MATHS

BOOKS - MTG WBJEE MATHS (HINGLISH)

A.P.,G.P.,H.P.

Wb Jee Workout Category 1 Single Option Correct Type 1 Mark

1. If S_1, S_2, S_3 are the sums of n, 2n, 3n terms respectively of an A.P., then $S_3/(S_2 - S_1) -$

A. 1

B. 2

C. 3

D. 4

Answer: C

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2. In an A.P., if 1 is the first term and the sum of the are 1 first p terms is zero, then the sum of the next q terms is

A. $\frac{q(p+q)}{1-p}$

B. $\frac{q(p-q)}{1+p}$

C. $\frac{p(p+q)}{1-p}$

D. $\frac{p(p-q)}{1+p}$

Answer: A

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3. In an A.P. , 3 is the first term. If the second, tenth and thirty fourth terms forms a G.P., then the fourth term of the A.P. is

A. 2

B. 1

C. 4

D. 6

Answer: D

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4. The sum of four numbers in arithmetical progression is 48 and the product of the extremes to the product of the means as 27 to 35 Find the numbers

A. 10

B. 12

C. 14

D. 18

Answer: D

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5. If $x, 2y, 3z$ are in A.P., where the distinct numbers x, y, z are in G.P, then te common ratio of the G.P. is 3 b. $\frac{1}{3}$ c. 2 d. $\frac{1}{2}$

A. 1

B. $\frac{1}{2}$

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

D. $\frac{2}{5}$

Answer: C

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6. STATEMENT-1 : If $\log(x+z)+\log(x-2y+z)=2\log(x-z)$ then x,v,z are in H.P.

STATEMENT-2 : If p , q , r in AP and $\frac{a-x}{px}=\frac{a-y}{qy}=\frac{a-z}{rz}$, then x, y, z

are in A.P.

STATEMENT-3 : If $\frac{a+b}{1-ab}, b, \frac{b+c}{1-bc}$ are in A .P. then $a, \frac{1}{b}, c$ are in H.P.

A. $A.P.$

B. G.P.

C. H.P.

D. none of these

Answer: C

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7. Divide 28 into four parts in an A.P. so that the ratio of the product of first and third with the product of second and fourth is 8:15.

A. 6

B. 8

C. 10

D. 12

Answer: C

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8. Three numbers a, b, c are lies between 2 and 18 such that their sum is 25. 2, a, b, are in A.P, and b, c, 18 are in G.P. Then abc =

A. 360

B. 420

C. 480

D. 540

Answer: C

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9. The sum of an infinite numbers of a G.P. is 2 and the sum of their cubes is 24. The second term of the G.P. is

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

B. $\frac{1}{2}$

C. 2

D. $-\frac{3}{2}$

Answer: D

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10. Find the sum of the series $\frac{5}{13}+\frac{55}{(13)^2}+\frac{555}{(13)^2}+\frac{5555}{(13)^4}$.....up to $\propto$.

A. $\frac{31}{18}$

B. $\frac{65}{32}$

C. $\frac{65}{36}$

D. $\frac{75}{36}$

Answer: C

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11. if $\frac{a+b}{1-ab}, b, \frac{b+c}{1-bc}$ are in AP then $a, \frac{1}{b}, c$ are in

A. A.P

B. G.P.

C. H.P.

D. none of these

Answer: C

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12. The successive terms of an A.P. are a_1, a_2, a_3,.....

If $a_6 + a_9 + a_{12} + a_{15} = 20$ then $\sum_{r=1}^{20} a_r$=

A. 75

B. 100

C. 120

D. 150

Answer: B

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13. If $\frac{5 + 9 + 13 + \ldots \text{upto n terms}}{7 + 9 + 11 + \ldots \text{upto 12 terms}} = \frac{5}{12}$, then n is equal to

A. 12

B. 18

C. 10

D. none of these

Answer: D

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14. If the sum to infinity of the series $3+(3+d)\frac{1}{4}+(3+2d)\frac{1}{4^2}+\infty$ is $\frac{44}{9}$, then find ..

