MATHS

BOOKS - DEEPTI MATHS (TELUGU ENGLISH)

EXPONENTIAL SERIES & LOGARITHMIC SERIES (APPENDIX-1)

Solved Examples

1. $\frac{1^3}{1!}+\frac{2^3}{2!}+\frac{3^3}{3!}+\frac{4^3}{4!}+\ldots.=$

A. e

B. 3e

C. 5e

D. $e/5$

Answer: C

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2. $1+\frac{2^3}{1!}x+\frac{3^3}{2!}x^2+\ldots.=$

A. $\left(x^3-6x^2+7x-1\right)e^x$

B. $\left(x^2+7x+8\right)e^x-8$

C. $\left(x^3+6x^2+7x+1\right)e^x$

D. $\left(x^2+7x+8\right)e^x+8$

Answer: C

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3. If $y=\frac{1}{2x^2-1}$ then $y+\frac{y^3}{3}+\frac{y^5}{5}+\ldots.=$

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

B. $2\left(x+\frac{x^3}{3}+\frac{x^5}{5}+\ldots.\right)$

C. $\frac{1}{2}\left(x+\frac{x^3}{3}+\frac{x^5}{5}+\ldots\right)$

D. $-\frac{1}{2}\left(x+\frac{x^3}{3}+\frac{x^5}{5}+\ldots\right)$

Answer: B

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4. $\frac{x}{1.2}+\frac{x^2}{2.3}+\frac{x^3}{3.4}+\ldots. =$

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

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

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

D. 1+(x-1)/(x)log(x-1)`

Answer: A

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Exercise 1 A

1. $1+\frac{2}{1!}+\frac{4}{2!}+\frac{8}{3!}+\ldots.=$

A. e

B. e^2

C. e^3

D. $1/e$

Answer: B

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2. $1+\frac{4}{1!}+\frac{16}{2!}+\frac{64}{3!}+\ldots.=$

A. e

B. e^2

C. e^3

D. e^4

Answer: D

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3. $\sum_{k=1}^{\infty} \frac{1}{k!}\left(\sum_{n=1}^{k} 2^{n-1}\right) =$

A. e

B. $e^2 + e$

C. e^2

D. $e^2 - e$

Answer: D

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4. $1 - \frac{2}{1!} + \frac{4}{2!} - \frac{8}{3!} + \ldots. =$

A. e

B. e^2

C. e^{-1}

D. e^{-2}

Answer: D

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5. $1 - \frac{3}{1!} + \frac{9}{2!} - \frac{27}{3!} + ... =$

A. e

B. e^2

C. e^3

D. e^{-3}

Answer: D

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6. $\log_e 2 + \frac{(\log_e 2)^2}{2!} + \frac{(\log_e 2)^3}{3!} + ... =$

A. 1

B. 2

C. e

D. e^2

Answer: A

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7. $\log_e 3 + \frac{(\log_e 3)^2}{2!} + \frac{(\log_e 3)^3}{3!} + ... =$

A. 1

B. 2

C. e

D. e^2

Answer: B

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8. $1 + 2(\log_e a) + \frac{2^2}{2!}(\log_e a)^2 + \frac{2^3}{3!}(\log_e a)^3 + ... =$

A. e

B. a

C. a^2

D. e^2

Answer: C

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9. $1 + x(\log_e 2) + \frac{x^2}{2!}(\log_e 2)^2 + \frac{x^3}{3!}(\log_e 2)^3 + ... =$

A. e^2

B. x^2

C. e^x

D. 2^x

Answer: D

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10. $x \log_e a + \frac{x^3}{3!}(\log_e a)^3 + \frac{x^5}{5!}(\log_e a)^5 + \ldots =$

A. $\cosh(x \log_e a)$

B. $\coth(x \log_e a)$

C. $\sinh(x \log_e a)$

D. $\tanh(x \log_e a)$

Answer: C

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11. $x \log_e a + \frac{x^3}{3!}(\log_e a)^3 + \frac{x^5}{5!}(\log_e a)^5 + \ldots =$

