doubtnut
India's Number 1 Education App

MATHS

BOOKS - PREMIERS PUBLISHERS

BINOMIAL THEOREMN,SEQUENCES AND SERIES

Worked Examples

1. Find the value of $(99)^3$ using binomial expansion.

Watch Video Solution

2. Expand $(3x+2)^5$

Watch Video Solution

3. Expand $\left(3x-\frac{1}{2x}\right)^4$

Watch Video Solution

4. Simplify $\left(x+\sqrt{1+x^2}\right)^3-\left(x-\sqrt{1+x^2}\right)^3$

View Text Solution

5. Find the middle term in the expansion of $\left(3-\frac{1}{2x}\right)^{10}$

Watch Video Solution

6. Find the middle terms in the expansion of $(2x+y)^7$

Watch Video Solution

7. Using binomial theorem prove that 8^n-7n always leaves remainder f when divided by 49 for all

positive integer n.

View Text Solution

8. Find the coefficient of x^5 in $\left(x^2 - \frac{3}{x}\right)^7$

Watch Video Solution

9. Find the coefficient of x^2 in $\left(2x + \frac{1}{2x}\right)^4$

Watch Video Solution

10. Find the last two digits in the number 11^{100}

Watch Video Solution

11. Find the constant term in the expansion of $\left(\sqrt{x} - \frac{2}{x^2}\right)^{20}$

Watch Video Solution

12. If a, b, c are in HP show that ab + bc = 2ac.

Watch Video Solution

13. If 4^{th} term and sixth term of an HP are $\frac{1}{9}$ and $\frac{1}{13}$ respectively, find the 10^{th} term of the sequence.

Watch Video Solution

14. Given that 3 is the first term and sixth term of an AP is 23. Find the remaining terms between first and sixth terms.

Watch Video Solution

15. If second term of a GP is 15 and fourth term is 135. Find the sixth term.

Watch Video Solution

16. Find the sum $1 + \frac{3}{5} + \frac{5}{25} + \frac{7}{125} + \ldots$

Watch Video Solution

17. Find $\sum_{n=1}^{n} \frac{1}{(4n^2 - 1)}$

View Text Solution

18. Find the sum of the first n terms of the series

$$\frac{1}{\sqrt{2}+\sqrt{3}}+\frac{1}{\sqrt{3}+\sqrt{4}}+\ldots$$

Watch Video Solution

19. Find the sum $1+\frac{3}{5}+\frac{5}{25}+\frac{7}{125}+\ldots$

Watch Video Solution

20. Find $sun_{n+1}^{\infty}\frac{1}{4n^2-1}$

View Text Solution

21. Expand $(1-x)^{\frac{1}{3}}$ upto 4 terms for |x|<1

Watch Video Solution

22. Expand $\frac{1}{(1+4x)^3}$ in powers of x. State when is the expansion valid.

Watch Video Solution

23. Expand $\frac{1}{(2+3x)^2}$ in powers of x. State when is the expansion valid.

Watch Video Solution

24. Evaluate $\sqrt[4]{82}$ using binomial expansion.

Watch Video Solution

25. Show that

$$x^n = 1 + n\left(1 - \frac{1}{x}\right) + \frac{n(n+1)}{1.2}\left(1 - \frac{1}{x}\right)^2 + \ldots$$