A. 9

B. 10

C. 12

D. 15

Answer: A

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15. If a,b,c are in H.P., then $\frac{c^2(b-a)^2+a^2(c-b)^2}{b^2(a-c)^2}=$

A. 1

B. 2

C. $\frac{1}{2}$

D. None of these

Answer: C

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16. The sum of the first n terms of the series $1^2+2.2^2+3^2+2.4^2+5^2+2.6^2+\ldots$ is

A. 4410

B. 4210

C. 4120

D. 4040

Answer: A

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17. Show that If $a(b-c)x^2+b(c-a)xy+c(a-b)y^2=0$ is a perfect square, then the quantities a, b, c are in harmonic progresiion

A. A.P.

B. G.P.

C. H.P.

D. none of these

Answer: A

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18. If $\frac{1}{a}+\frac{1}{a-b}+\frac{1}{c}+\frac{1}{c-b}=0$ and $a+c-b\neq 0$, then prove that a, b, c are in H.P.

A. A.P.

B. G.P.

C. H.P.

D. none of these

Answer: C

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19. If a,b,c, are in A.P., b,c,d are in G.P. and c,d,e, are in H.P., then a,c,e are in

A. A.P

B. G.P.

C. H.P.

D. none of these

Answer: B

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20. The sum of the first 10 terms common to the series 17, 21, 25, ... and 16, 21, 26,31 ,· · · is

A. 1100

B. 1010

C. 1110

D. 1200

Answer: C

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21. If the sum of an infinite G.P. is $\frac{7}{2}$ and sum of the squares of its terms is $\frac{147}{16}$ then the sum of the cubes of its terms is

A. $\frac{315}{19}$

B. $\frac{700}{39}$

C. $\frac{985}{13}$

D. $\frac{1029}{38}$

Answer: D

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22. $\sum_{r=0}^{2006}(-1)^r(a+rd) =$

A. a+2007d

B. a+1004d

C. a+1003d

D. none of these

Answer: C

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23. If a, b, c and d are in G.P. show that $\left(a^2+b^2+c^2\right)\left(b^2+c^2+d^2\right)=(ab+bc+cd)^2$.

A. 1

B. 2

C. 3

D. none of these

Answer: A

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24. If a, b, c, d are in GP, prove that

$(b-c)^2+(c-a)^2+(d-b)^2=(a-d)^2$.

A. $(c+d)^2$

B. $(c-d)^2$

C. $(a+d)^2$

D. $(a-d)^2$

Answer: D

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25. There are m A.M.s' between 1 and 31 . If the ratio of the 7^{th} and $(m-1)^{th}$ means is 5:9 then m=

A. 10

B. 12

C. 14

D. 16

Answer: C

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26. If one G.M., G and two A.M.\'s p and q be inserted between two given quantities, show that $G^2 = (2p - q)(2q - p)$.

A. 1

B. -1

C. 2

D. -3

Answer: B

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27. If $x = 111....(20digits), y = 333....(10digits)$ and $z = 222.....2(10digits), th$ equals.

A. 1

B. 2

C. $\frac{1}{2}$

D. 3

Answer: A

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28. The sum of the series $1^3 + 3^3 + 5^3 + ...$ To 20 terms is

A. 319600

B. 321760

C. 306000

D. 347500

Answer: A

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29. $G.M$ and $H.M$ of two numbers are 10 and 8 respectively. The numbers are

A. 5,20

B. 4,25

C. 2,50

D. 1100

Answer: A

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30. If the sum of m consecutive odd integers is m^4 , then the first integer is

A. $m^3 + m + 1$

B. $m^3 + m - 1$

C. $m^3 - m - 1$

D. $m^3 - m + 1$

Answer: D

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Wb Jee Workout Category 2 Single Option Correct Type 2 Marks

1. If $\frac{b+c}{a+d} = b\frac{c}{a}d = 3\left(\frac{b-c}{a-d}\right)$ then a,b,c,d are in (A) H.P. (B) G.P. (C) A.P. (D) none of these