A. cash $(x \log_e a)$

B. coth $(x \log_e a)$

C. sinh $(x \log_e a)$

D. tanh $(x \log_e a)$

Answer: C

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12. $\left(1 - \frac{3}{1!} + \frac{9}{2!} - \frac{27}{3!} + \ldots\right)\left(1 + \frac{3}{1!} + \frac{9}{2!} + \frac{27}{3!} + \ldots.\right) =$

A. e

B. e^2

C. e^3

D. 1

Answer: D

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13. $\left(1-\frac{2}{1!}+\frac{4}{2!}-\frac{8}{3!}+....\right)\left(1+\frac{4}{1!}+\frac{16}{2!}+\frac{64}{3!}+....\right)=$

A. e

B. e^2

C. e^3

D. 1

Answer: B

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14. e^{3x}=

A. $1+\frac{3}{1!}+\frac{3^2}{2!}+\frac{3^3}{3!}+....$

B. $1-\frac{3}{1!}+\frac{3^2}{2!}-\frac{3^3}{3!}+....$

C. $1+\frac{3x}{1!}+\frac{(3x)^2}{2!}+\frac{(3x)^3}{3!}+....$

D. $1-\frac{3x}{1!}+\frac{(3x)^2}{2!}-\frac{(3x)^3}{3!}+....$

Answer: C

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15. $e^{-2x}=$

A. $1+\frac{2}{1!}+\frac{2^2}{2!}+\frac{2^3}{3!}+....$

B. $1-\frac{2}{1!}+\frac{2^2}{2!}-\frac{2^3}{3!}+....$

C. $1+\frac{2x}{1!}+\frac{(2x)^2}{2!}+\frac{(2x)^3}{3!}+....$

D. $1-\frac{2x}{1!}+\frac{(2x)^2}{2!}-\frac{(2x)^3}{3!}+....$

Answer: D

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16. $e^{5x} + e^{-5x} =$

A. $1 + \frac{5x}{1!} + \frac{(5x)^2}{2!} + \frac{(5x)^3}{3!} + \ldots.$

B. $1 - \frac{5x}{1!} + \frac{(5x)^2}{2!} - \frac{(5x)^3}{3!} + \ldots.$

C. $1 + \frac{(5x)^2}{2!} + \frac{(5x)^4}{3!} + \ldots.$

D. $2\left[1 + \frac{(5x)^2}{2!} + \frac{(5x)^4}{4!} + \ldots.\right]$

Answer: D

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17. $e^{7x} - e^{-7x} =$

A. $1 + \frac{7x}{1!} + \frac{(7x)^2}{2!} + \frac{(7x)^3}{3!} + \ldots.$

B. $1 + \frac{(7x)^2}{2!} + \frac{(7x)^4}{3!} + \ldots.$

C. $2\left[1 + \frac{(7x)^2}{2!} + \frac{(7x)^4}{4!} + \ldots.\right]$

D. $2\left[\frac{7x}{1!}+\frac{(7x)^3}{3!}+\frac{(7x)^5}{5!}+....\right]$

Answer: C

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18. $\frac{e^{5x}+e^x}{e^{3x}}=$

A. $2\left[1+\frac{(5x)^2}{2!}+\frac{(5x)^4}{4!}+....\right]$

B. $2\left[1+\frac{(3x)^2}{2!}+\frac{(3x)^4}{4!}+....\right]$

C. $2\left[1+\frac{(2x)^2}{2!}+\frac{(2x)^4}{4!}+....\right]$

D. $2\left[1+\frac{x^2}{2!}+\frac{x^4}{4!}+....\right]$

Answer: C

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19. $\frac{e^{7x}-e^x}{e^{4x}}=$

A. $2\left[1+\frac{(3x)^2}{2!}+\frac{(3x)^4}{4!}+....\right]$

B. $2\left[\frac{3x}{1!}+\frac{(3x)^3}{3!}+....\right]$

C. $2\left[1+\frac{(2x)^2}{2!}+\frac{(2x)^4}{4!}+....\right]$

D. $2\left[\frac{2x}{1!}+\frac{(2x)^3}{3!}+....\right]$

Answer: B

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20. The $(n+1)$ the term in the expansion of e^5 is