Watch Video Solution

26. Find the coefficient of x^8 in the expansion of $(1 - 2x)^{-\frac{1}{2}}$.

Watch Video Solution

27. Evaluate $\sqrt[3]{1003}$ correct to 2 places of decimals.

Watch Video Solution

Exercise 5 1

1. Expand

$$\left(2x^2 - \frac{3}{x}\right)^3$$

Watch Video Solution

2. Expand

$$\left(2x^2 - 3\sqrt{1-x^2}\right)^4 + \left(2x^2 + 3\sqrt{1-x^2}\right)^4$$

Watch Video Solution

3. Compute

102^4

Watch Video Solution

4. Compute

99^4

Watch Video Solution

5. Simplify

Q $9^{\frac{1}{2}}$

Watch Video Solution

6. Using binomial theorem indicate which of the following two numbers is larger $(1.01)^{1000000}$ or 10000

Watch Video Solution

7. Find the co-efficient of x^{15} in $\left(x^2+\frac{1}{x^3}\right)^{10}$

Watch Video Solution

8. Find the Co-efficient of x^6 and the co-efficient of x^2 in $\left(x^2-\frac{1}{x^3}\right)^6$

Watch Video Solution

9. Find the Co-efficient of x^4 in the expansion of $(1+x^3)^{50}\left(x^2+\frac{1}{x}\right)^5$.

Watch Video Solution

Watch Video Solution

10. Find the constant term of $\left(2x^3 - \frac{1}{3x^2}\right)^5$.

Watch Video Solution

11. Find the last two digits of the number 3^{600}.

Watch Video Solution

12. If n is a positive integer, show that, $9^{n+1} - 8n - 9$ is always divisible by 64.

Watch Video Solution

Watch Video Solution

13. If n is a positive integer and r is a nonnegative integer, prove that the coefficients of x^r and x^{n-r} in the expansion of $(1+x)^n$ are equal.

Watch Video Solution

14. If a and b are distinct Integers, prove that a - b is a factor of $a^n - b^n$, whenever n is a positive integer. [Hint: write $a^n = (a-b+b)^n$ and expand]

Watch Video Solution

15. In the binomial expansion of $(a+b)^n$, the coefficients of the 4^{th} and 13^{th} terms are equal to each other, find n.

Watch Video Solution

16. If the binomial coefficients of three consecutive terms in the expansion of $(a+x)^n$ are in the ratio 1:7 :42 , then find n .

Watch Video Solution

17. In the binomial coefficients of $(1+x)^n$, the coefficients of the 5th, 6th and 7th terms are in AP Find all values of n.

Watch Video Solution

18. Prove that $C_0^2 + C_1^2 + C_2^2 + \ldots + C_n^2 = \frac{2n!}{(n!)^2}$

Watch Video Solution

Exercise 5 2

1. Write the first 6 terms of the sequences whose n^{th} terms are given below and classify them as arithmetic progression, geometric progression, arithmetico-geometric progression, harmonic progression and none of them.

$$\frac{1}{2^{n+1}}$$

Watch Video Solution

2. Write the first 6 terms of the sequences whose n^{th} terms are given below and classify them as arithmetic progression, geometric progression, arithmetico-geometric progression, harmonic

progression and none of them.

$$\frac{(n+1)(n+2)}{n+3(n+4)}$$

Watch Video Solution

3. Write the first 6 terms of the sequences whose n^{th} terms are given below and classify them as arithmetic progression, geometric progression, arithmetico-geometric progression, harmonic progression and none of them.

$$4\left(\frac{1}{2}\right)^{n}$$

Watch Video Solution

4. Write the first 6 terms of the sequences whose n^{th} terms are given below and classify them as arithmetic progression, geometric progression, arithmetico-geometric progression, harmonic progression and none of them.

$$\frac{(-1)^n}{n}$$

Watch Video Solution

5. Write the first 6 terms of the sequences whose n^{th} terms are given below and classify them as arithmetic progression, geometric progression, arithmetico-geometric progression, harmonic

progression and none of them.

$$\frac{2n+3}{3n+4}$$

Watch Video Solution

6. Write the first 6 terms of the sequences whose n^{th} terms are given below and classify them as arithmetic progression, geometric progression, arithmetico-geometric progression, harmonic progression and none of them.

$$\frac{(-1)^n}{n}$$

Watch Video Solution

7. Write the first 6 terms of the sequences whose n^{th} terms are given below and classify them as arithmetic progression, geometric progression, arithmetico-geometric progression, harmonic progression and none of them.

$$\frac{3n-2}{3^{n-1}}$$

Watch Video Solution

8. Write the n^{th} term of the following sequences.

2, 2, 4, 4, 6, 6, ___

Watch Video Solution

9. Write the n^{th} term of the following sequences.

$\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \frac{5}{6}, \cdots$

Watch Video Solution

10. Write the n^{th} term of the following sequences.

$\frac{1}{2}, \frac{3}{4}, \frac{5}{6}, \frac{7}{8}, \frac{9}{10}, \cdots$

Watch Video Solution

11. Write the n^{th} term of the following sequences.

6, 10, 4, 12, 2, 14, 0, 16, -2, ____

Watch Video Solution

12. The sum of three numbers is 20. If we multiply the third number by 2 and add the first number to the result we get 23. By adding second and third numbers to 3 times the first number we get 46. Find the numbers using Cramer's rule.