A. A.P

B. G.P.

C. H.P.

D. A.G.P.

Answer: C

Watch Video Solution

2. The A.M. between m and n and the G.M. between a and b are each equal to $\frac{ma+nb}{m+n}$. Then m=

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

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

C. $\frac{2a\sqrt{b}}{\sqrt{a}+\sqrt{b}}$

D. $\frac{2b\sqrt{a}}{\sqrt{a}+\sqrt{b}}$

Answer: D

Watch Video Solution

3. If $a_1, a_2, a_3, , a_n$ is an A.P. with common difference d, then prove that $\tan\left[\tan^{-1}\left(\frac{d}{1+a_1a_2}\right)+\tan^{-1}\left(\frac{d}{1+a_2a_3}\right)+\tan^{-1}\left(\frac{d}{11+a_{n-1}a_n}\right)\right]$ =

A. $\tan^{-1}\frac{nd}{1+a_1a_{n+1}}$

B. $\tan^{-1}\frac{(n+1)d}{1+a_1a_{n+1}}$

C. $\tan^{-1}\frac{(n+1)d}{1+a_1a_{n+1}}$

D. $\tan^{-1}\frac{(n+1)nd}{1+a_1a_{n+1}}$

Answer: A

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4. The values of xyz is $\frac{15}{2}$ or $\frac{18}{5}$ according as the series a, x, y, z, b is an AP or HP. Find the values of $a\&b$ assuming them to be positive integer.

A. 1

B. 2

C. 3

D. 4

Answer: C

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5. If positive numbers a, b, c are in H.P, then minimum value of $\frac{a+b}{2a-b}+\frac{c+b}{2c-b}$ is

A. `1

B. 2

C. 3

D. 4

Answer: D

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6. In an A.P the sum of the first n terms bears a constant ratio λ with the sum of the next n terms then λ =

A. $\frac{1}{2}$

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

C. $\frac{1}{4}$

D. $\frac{2}{5}$

Answer: B

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7. If 2, 7, 9 and 5 are subtraced respectively from four numbers in geometric progression, then the resulting numbers are in arithmetic progression. The smallest of the four numbers is

A. -24

B. -12

C. 6

D. 3

Answer: A

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8. The sum of 50 terms of the series $\frac{3}{1^2} + \frac{5}{1^2+2^2} + \frac{7}{1^2+2^2+3^2} +$ is $\frac{100}{17}$ b. $\frac{150}{17}$ c. $\frac{200}{51}$ d. $\frac{50}{17}$

A. $\frac{50}{17}$

B. $\frac{100}{17}$

C. $\frac{150}{17}$

D. $\frac{200}{71}$

Answer: B

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9. The coefficient of x^8 in the polynomial $(x-1)(x-2)(x-3)\ldots.(x-10)$ is :

A. 1025

B. 1240

C. 1320

D. 1440

Answer: C

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10. If A, G, H are respectively the A.M., G.M., H.M. of three numhers α, β, γ, then the cquation whose roots are α, β, γ is

A. $x^3 - 3Ax^2 + \frac{G^3}{H}x + G^3 = 0$

B. $x^3 - 3Ax^2 + \frac{G^3}{H}x - G^3 = 0$

C. $x^3 - 3Ax^2 - \frac{G^3}{H}x - G^3 = 0$

D. none of these

Answer: C

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11. (i) a , b, c are in H.P. , show that $\frac{b+a}{b-a}+\frac{b+c}{b-c}=2$

(ii) If a^2, b^2, c^2 are A.P. then b + c , c + a , a + b are in H.P. .