A. $5!$

B. 5^n

C. $5^n/n$

D. $5^n/n!$

Answer: D

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21. The $(n+1)$ the term in the expansion of e^{4x} is

A. $4!$

B. 4^n

C. $4^n/n!$

D. $(4x)^n/n!$

Answer: D

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22. The 12th term in the expansion of e^{-3} is

A. $\frac{3^{11}}{11!}$

B. $\frac{-3^{11}}{11!}$

C. $\frac{11!}{3^{11}}$

D. $-\frac{11!}{3^{11}}$

Answer: B

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23. The $(n+1)th$ term in the expansion of e^{-2} is

A. $\frac{3^n}{n!}$

B. $\frac{(3x)^n}{n!}$

C. $\frac{(-3x)^n}{n!}$

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

Answer: D

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24. The $(n+1)th$ term in the expansion of e^{-3x} is

A. $\frac{3^n}{n!}$

B. $\frac{(3x)^n}{n!}$

C. $\frac{(-3x)^n}{n!}$

D. $\frac{x^n}{n!}$

Answer: C

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25. The coefficient of x^8 in the expansion of e^{3x} is

A. 3^8

B. $\frac{3^8}{3!}$

C. $\frac{3^8}{8!}$

D. none

Answer: C

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26. The coefficient of x^2 in the expansion of e^{2x+3} is

A. e^2

B. e^3

C. $2e^3$

D. $3e^2$

Answer: C

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27. The coefficent of x^n in the expansion of $(1-x)e^x$ is

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

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

C. $\frac{1-n}{n!}$

D. $\frac{n-1}{n!}$

Answer: C

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28.

$$\frac{1}{e^{3x}}\left(e^{x}+e^{5x}\right)=a_0+a_1x+a_2x^2+\ldots. \Rightarrow 2a_1+2^3a_3+2^5a_5+\ldots..$$

A. e

B. e^{-1}

C. 1

D. 0

Answer: D

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29. The coefficient of x^n in the expansion of $\frac{e^{7x}+e^x}{e^{3x}}$ is

A. $\frac{4^n}{n!}-\frac{(-1)^n 2^n}{n!}$

B. $\frac{(-1)^n}{n!}+\frac{(-1)^{n-1}a}{(n-1)!}+\frac{(-1)^{n-2}}{(n-2)!}$

C. $\frac{4^n}{n!}+\frac{(-1)^n 2^n}{n!}$

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

Answer: C

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30. The coefficient of x^n in the expansion of $\frac{1+ax+x^2}{e^x}$ is

A. $\frac{4^n}{n!}-\frac{(-1)^n 2^n}{n!}$

B. $\frac{(-1)^n}{n!}+\frac{(-1)^{n-1}a}{(n-1)!}+\frac{(-1)^{n-2}}{(n-2)!}$

C. $\frac{4^n}{n!}+\frac{(-1)^n 2^n}{n!}$

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

Answer: B

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31. The coefficient of x^n in the expansion of $(2+3x)\left(e^{-3x}\right)$ is

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

B. $(-1)^n 2^n\left(\frac{3}{n!}-\frac{1}{(n-1)!}\right)$

C. $(-1)^n 2^n\left(\frac{3}{n!}+\frac{1}{(n-1)!}\right)$

D. $(-1)^n 3^n\left(\frac{2}{n!}-\frac{1}{(n-1)!}\right)$

Answer: D

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32. Coefficicent of x^{10} in the expansion of $(2+3x)e^{-x}$ is

A. $\frac{-26}{(10)!}$

B. $\frac{-28}{(10)!}$

C. $\frac{-30}{(10)!}$

D. $\frac{-32}{(10)!}$

Answer: B

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33. The coefficient of x^n in $\frac{1-2x}{e^x}$ is

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

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

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

D. $(-1)^n.\frac{(1+4n)}{n!}$

Answer: B

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34. The coefficient of x^5 in the expansion of $\frac{1-2x+3x^2}{e^x}$ is