Watch Video Solution

13. Write the n^{th} term of the sequence $\frac{3}{1^2 2^2}, \frac{5}{2^2 3^2}, \frac{7}{3^2 4^2}, \ldots$ as a difference of two terms.

Watch Video Solution

14. If t_k is the k^{th} term of a G.P, then show that t_{n-k}, t_n, t_{n+k} also form a GP for any positive integer k.

Watch Video Solution

15. If a, b, c are in geometric progression, and if $a^{\frac{1}{x}} = b^{\frac{1}{y}} = c^{\frac{1}{z}}$, then prove that x, y, z are in arithmetic progression.

Watch Video Solution

16. The AM of two numbers exceeds their GM by 10 and HM by 16. Find the numbers.

Watch Video Solution

17. If the roots of the equation $(q-r)x^2+(r-p)x+p-q=0$ are equal, then show that p, q and r are in A.P.

Watch Video Solution

18. Thep^{th}, q^{th} and r^{th} terms of an A.P. are a, b, c, respectively. Show that

$(q-r)a+(r-p)b+(q-p)c=0$

Watch Video Solution

Exercise 5 3

1. Find the sum of first 20 terms of the arithmetic progression having the sum of first 10 terms as 52 and the sum of the first 15 terms as 77.

Watch Video Solution

2. Find the sum upto the 17^{th} term of the series

$$\frac{1^3}{1} + \frac{1^3+2^3}{1+3} + \frac{1^3+2^3+3^3}{1+3+5} + \ldots$$

Watch Video Solution

3. Compute the sum of first n terms of the following series :

8 + 88 + 888 + 8888 ____

Watch Video Solution

4. Compute the sum of first n terms of the following series :

6 + 66 + 666 + 6666 ...

Watch Video Solution

5. Compute the sum of first n terms of

$1 + (1 + 4) + (1 + 4 + 4^2) + (1 + 4 + 4^2 + 4^3) + ...$

Watch Video Solution

6. Find the general term and sum to n terms of the sequanece $1, \frac{4}{3}, \frac{7}{9}, \frac{10}{27}, \ldots$

Watch Video Solution

7. Find the value of n, if the sum to n terms of the series $\sqrt{3} + \sqrt{75} + \sqrt{243} + \ldots 435\sqrt{3}$. Is

Watch Video Solution

8. Show that the sum of $(m+n)^{th}$ and $(m-n)^{th}$ term of an A.P is equal to twice the m^{th} term.

Watch Video Solution

9. A man repays an amount of Rs.3250 by paying Rs.20 in the first month and then increases the payment by Rs.15 per month. How long will it take him to clear the amount?

Watch Video Solution

10. In a race, 20 balls are placed in a line at intervals of 4 meters, with the first ball 24 meters away from the starting point. A contestant is required to bring the balls back to the starting place one at a time.

How far would the contestant run to bring back all balls?

Watch Video Solution

11. The number of bacteria in a certain culture doubles every hour. If there were 30 bacteria present in the culture originally, how many bacteria will be present at the end of 2^{nd} hour, 4^{th} hour and n^{th} hour?

Watch Video Solution

12. What will Rs. 500 amounts to in 10 years after its deposit in a bank which pays annual interest rate of 10% compounded annually?

Watch Video Solution

13. In a certain town, a viral disease caused severe health hazards upon its people disturbing their normal life. It was found that on each day, the virus which caused the disease spread in Geometric Progression. The amount of infectious virus particle gets doubled each day, being 5 particles on the first

day. Find the day when the infectious virus particles just grow over 1,50,000 units?