A. A.P

B. G.P.

C. H.P.

D. none of these

Answer: C

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12. If b+c,c+a,a+b are in H.P., then $\frac{b+c}{a}, \frac{c+a}{b}, \frac{a+b}{c}$

A. A.P.

B. G.P.

C. H.P.

D. none of these

Answer: C

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13. If $S_1, S_2, \cdots S_n$, ., are the sums of infinite geometric series whose first terms are 1, 2, 3,..... ,n and common ratios are $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \cdots, \frac{1}{n+1}$ then $S_1 + S_2 + S_3 + \cdots + S_n$=

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

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

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

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

Answer: D

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14. The sum of the first 10 terms of $\frac{3}{2} + \frac{5}{4} + \frac{9}{8} + \frac{17}{16} + \cdots$ is

A. $10 - 2^{10}$

B. $9 - 2^{-10}$

C. $11 - 2^{-10}$

D. none of these

Answer: C

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15. If a, b, c are in GP, then the equations $ax^2 + 2bx + c = 0$ and $dx^2 + 2ex + f = 0$ have a common root if $\frac{d}{a}, \frac{e}{b}, \frac{f}{c}$ are in

A. A.P.

B. G.P.

C. H.P.

D. No definite sequence

Answer: A

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Wb Jee Workout Category 3 One Or More Than One Option Correct Type 2 Marks

1. If the distinct numbers a, b, c are in G.P. while a - b, c-a,b-c are in H.P., then $\frac{a+c}{b}$ =

A. 2

B. -2

C. 3

D. -4

Answer: A::D

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2. There are two numbers a and b whose product is 192 and the quotient of AM by HM of their greatest common divisor and least common multiple is `(169)/(48). The smaller of a and b is

A. 2

B. 4

C. 6

D. 12

Answer: B::D

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3. If the sides of a right angled triangle are in A.P., then $\frac{R}{r} =$

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

B. $\frac{7}{3}$

C. $\frac{9}{4}$

D. $\frac{8}{3}$

Answer: A

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4. If $(m+1)^{th}$, $(n+1)^{th}$, $(r+1)^{th}$ terms of the A.P. a, a+d ,a+2d , ... are in G.P. while m,n,r are in H.P. , then $\frac{d}{a}$ =

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

B. $-\frac{1}{n}$

C. $-\frac{2}{n}$

D. $\frac{2}{n}$

Answer: C

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5. Let S_k, be the sum of an infinite geometric series whose first term is kand common ratio is $\frac{k}{k+1}(k>0)$. Then the value of $\sum_{k=1}^{\infty}\frac{(-1)^k}{S_k}$ is equal to

A. $1-4\log_e\sqrt{2}$

B. $\log_e 2-1$

C. $1-\log_e 2$

D. $1-\log_e 4$

Answer: A::D

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6. If a,b,c are in H.P., then the expression E= $\left(\frac{1}{b}+\frac{1}{c}-\frac{1}{c}\right)\left(\frac{1}{c}+\frac{1}{a}-\frac{1}{b}\right)$ equals

A. $\frac{2}{bc}-\frac{1}{b^2}$

B. $\frac{1}{4}\left(\frac{3}{c^2}+\frac{2}{ca}-\frac{1}{a^2}\right)$

C. $\frac{3}{b^2} - \frac{2}{ab}$

D. none of these

Answer: A::B::C::D

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7. Sides of triangle ABC, a, b, c are in G.P. If 'r' be the common ratio of this G.P. , then

A. $1 < r < 2\cos 36^\circ$

B. $2\sin 18^\circ < r < 1$

C. $r^2 + r^{-2} = 4$

D. none of these

Answer: A::B

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8. If $a > 0, b > 0, c > 0$ and $2a + b + 3c = 1$, then

A. $a^4b^2c^2$ is greatest when a $= \frac{1}{4}$

B. $a^4b^2c^2$ is greatest when b $= \frac{1}{4}$

C. $a^4b^2c^2$ is greatest when c $= \frac{1}{12}$

D. greatest value of $a^4b^2c^2$ is $\frac{1}{9.4^8}$

Answer: A::B::C::D

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9. The fourth term of the A.G.P. 6, 8, 8,..... is

A. 0

B. 12

C. $\frac{32}{3}$

D. $\frac{64}{9}$

Answer: A::D

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10. Let $S_n = \sum_{k=1}^{4n} (-1)^{\frac{k(k+1)}{2}} k^2$. Then S_n can take values