A. $\frac{71}{120}$

B. $-\frac{71}{120}$

C. $\frac{67}{120}$

D. $-\frac{67}{120}$

Answer: B

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35. The coefficient of x^k in the expansion of $\frac{1-2x-x^2}{e^{-x}}$ is

A. $\frac{1-k-k^2}{k!}$

B. $\frac{k^2+1}{k!}$

C. $\frac{1-k}{k!}$

D. $\frac{1}{k!}$

Answer: A

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36. The coefficient of x^n in $\frac{1+x}{1!} + \frac{(1+x)^2}{2!} + \frac{(1+x)^3}{3!} + \ldots.$

A. e

B. $n!$

C. $en!$

D. $e/n!$

Answer: D

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37. The coefficient of x^n in $1 + (ax+b) + \frac{(ax+b)^2}{2!} + \frac{(ax+b)^3}{3!} + \ldots.$

A. $\frac{e^b a^n}{n!}$

B. $\frac{e^a b^n}{n!}$

C. $\frac{e^b a^n}{(n-1)!}$

D. $\frac{e^a b^n}{(n-1)!}$

Answer: A

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38. The coefficient of x^n in the expansion of $\sum_{n=1}^{\infty}(-1)^n \frac{(2+3x)^n}{n!}$ is

A. $\frac{(-3)^n}{e^2 . n!}$

B. $\frac{(-2)^n}{e^3 . n!}$

C. $\frac{(-3)^n}{e^3 . n!}$

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

Answer: A

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39. If n is odd, coefficient of x^n in the expansion of $\left(1+\frac{x^2}{2!}+\frac{x^4}{4!}+\ldots\right)^2$ is

A. $\frac{2^n}{n!}$

B. $\frac{2^{2n}}{(2n)!}$

C. 0

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

Answer: C

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40. If n is even, coefficient of x^n in the expansion of $\left(1+\frac{x^2}{2!}+\frac{x^4}{4!}+\ldots\right)^2$ is

A. $\frac{2^n}{n!}$

B. $\frac{2^{2n}}{(2n)!}$

C. 0

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

Answer: D

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41. $2-\frac{3^2}{2!}+\frac{3^3}{3!}-\frac{3^4}{4!}+\ldots.=$

A. e^3

B. e^{-3}

C. $-e^3$

D. $-e^{-3}$

Answer: D

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42. $\frac{1}{2!}+\frac{1}{3!}+\frac{1}{4!}+\ldots.=$

A. e

B. $e/2$

C. e^{-1}

D. e-2

Answer: D

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43. $\frac{1}{2!}-\frac{1}{3!}+\frac{1}{4!}-\frac{1}{5!}+\ldots.=$

A. e

B. $e/2$

C. e^{-1}

D. $e-2$

Answer: C

Watch Video Solution

44. $-1+\frac{2^2}{2!}-\frac{2^3}{3!}+\frac{2^4}{4!}-\ldots.=$

A. e

B. $e/2$

C. e^{-1}

D. e^{-2}

Answer: D

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45. Sum of the series $1+\frac{3^2}{2!}+\frac{3^4}{4!}+\frac{3^6}{6!}+\ldots.\text{ to }\infty$ is

A. e^{-3}

B. e^3

C. $\frac{1}{2}\left(e^3 - e^{-3}\right)$

D. $\frac{1}{2}\left(e^3 + e^{-3}\right)$

Answer: D

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46. $\sum_{n=0}^{\infty} \frac{1}{(n+1)!} =$

A. e

B. $e + 1$

C. $1 - e$

D. $e - 1$

Answer: D

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47. $\sum_{n=1}^{\infty} \frac{1}{(2n-1)!} =$

A. $\frac{1}{2}\left(e + e^{-1}\right)$

B. $\frac{1}{2}\left(e - e^{-1}\right)$

C. $e + e^{-1}$

D. $e - e^{-1}$

Answer: B

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48. $\sum_{n=1}^{\infty} \frac{x^n}{(2n-1)!} =$