View Text Solution

Exercise 5 4

1. Expand the following in ascending powers of x and find the condition on x for which the binomial expansion is valid.

$$\frac{1}{5+x}$$

Watch Video Solution

2. Expand the following in ascending powers of x and find the condition on x for which the binomial expansion is valid.

$$\frac{2}{(3+4x)^2}$$

Watch Video Solution

3. Expand the following in ascending powers of x and find the condition on x for which the binomial expansion is valid.

$$(5+x^2)^{\frac{2}{3}}$$

Watch Video Solution

4. Expand the following in ascending powers of x and find the condition on x for which the binomial expansion is valid.

$(x+2)^{\frac{-2}{3}}$

Watch Video Solution

5. Find $\sqrt[3]{1001}$ approximately. (two decimal places).

Watch Video Solution

6. Prove that $\sqrt[3]{x^3+6}-\sqrt[3]{x^3+3}$ is approximately equal to $\frac{1}{x^2}$ when x is sufficiently large.

Watch Video Solution

7. Prove that $\sqrt{\frac{1-x}{1+x}}$ is approximately equal to $1-x+\frac{x^2}{2}$ when x is very small.

Watch Video Solution

8. Write the first 6 terms of the exponential series

e^{5x}

Watch Video Solution

9. Write the first 6 terms of the exponential series

e^{-2x}

Watch Video Solution

10. Write the first 6 terms of the exponential series

$e^{\frac{1}{2}x}$

Watch Video Solution

11. Write the first 4 terms of the logarithmic series

$\log(1+4x)$

Find the intervals on which the expansions are valid.

Watch Video Solution

12. Write the first 4 terms of the logarithmic series

$\log(1-2x)$

Find the intervals on which the expansions are valid.

Watch Video Solution

13. Write the first 4 terms of the logarithmic series

$$\log\left(\frac{1+3x}{1-3x}\right)$$

Find the intervals on which the expansions are valid.

Watch Video Solution

14. If $y = x + \frac{x^2}{2} + \frac{x^3}{3} + \frac{x^4}{4} + \ldots$ then show that $x = y - \frac{y^2}{2!} + \frac{y^3}{3!} - \frac{y^4}{4!} + \ldots$

Watch Video Solution

15. If p - q is small compared to either p or q, then show that $\sqrt{\frac{p}{q}} = \frac{(n+1)p + (n-1)q}{(n-1)p + (n+1)q}$

Hence find $\sqrt{\frac{15}{16}}$.

Watch Video Solution

16. Find the co-efficient of x^4 in the expansion of $\frac{3 - 4x + x^2}{e^{2x}}$.

Watch Video Solution

17. Find the value of

$$\sum_{n=1}^{\infty} \frac{1}{2n-1}\left(\frac{1}{9^{n-1}}+\frac{1}{9^{2n-1}}\right)$$

Watch Video Solution

Exercise 5 5 Choose The Correct

1. The value of 2 + 4 + 6 + ...+ 2n is

A. $\frac{n(n-1)}{2}$

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

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

D. $n(n+1)$

Answer: D

Watch Video Solution

2. The coefficient of x^6 in $(2+2x)^{10}$ is

A. ${}^{10}C_6$

B. 2^6

C. ${}^{10}C_6 2^6$

D. ${}^{10}C_6 2^{10}$

Answer: D

Watch Video Solution

3. The coefficient of x^8y^{12} in the expansion of $(2x+3y)^{20}$ is

A. 0

B. $2^8 3^{12}$

C. $2^8 3^{12} + 2^{12} 3^8$

D. ${}^{20}C_8 2^8 3^{12}$

Answer: D

Watch Video Solution

4. If ${}^{n}C_{10} > {}^{n}C_{r}$ for all possible r, then a value of n is

A. 10

B. 21

C. 19

D. 20

Answer: D

Watch Video Solution

5. If a is the arithmetic mean and g is the geometric mean of two numbers, then

A. $a \leq g$

B. $a \geq g$

C. a=g

D. $a > g$

Answer: B

 Watch Video Solution

6. If

$$\left(1+x^2\right)^2(1+x)^n = a_0 + a_1x + a_2x^2 + \ldots + x^{n+4}$$

and if a_0, a_1, a_2 are in A.P., then n is:

A. 1

B. 5

C. 2

D. 4

Answer: C

Watch Video Solution

7. If a, 8, b are in AP, a, 4, b are in GP, and if a, x, b are in HP then x is

A. 2

B. 1

C. 4

D. 16

Answer: A

 Watch Video Solution

8. The sequence $\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}+\sqrt{2}}, \frac{1}{\sqrt{3}+2\sqrt{2}}$ form an ..... .