A. 1056

B. 1088

C. 1120

D. 1332

Answer: A::D

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11. Let a, x, b are in A.P., a, y, b are in G.P. and a, z, b are in H.P. If $x = y + 2$ and $a = 5z$ then (where $a, b, ceR \cdot$)

A. $y^2 = xz$

B. $x > y > z$

C. a=9,b=1

D. $a = \frac{1}{4}, b = \frac{9}{4}$

Answer: A::B::C

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12. If angles $A, B,$ and C are in $A.P.,$ then $\frac{a+c}{b}$ is equal to

A. $2\sin\left(\frac{A-C}{2}\right)$

B. $2\cos\left(\frac{A-C}{2}\right)$

C. $\cos\left(\frac{A-C}{2}\right)$

D. $\sin\left(\frac{A-C}{2}\right)$

Answer: B

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13. The sum of the series $(1+2)+\left(1+2+2^2\right)+\left(1+2+2^2+2^3\right)+\ldots.$ upto n terms is

A. $2^{n+2}-n-4$

B. $2(2^n-1)-n$

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

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

Answer: A

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14. The AM of two numbers exceeds their GM by 15 & HM by 27.Find the numbers.

A. 30, 128

B. 30, 120

C. 50, 3

D. none of these

Answer: B

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15. If x, y, z are in H.P., then the value of $\frac{x+y}{y-x}+\frac{y+z}{y-z}$ is

A. independent of x

B. independent of y

C. independent of z

D. 1

Answer: A::B::C

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Wb Jee Previous Years Questions Category 1 Single Option Correct Type 1 Mark

1. Five numbers are in H.P. The middle term is 1 and the ratio of the second and the fourth terms is 2:1. Then the sum of the first three terms is

A. $11/2$

B. 5

C. 2

D. $14/3$

Answer: A

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2. The value of

$$1000\left[\frac{1}{1\times 2}+\frac{1}{2\times 3}+\frac{1}{3\times 4}+\cdots+\frac{1}{999\times 1000}\right]$$ is equal to

A. 1000

B. 999

C. 1001

D. $1/999$

Answer: B

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3. Six positive numbers are in G.P., such that their product is 1000. If the fourth term is 1, then the last term is

A. 1000

B. 100

C. $1/100$

D. $1/1000$

Answer: C

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4. Five numbers are in A.P. with common diference $\neq 0$. If the 1^{th}, 3^{th} and 4^{th} terms are in G.P., then

A. the 5^{th} term is always 0

B. the 1^{st} term is always 0

C. the middle term is always 0

D. the middle term is always-2

Answer: A

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5. $\left[\frac{1}{1\times 2}+\frac{1}{2\times 3}+\frac{1}{3\times 4}+,+\frac{1}{99\times 100}\right]=$

A. $P=Q$

B. $2P=Q$

C. P=2Q

D. P=4Q

Answer: C

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6. Let S denote the sum of the infinite series

$1+\frac{8}{2!}+\frac{21}{3!}+\frac{40}{4!}+\frac{65}{5!}+\ldots..$ Then

A. $S<8$

B. $S>12$

C. $8<S<12$

D. $S=8$

Answer: C

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7. Let α, β be the roots of $x^2 - x - 1 = 0$ and $S_n = \alpha^n + \beta^n$, for all integers $n \geq 1$. Then, for every integern $n \geq 2$.

A. $s_n + S_{n-1} = S_{n+1}$

B. $S_n - S_{n-1} = S_{n+1}$

C. $S_{n-1} = S_{n+1}$

D. $S_n + S_{n-1} = 2S_{n+1}$

Answer: A

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8. If $f(x) = x + 1/2$ Then. The number of real values of x for which the three unequal terms f(x) , f(2x) and f(4x) are in HP is

A. 1

B. 0

C. 3

D. 2

Answer: A

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9. For every real number x. let

$$f(x) = \frac{x}{1!} + \frac{3}{2!}x^2 + \frac{7}{3!}x^3 + \frac{15}{4!}x^4 + \cdots$$