A. $e^{\sqrt{x}} - e^{-\sqrt{x}}$

B. $\sqrt{x}\left(e^{\sqrt{x}} - e^{-\sqrt{x}}\right)$

C. $\sqrt{x}\left(e^{\sqrt{x}} + e^{-\sqrt{x}}\right)$

D. $\sqrt{x}\left(e^{\sqrt{x}} - e^{-\sqrt{x}}\right)/2$

Answer: D

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49. The sum of series $\frac{1}{2!}+\frac{1}{4!}+\frac{1}{6!}+\ldots$ is

A. $\frac{\left(e^2-1\right)}{2}$

B. $\frac{\left(e^2-2\right)}{e}$

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

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

Answer: D

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50. $1+\frac{1}{3!}+\frac{1}{5!}+\ldots.=$

A. e

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

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

D. $\frac{1}{2}\left(e-e^{-1}\right)$

Answer: D

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51. $\frac{2}{1!}+\frac{4}{3!}+\frac{6}{5!}+\ldots.=$

A. e

B. e^2

C. $2e$

D. $1/e$

Answer: A

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52. $\frac{3}{2!}+\frac{5}{4!}+\frac{7}{6!}+\frac{9}{8!}+\ldots.=$

A. e

B. $2e$

C. e^{-1}

D. $e-1$

Answer: D

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53. $2\left[1+\frac{(\log_e a)^2}{2!}+\frac{(\log_e a)^4}{4!}+\ldots.\right]=$

A. a

B. $a+a^{-1}$

C. a^2+a^{-2}

D. $a-a^{-1}$

Answer: B

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54. $1+\frac{2}{3!}+\frac{3}{5!}+\frac{4}{7!}+\ldots.=$

A. e

B. $e/2$

C. e^{-1}

D. $e^{-1}/2$

Answer: B

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55. $\frac{2}{3!}+\frac{4}{5!}+\frac{6}{7!}+\ldots.=$

A. e

B. $e/2$

C. e^{-1}

D. $e^{-1}/2$

Answer: C

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56. $\frac{1}{3!}+\frac{2}{5!}+\frac{3}{7!}+....=$

A. e

B. $e/2$

C. e^{-1}

D. $e^{-1}/2$

Answer: D

Watch Video Solution

57. $1+\frac{2}{1!}+\frac{3}{2!}+\frac{4}{3!}+\ldots.=$

A. e

B. $2e$

C. e^{-1}

D. $e^{-1}/2$

Answer: B

Watch Video Solution

58. $1+\frac{3}{1!}+\frac{5}{2!}+\frac{7}{3!}+\ldots.=$

A. e

B. $2e$

C. $3e$

D. $e+2$

Answer: C

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59. $\frac{3}{2!}+\frac{5}{3!}+\frac{7}{4!}+\frac{9}{5!}+\ldots.=$

A. e

B. 2e

C. e^{-1}

D. $e^{-1}/2$

Answer: A

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60. $1+\frac{4}{2!}+\frac{7}{3!}+\frac{10}{4!}+\ldots.=$

A. e

B. 2e

C. 3e

D. $e + 2$

Answer: D

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61. $\sum_{n=1}^{\infty} \frac{2n}{(2n+1)!} =$

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

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

C. e

D. 2e

Answer: A

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62. $\sum_{n=1}^{\infty} \frac{n^2}{(n+1)!} =$

A. e

B. 2e

C. 3e

D. $e - 1$

Answer: D

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63. $\sum_{n=1}^{\infty}$ (2n^(2)+n+1)/(n!)=`

A. $2e - 1$

B. $2e + 1$

C. $6e - 1$

D. $6e + 1$

Answer: C

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64. $\left(1+\frac{1}{2!}+\frac{1}{4!}+\frac{1}{6!}+\ldots.\right)^2-\left(1+\frac{1}{3!}+\frac{1}{5!}+\frac{1}{7!}+\ldots.\right)^2=$

A. 0

B. 1

C. e

D. $1/e$

Answer: B

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65. $\left(1+\frac{a^2x^2}{2!}+\frac{a^4x^4}{4!}+\ldots.\right)^2-\left(ax+\frac{a^3x^3}{3!}+\frac{a^5x^5}{5!}+\ldots.\right)^2=$