A. AP

B. GP

C. HP

D. AGP

Answer: C

Watch Video Solution

9. The HM of two positive numbers whose AM and GM are 16, 8 respectively is

A. 10

B. 6

C. 5

D. 4

Answer: D

 Watch Video Solution

10. If S_n denotes the sum of n terms of an AP whose common difference is d, the value of $S_n - 2S_{n-1} + S_{n-2}$ is

A. d

B. 2d

C. 4d

D. d^2

Answer: A

Watch Video Solution

11. The remainder when 38^{15} is divided by 13 is

A. 12

B. 1

C. 11

D. 5

Answer: A

Watch Video Solution

12. The n^{th} term of the sequence 1, 2, 4, 7, 11, ... is

A. $n^3 + 3n^2 + 2n$

B. $n^3 - 3n^2 + 3n$

C. $\frac{n(n+1)(n+2)}{3}$

D. $\frac{n^2 - n + 2}{2}$

Answer: D

Watch Video Solution

13. The sum up to n terms of the series $\frac{1}{\sqrt{1}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{5}} + \frac{1}{\sqrt{5}+\sqrt{7}}$ +... is:

A. $\sqrt{2n+1}$

B. $\frac{\sqrt{2n+1}}{2}$

C. $\sqrt{2n+1}-1$

D. $\frac{\sqrt{2n+1}-1}{2}$

Answer: D

Watch Video Solution

14. The n^{th} term of the sequence $\frac{1}{2}, \frac{3}{4}, \frac{7}{8}, \frac{15}{16}, \ldots$ is

A. $2^n - n - 1$

B. $1 - 2^{-n}$

C. $2^{-n} + n - 1$

D. 2^{n-1}

Answer: B

Watch Video Solution

15. Sum of first 'n' terms of the series $\sqrt{2} + \sqrt{8} + \sqrt{18} + \ldots$ is ___.

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

B. $2n(n+1)$

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

D. 1

Answer: C

Watch Video Solution

16. The value of the series $\frac{1}{2}+\frac{7}{4}+\frac{13}{8}+\frac{19}{16}+\ldots$ is

A. 14

B. 7

C. 4

D. 6

Answer: A

Watch Video Solution

17. The sum of an infinite GP is 18. If the first term is 6, the common ratio is

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

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

C. $\frac{1}{6}$

D. $\frac{3}{4}$

Answer: B

Watch Video Solution

18. The coefficient of x^5 in the series e^{-2x} is

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

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

C. $\frac{-4}{15}$

D. $\frac{4}{15}$

Answer: C

Watch Video Solution

19. The value of $\frac{1}{2!}+\frac{1}{4!}+\frac{1}{6!}+\ldots$ is

A. $\frac{e^2+1}{2e}$

B. $\frac{(e+1)^2}{2e}$

C. $\frac{(e-1)^2}{2e}$

D. $\frac{e^2+1}{2e}$

Answer: C

Watch Video Solution

20. The value of $1-\frac{1}{2}\left(\frac{2}{3}\right)+\frac{1}{3}\left(\frac{2}{3}\right)^2-\frac{1}{4}\left(\frac{2}{3}\right)^3+\ldots$ is

A. $\log\left(\frac{5}{3}\right)$

B. $\frac{3}{2}\log\left(\left(\frac{5}{3}\right)\right.$

C. $\frac{5}{3}\log\left(\frac{5}{3}\right)$

D. $\frac{2}{3}\log\left(\frac{2}{3}\right)$

Answer: B

Watch Video Solution

Problems For Practice Answer The Following Questions

1. Prove that 7^n - 6n - 1 is always divisible by 36.

Watch Video Solution

2. Find the term independent of x in the expansion of $\left(x^{2+\frac{3}{x}}\right.$ ^ (15)

View Text Solution

3. Find the cofficient x^9 in the expansion of $\left(ax^2 - \frac{b}{cx}\right)^{12}$

View Text Solution

4. with usual notation find the sum $C_0 + {}^3C_1 + {}^5C_2 + \ldots + (2n+1)C_n$ where C_r is representing ${}^nC_r$