Then the equation f(x) = 0 has

A. no real solution

B. exactly one real solution

C. exactly two real solutions

D. infinite number of real solutions

Answer: B

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10. Let d(n) denote the number of divisors of n including 1 and itself. Then $d(225), d(1125)$ and $d(640)$ are (a) In AP (6) In HP(c) In GP (d) Consecutive integers

A. in A.P.

B. in H.P

C. in G.P.

D. consecutive integers

Answer: C

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11. If a, x arereal numbers and $|a| < 1, |x| < 1$ then $1 + (1 + a)x + \left(1 + a + a^2\right)x^2 + \ldots\infty$ is equal to

A. $\frac{1}{(1-a)(1-ax)}$

B. $\frac{1}{(1-a)(1-x)}$

C. $\frac{1}{(1-x)(1-ax)}$

D. $\frac{1}{(1-ax)(1-a)}$

Answer: C

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12. In a G.P. of positive terms if any terms is equal to the sum of next tow terms, find the common ratio of the G.P.

A. $\sqrt{2}$

B. $\frac{\sqrt{5}-1}{2}$

C. $\frac{\sqrt{5}}{2}$

D. $\frac{\sqrt{5}+1}{2}$

Answer: B

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13. Given that n arithmetic means are inserted between two sets of numbers a,2b, and 2a,b,2a,b where a,b, $\in R$. Suppose further that m^{th} mean between these two sets of numbers is same, then the ratio a:b equals

A. $n-m+1:m$

B. $n-m+1:n$

C. $n:n-m+1$

D. $m:n-m+1$

Answer: D

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14. The three sides of a right-angled triangle are in G.P. (gcometric progression). If the two acute angles be α and β then tan α and tan β are

A. $\frac{\sqrt{5}+1}{2}\text{and}\frac{\sqrt{5}-1}{2}$

B. $\sqrt{\frac{\sqrt{5}+1}{2}}$ and $\sqrt{\frac{\sqrt{5}-1}{2}}$

C. $\sqrt{5}$ and $\frac{1}{\sqrt{5}}$

D. $\frac{\sqrt{5}}{2}$ and $\frac{2}{\sqrt{5}}$

Answer: B

View Text Solution

Wb Jee Previous Years Questions Category 2 Single Option Correct Type 2 Mark

1. Let $x = 1 + \frac{1}{2 \times \lfloor 1} + \frac{1}{4 \times \lfloor 2} + \frac{1}{8 \times \lfloor 3} + \ldots$ and $y = 1 + \frac{x^2}{\lfloor 1} + \frac{x^4}{\lfloor 2} + \frac{x^6}{\lfloor 3} + \ldots.$ Then the value of $\log_e$ y is

A. e

B. e^2

C. 1

D. $1/e$

Answer: A

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2. The value of the infinite series $\frac{1^2+2^2}{\lfloor 1} + \frac{x^4}{\lfloor 2} + \frac{x^6}{\lfloor 3} \ldots$. Then the value of $\log_e$ y is

A. e

B. 5e

C. $\frac{5e}{6} - \frac{1}{2}$

D. $\frac{5e}{6}$

Answer: C

View Text Solution

3. Sum of n terms of the following series $1^3 + 3^3 + 5^3 + 7^3 +$

A. $n^2(2n^2-1)$

B. $n^3(n-1)$

C. n^3+8n+4

D. $2n^4+3n^2$

Answer: A

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4. Let $a = \min\{x^2+2x+3, x \in R\}$ and $b = \lim_{\theta \to 0} \frac{1-\cos\theta}{\theta^2}$ then the value of $\sum_{r=0}^{n} a^r \cdot b^{n-r}$ is :

A. $\frac{2^{n+1}-1}{3.2^n}$

B. $\frac{2^{n+1}+1}{3.2^n}$

C. $\frac{4^{n+1}-1}{3.2^n}$

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

Answer: C

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5. If the first and $(2n-1)^{th}$ terms of an A.P, a G.P and an H.P of positive terms are equal and their $(n+1)^{th}$ terms are $a, b\&c$ respectively then

A. a+c=b

B. $a \geq b \geq c$

C. $a + c = b$

D. $ac - b^2 = 0$

Answer: B::D

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