A. 0

B. 1

C. e

D. $1/e$

Answer: B

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66. $\frac{1+\frac{2^2}{2!}+\frac{2^4}{3!}+\frac{2^6}{4!}+....}{1+\frac{1}{2!}+\frac{2}{3!}+\frac{2^2}{4!}+....}=$

A. $e-1$

B. e^2-1

C. $e+1$

D. e^2+1

Answer: B

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67. $\frac{1+\frac{1}{3!}+\frac{1}{5!}+....}{1+\frac{1}{2!}+\frac{1}{4!}+....}=$

A. $\frac{e-1}{e+1}$

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

C. $\frac{e+1}{e-1}$

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

Answer: B

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68. $\frac{\frac{1}{2!}+\frac{1}{4!}+\frac{1}{6!}+....}{1+\frac{1}{3!}+\frac{1}{5!}+....}=$

A. $\frac{e-1}{e+1}$

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

C. e^{-1}

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

Answer: A

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69. $\frac{1}{2} - \frac{1}{3(1!)} + \frac{1}{4(2!)} - \frac{1}{5(3!)} + \ldots. =$

A. e

B. $2/e$

C. $1 - 1/e$

D. $1 - 2/e$

Answer: D

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70. $\frac{1}{1!} + \frac{1+2}{2!} + \frac{1+2+2^2}{3!} + \ldots. =$

A. e

B. e^2

C. $e^2 + e$

D. $e^2 - e$

Answer: D

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71. $\frac{1}{1!} + \frac{1+3}{2!} + \frac{1+3+3^2}{3!} + ... =$

A. $e^3 - e$

B. $\frac{1}{4}(e^3 - e)$

C. $\frac{1}{3}(e^3 - e)$

D. $\frac{1}{2}(e^3 - e)$

Answer: D

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72. $\frac{1}{2!}+\frac{1+2}{3!}+\frac{1+2+3}{4!}+\ldots.$

A. e

B. 2e

C. $e/2$

D. $1/e$

Answer: C

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73. $\frac{2}{2!}+\frac{2+4}{3!}+\frac{2+4+6}{4!}+\ldots. =$

A. $e-2$

B. $e-1$

C. e

D. e^{-1}

Answer: C

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74. $\frac{1}{1!}+\frac{1+3}{2!}+\frac{1+3+3^2}{3!}+\ldots.=$

A. e

B. 2e

C. $e/2$

D. $1/e$

Answer: B

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75. $1^2+\frac{2^2}{2!}+\frac{3^2}{3!}+\frac{4^2}{4!}+\ldots.=$

A. e

B. 2e

C. $e/2$

D. $1/e$

Answer: B

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76. $\frac{1^2}{2!}+\frac{2^2}{3!}+\frac{3^2}{4!}+\ldots.=$

A. e

B. 2e

C. $e-1$

D. $e+1$

Answer: C

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77. $\frac{1^2}{1!}+\frac{1^2+2^2}{2!}+\frac{1^2+2^2+3^2}{3!}+\ldots.=$

A. $17e/6$

B. $6e/17$

C. $11e/7$

D. $7e/11$

Answer: A

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78. $\frac{1^2.2}{1!}+\frac{2^2.3}{2!}+\frac{3^2.4}{3!}+\ldots.=$

A. 5e

B. 7e

C. 11e

D. $e/5$

Answer: B

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79. $\frac{1^2.2^2}{1!}+\frac{2^2.3^2}{2!}+\frac{3^2.4^2}{3!}+....=$

A. 27e

B. $6e-1$

C. 7e

D. 2e

Answer: A

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80. $\sum_{n=1}^{\infty}.^nC_0+.^nC_1+.^n_{.^nP_n}C_2+....+.^nC_n=$

A. $e-1$

B. $e+1$

C. e^2-1

D. e^2+1

Answer: C

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81. $1-\frac{x^2}{2!}+\frac{x^4}{4!}-\frac{x^6}{6!}+\ldots.=$