View Text Solution

5. Which two consecutive terms in the expansion $(1+x)^{15}$ have equal coefficients.

View Text Solution

6. Insert 5 arthematical means between 3 and 15.

Watch Video Solution

7. If p^{th} term of an AP is q and q^{th} term is p, find $(p+q)^{th}$ term.

Watch Video Solution

8. Find 3 numbers in AP where sum is 15 and sum of their reciprocals is $\frac{71}{105}$

Watch Video Solution

9. Find 3 numbers in GP where sum is 24 and product is 216.

Watch Video Solution

10. Find $\sum_{1}^{\infty} \frac{1}{(k+1)(k+2)}$

View Text Solution

11. Find the cofficient of x in the expansion of $\log\left(\frac{1}{1-5x+6x^2}\right)$

View Text Solution

12. Find $\sqrt{x^4+4}-\sqrt{x^2-4}$ when x is large.

View Text Solution

13. Find $\sqrt{4+x^2}-\sqrt{4-x^2}$ when x is small.

View Text Solution

14. Evaluate $\sum_{k=1}^{10}\left(k^2-3k+5\right)$

View Text Solution

15. Prove that

$$\frac{2^{(\log)_2 \frac{1}{4}x} - 3^{\log}\_(27)\left(x^2+1\right)^3 - 2x >}{7^{4(\log)_{49}x} - x - 1} 0$$

Watch Video Solution

Problems For Practice Choose The Correct Option For The Following

1. The sum upto n terms of the series

$\sqrt{3} + \sqrt{12} + \sqrt{27} + \sqrt{48}$ +... is:

A. $\sqrt{3}n$

B. 3n(n+1)

C. $\sqrt{3}n(n+1)$

D. none of these

Answer: a

Watch Video Solution

2. The sum up to n terms of the series $\frac{1}{\sqrt{1}+\sqrt{3}}+\frac{1}{\sqrt{3}+\sqrt{5}}+\frac{1}{\sqrt{5}+\sqrt{7}}$ +... is:

A. $\frac{1}{\sqrt{n}+\sqrt{n+1}}$

B. $\frac{n}{\sqrt{n+1}+\sqrt{2n+1}}$

C. $\frac{n}{\sqrt{n+1}}$

D. $\frac{n}{\sqrt{2n-1}+\sqrt{2n+1}}$

Answer: d

Watch Video Solution

3. The remainder when $(52)^{15}$ is divided by 17 is

A. 3

B. 13

C. 1

D. 7

Answer: c

Watch Video Solution

4. If HM and GM of two numbers are $\frac{10}{9}$ and 3, then its AM is :

A. 4

B. 1/10

C. 3

D. $\sqrt{10}$

Answer: b

Watch Video Solution

5. The no. of terms in the expansion $(a+b)^{100}$

A. 100

B. 101

C. 99

D. none of these

Answer: b

Watch Video Solution

6. Find the term independent of x in the expansion of $\left(x^2 - \frac{1}{x}\right)^7$

A. 4th term

B. 5th term

C. 3rd term

D. none of these

Answer: d

Watch Video Solution

7. The coefficient of x^4 in the expansion of $\left(\frac{x}{2}-\frac{3}{x^2}\right)^{10}$ is

A. $10C_3 5^7$

B. $10C_3 5^3$

C. $10C_7 5^3$

D. none of these

Answer: a

Watch Video Solution

8. If S_n denotes the sum of n terms of an AP whose first term is a, common difference is d and n denotes the no. of terms, then $S_n + 1 - S_n$ is :

A. AP

B. nd

C. a+nd

D. 0

Answer: c

View Text Solution

9. The coefficient of x^5 in the expansion of $\left(e^x + e^{-x}\right)$ is:

A. 5

B. 5!

C. $\frac{2}{\lfloor}(5)$

D. 0

Answer: d

View Text Solution

10. $2\left[\frac{1}{2}+\frac{1}{3.2^3}+\frac{1}{5.2^5}+\ldots\right]$ is :

