(n+1)(n+2)}{6}$

B. $\dfrac{n(n+1)}{2}$

C. $\dfrac{n^2 + 3n + 2}{2}$

D. $\dfrac{2n + 1}{3}$

Answer: B

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29. If t_n denotes the n th term of the series

$2 + 3 + 6 + 1 + 18 +$ ....then t_{50} is

A. $49^2 - 1$

B. 49^2

C. $50^2 + 1$

D. $49^2 + 2$

Answer: D

30. If every term of a G.P with positive terms is the sum of its two previous terms, then the common ratio of the G.P is

A. 1–5–√2

B. √+12

C. 9

D. None of these

Answer: D

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31. The value of $9^{1/3} \times 9^{1/9} \times 9^{1/27} \times \ldots\ldots$ to ∞

is

A. 1

B. 3

C. 9

D. None of these

Answer: B

32. If the first second and the last terms of an A.P

are a,band 2a , respectively, then its sum is

A. $\dfrac{ab}{2(b-a)}$

B. $\dfrac{ab}{b-a}$

C. $\dfrac{3ab}{2(b-a)}$

D. None of these

Answer: C

33. If the sum of two extreme numbers of an A.P with four terms is 8 and the product of remaining two middle terms is 15, then the greatest number will be

A. 5

B. 7

C. 9

D. 11

Answer: B

34. If the first term of a G.P. a_1, a_2, a_3 is unity such that $4a_2 + 5a_3$ is least, then the common ratio of the G.P. is

A. $\dfrac{2}{5}$

B. $-\dfrac{2}{5}$

C. $-\dfrac{3}{5}$

D. $-\dfrac{1}{5}$

Answer: B