A. $\frac{e^x+e^{-x}}{2}$

B. $\frac{e^x-e^{-x}}{2}$

C. $\frac{e^{ix}+e^{-ix}}{2}$

D. $\frac{e^{ix}-e^{-ix}}{2}$

Answer: C

Watch Video Solution

82. $\frac{1.2}{1!}+\frac{2.3}{2!}+\frac{3.4}{3!}+\ldots.=$

A. e

B. 2e

C. 3e

D. $e+2$

Answer: C

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83. $1+\frac{1}{2!}+\frac{1.3}{4!}+\frac{1.3.5}{6!}+\ldots=$

A. e

B. 2e

C. $1/e$

D. $\sqrt{e}$

Answer: D

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84. If $S = \frac{1}{1.2} + \frac{1.3}{1.2.3.4} + \frac{1.3.5}{1.2.3.4.5.6} + \ldots$. to ∞, then S =

A. $e^{1/2} - 1$

B. $e^{1/2} + e$

C. $e + 1$

D. none of these

Answer: A

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85. $\frac{4}{1!} + \frac{11}{2!} + \frac{22}{3!} + \frac{37}{4!} + \frac{56}{5!} + \ldots. =$

A. 27e

B. $6e - 1$

C. 7e

D. 2e

Answer: B

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86. $\frac{5}{1!} + \frac{7}{3!} + \frac{9}{5!} + ... =$

A. $5e - 3e^{-1}$

B. $\frac{5e - 3e^{-1}}{2}$

C. $5e - 3e^{-1}$

D. $\frac{5e - 3e^{-1}}{2}$

Answer: B

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87. The sum of the series $1+\frac{1}{4.2!}+\frac{1}{16.4!}+\frac{1}{64.6!}+\ldots\infty$ is

A. $\frac{e-1}{\sqrt{e}}$

B. $\frac{e+1}{\sqrt{e}}$

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

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

Answer: D

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88. $1+\frac{2x}{1!}+\frac{3x^2}{2!}+\frac{4x^2}{3!}+\ldots.=$

A. $(x+1)e^x$

B. $(x-1)e^x$

C. xe^x

D. e^x

Answer: A

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89. $1.2 + \frac{2.3}{1!}x + \frac{3.4}{2!}x^2 + \ldots. =$

A. $\left(x^2 + 4x + 2\right)e^x$

B. $\left(x^2 + 3x + 2\right)e^x$

C. $\left(x^2 - 4x + 2\right)e^x$

D. $\left(x^2 - 3x + 2\right)e^x$

Answer: A

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90. $\frac{3.5}{1!}x + \frac{4.6}{2!}x^2 + \frac{5.7}{3!}x^3 + \ldots. =$

A. $\left(x^3 - 6x^2 + 7x - 1\right)e^x$

B. $\left(x^2+7x+8\right)e^x-8$

C. $\left(x^3+6x^2+7x+1\right)e^x$

D. $\left(x^2+7x+8\right)e^x+8$

Answer: B

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91. If

$$S=(x+y)(x-y)+\frac{1}{2!}(x+y)(x-y)\left(x^2+y^2\right)+\frac{1}{3!}(x+y)(x-y)\left(x$$

then S =

A. $e^{x^2}-y^2$

B. $e^{x^2}+e^{y^2}$

C. $e^{x^2}-e^{y^2}$

D. none of these

Answer: C

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92. The approximate value of e^2 is

A. 7.2

B. 7.3

C. 7.4

D. 7.5

Answer: C

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93. $x + \frac{x^2}{3!} + \frac{x^3}{5!} + ... =$

A. $2\sqrt{x}\left(e^{\sqrt{x}} + e^{\sqrt{x}}\right)$

B. $\sqrt{x}\left(e^{\sqrt{x}} - e^{\sqrt{x}}\right)/2$

C. $\sqrt{x}\left(e^{\sqrt{x}} + e^{\sqrt{x}}\right)$

D. $\sqrt{x}\left(e^{\sqrt{x}}-e^{\sqrt{x}}\right)$

Answer: B

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Exercise 1 B

1. The 7th term of $\log_e(5/4)$ is

A. $\frac{1}{7.4^7}$

B. $-\frac{1}{7.4^7}$

C. $\frac{1}{7}$

D. $-\frac{1}{7}$

Answer: A

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2. The nth term of $\log_e 2$ is