A. log 2

B. $\log\left(\frac{1}{3}\right)$

C. log 3

D. $\log\left(\frac{1}{2}\right)$

Answer: c

Watch Video Solution

11. match the following

11.	$2\left[\frac{x}{1!}+\frac{x^3}{3!}+\frac{x^5}{5!}+\ldots\right]$	(a) $(1+x)^{-2}$
12.	$2\left[x+\frac{x^3}{3}+\frac{x^5}{5}+\ldots.\right]$	(b) $(1-x)^{-1}$
13.	$1-2x+3x^2-4x^3+\ldots.$ $\lvert x\rvert < 1$	(c) $\log\left(\frac{1+x}{1-x}\right)$
14.	$1+x+x^2+\ldots.$ $\lvert x\rvert < 1$	(d) e^x-e^{-x}
15.	$1^3+2^3+3^3+\ldots+n^3$	(e) $\frac{n^2(n+1)^2}{4}$

View Text Solution

12. match the following

16.	For any positive numbers a and b, their Geometric mean is:	(a) 2^n
17.	With usual notations numbers ${}^nC_0 + {}^nC_1 + {}^nC_2 + \ldots {}^nC_n$:	(b) $\frac{n(n+1)(2n+1)}{6}$
18.	The sum of the square of first 'n' natural number is:	(c) $\frac{a(1-r^n)}{1-r}, r \neq 1$
19.	The sum of first n terms of a GP is:	(d) 1, 1, 2, 3, 5....
20.	Fibonacci sequence is:	(e) $\sqrt{ab}$

View Text Solution

13. Find the odd man out:

For any two positive integers:

A. $\frac{a+b}{2}$

B. $\frac{2ab}{a+b}$

C. a^2+b^2

D. $\sqrt{ab}$

Answer: c

Watch Video Solution

14. AM, GM, HM denote the arithmetic, geometric and harmonic means of a and b then,

A. $AM \geq GM$

B. $GM \geq HM$

C. $AM \geq GM \geq HM$

D. $AM > GM > HM$

Answer: d

View Text Solution

15. Find the odd man out in the following:

A. $\frac{n}{2}(2a+(n-1)d)$

B. $\frac{n^2(n+1)^2}{6}$

C. $\frac{a(1-r^n)}{1-r}$

D. $\frac{n(n+1)(2n+1)}{6}$

Answer: b

Watch Video Solution

16. Find the correct statement:

A. a, (a + d), (a + 2d), (a + 3d),a + nd is called Geometric progression.

B. There are n terms in the expansion of $(x+a)^n$

C. If a and b are positive integers the n $\frac{a+b}{2}$ is called Harmonic mean between a and b

D. $x_n = x_{n-2} n \geq 3$ with $x_0 = 1, x_1 = 1$ is called Fibonacci sequence.

Answer: d

View Text Solution

17. Find the correct statement:

A. In a triangle, if the altitudes are in AP then the sides are in HP.

B. In the expansion of $(a+b)^n, n \in N$ the middle term is given by $T_{\frac{n}{2}} - 1$ if n is even.

C. $nC_0 + nC_2 + nC_4 + \ldots = 2^n$.

D. n^{th} term of an Arithmetic expression is $T_n = ar(n-1)$

Answer: a

View Text Solution

18. Find the incorrect statement:

A. $\sqrt{2}, 2, 2\sqrt{2}, 4$...are in geometric progression.

B. 3, 7, 11 are three prime numbers which form an AP.

C. If abc are HP, then $\frac{1}{a}, \frac{1}{b}, \frac{1}{c}$ are in AP.

D. If n be any positive integer. Let $a_1, a_2 \ldots, a_n$ be n sum negative numbers. Then their Geometric mean is $\sqrt{a_1 a_2 \ldots a_n}$

Answer: d

Watch Video Solution

19. Assertion (A): In the expansion of $(a+b)^n$ $n \in N$ the coefficient at equidistant from the beginning and from the end are equal.

Reason(R): $nC_r = nC_{n-r}$

A. Since Reason is true Assertion is true

B. Reason is not correct explanation for Assertion

C. Both Assertion and Reason are not correct

D. Reason is correct but Assertion is not correct.

Answer: a

View Text Solution

20. Assertion: If a and b are distinct integers then (a - b) is a factor of $a^n - b^n$:

Reason(R): $a^n = [(a-b)+b]^n$

View Text Solution

21. With usual notation $C_0 + C_2 + C_4$ + ... is:

A. 2^{n-1}

B. 2^n

C. 2^{n+1}

D. 2^{n+2}

Answer: a

View Text Solution

22. In the expansion of $(2x+3)^5$ the coefficient of x^2 is:

A. 720

B. 1080

C. 810

D. 5

Answer: b

Watch Video Solution

23. In the expansion of $(I+x)^{22}$ which term is the middle term:

A. T_{11} and T_{12}

B. T_{11}

C. T_{12}

D. T_{13}

Answer: c

View Text Solution

24. AM, GM, HM denote the Arithmetic mean, Geometric mean and Harmonic mean respectively the relationship between this is:

A. $AM < GM < HM$

B. $AM \leq GM \leq HM$

C. $AM > GM > HM$

D. $AM \geq GM \geq HM$

Answer: d

Watch Video Solution

25. The sum of the first n terms of the series $\frac{1}{\sqrt{2}+\sqrt{5}}+\frac{1}{\sqrt{5}+\sqrt{8}}+\frac{1}{\sqrt{8}+\sqrt{11}}+\ldots$ is

A. 4

B. $\sqrt{24}$

C. $\frac{1}{\sqrt{24}}$

D. $\frac{1}{\sqrt{25}-\sqrt{24}}$

Answer: a

Watch Video Solution

26. The sum of series $1 + 2x + 3x^2 + 4x^3 + ...$ up to infinity when x lies between 0 and 1 i.e., $0 < x < 1$ is

A. $(1 - x)^{-2}$

B. $(1 + x)^{-2}$

C. $(1 - x)^2$

D. $(1 + x)^2$

Answer: b

Watch Video Solution

27. $\frac{1}{1!}+\frac{1}{3!}+\frac{1}{5!}+\ldots is.$

A. $\frac{e^{-1}}{2}$

B. $\frac{e+e^{-1}}{2}$

C. $\frac{e-e^{-1}}{2}$

D. none of these

Answer: c

View Text Solution

28. $\sqrt{\frac{1-2x}{1+2x}}$ is approximately equal to:

A. $1-2x-x^2$

B. $1+2x+x^2$

C. $1+2x$

D. $1-2x+x^2$

Answer: d

View Text Solution

29. Expansion of $\log\left(\sqrt{\frac{1+x}{1-x}}\right)$ is :

A. $x + \frac{x^3}{3} + \frac{x^5}{5} + \ldots$

B. $1 + \frac{x^2}{2} + \frac{x^4}{4} + \ldots$

C. $1 - x + \frac{x^2}{2} - \frac{x^3}{5} + \ldots$

D. $x - \frac{x^2}{3} + \frac{x^3}{3} - \ldots$

Answer: a

View Text Solution

30. The value of $1 - \frac{1}{2}\left(\frac{3}{4}\right) + \frac{1}{3}\left(\frac{3}{4}\right)^2 - \frac{1}{4}\left(\frac{3}{4}\right)^3 + \ldots$ is:

A. $\frac{3}{4}\log\left(\frac{7}{4}\right)$

B. $\frac{4}{3}\log\left(\frac{7}{4}\right)$

C. $\frac{1}{3}\log\left(\frac{7}{4}\right)$

D. $\frac{4}{3}\log\left(\frac{4}{7}\right)$

Answer: b

Watch Video Solution

31. Coefficient of x^2 in (x^(2) + 1/x)^(6) $is 1(ii) 1, 4, 7 are \in H.\ P(iii)$-log(1-x)=x + x^(2)/2 + x^(2)/3 $+ \ldots (iv) The Geometric mean between a$ and $b is$

sqrt(ab)`.

State which two are correct

A. (i) and (iv) are true

B. (iii) and (iv) are true

C. (i) and (ii) are true

D. (ii) and (iii) are true

Answer: b

View Text Solution