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

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

C. $\frac{(-1)^{n-1}}{n.3^n}$

D. $\frac{(-1)^{n-1}}{n.4^n}$

Answer: B

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3. The nth term of $\log_2(3/2)$ is

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

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

C. $\frac{(-1)^{n-1}}{n.3^n}$

D. $\frac{(-1)^{n-1}}{n.4^n}$

Answer: A

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4. The nth term of $\log_e(4/3)$ is

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

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

C. $\frac{(-1)^{n-1}}{n.3^n}$

D. $\frac{(-1)^{n-1}}{n.4^n}$

Answer: C

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5. $\frac{3}{4}+\frac{1}{3}\left(\frac{3}{4}\right)^3+\frac{1}{5}\left(\frac{3}{4}\right)^5+\ldots.=$

A. $\log_e 3$

B. $\log_e 4$

C. $\log_e 7$

D. $\frac{1}{2}\log_e 7$

Answer: D

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6. $2\left[\left(\frac{1}{3}\right)+\frac{1}{3}\left(\frac{1}{3}\right)^3+\frac{1}{5}\left(\frac{1}{3}\right)^5+\ldots\right]=$

A. $\log_e 3$

B. $\log_e 4$

C. $\log_e 2$

D. $\log_e 5$

Answer: C

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7. $2\left[\left(\frac{1}{2}\right)+\frac{1}{3}\left(\frac{1}{2}\right)^{3}+\frac{1}{5}\left(\frac{1}{2}\right)^{5}+\ldots\right]=$

A. $\log_e 3$

B. $\log_e 4$

C. $\log_e 2$

D. $\log_e 5$

Answer: A

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8. $2\left[\left(\frac{2}{3}\right)+\frac{1}{3}\left(\frac{2}{3}\right)^{3}+\frac{1}{5}\left(\frac{2}{3}\right)^{5}+\ldots\right]=$

A. $\log_e 3$

B. $\log_e 4$

C. $\log_e 2$

D. $\log_e 5$

Answer: D

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9. $\frac{1}{3}+\frac{1}{3.3^3}+\frac{1}{5.3^5}+\frac{1}{7.3^7}+\ldots.=$

A. log 2

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

C. 2 log 2

D. log $(1/2)$

Answer: B

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10. $\frac{1}{5}+\frac{1}{3.5^3}+\frac{1}{5.5^5}+\frac{1}{7.5^7}+\ldots.=$

A. log $(3/2)$

B. $\frac{1}{2}\log(3/2)$

C. $2\log(3/2)$

D. $\log(2/3)$

Answer: B

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11. $1+\frac{1}{3.2^2}+\frac{1}{5.2^4}+\frac{1}{7.2^6}+\ldots.=$

A. $\log_e 2$

B. $\log_e 3$

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

D. $\frac{1}{2}\log_e 3$

Answer: B

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12. $\log_4 2 - \log_8 2 + \log_{16} 2 - \ldots. =$

A. e^2

B. $\log_2$

C. $+\log_e 3$

D. $1 - \log_e 2$

Answer: D

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13. $\log_e 2 =$

A. $1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \ldots.$

B. $1 - \frac{1}{2} - \frac{1}{3} - \frac{1}{4} - \ldots.$

C. $\frac{1}{1.2} + \frac{1}{3.4} + \frac{1}{5.6} + \ldots.$

D. $\frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4} + \ldots.$

Answer: C

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14. $\frac{1}{1.2}+\frac{1}{3.4}+\frac{1}{5.6}+\ldots.$

A. $\log_e 2$

B. $\log_e 3$

C. $\log_e 5$

D. $\log_e 2-1/2$

Answer: A

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15. $\frac{1}{2.3}+\frac{1}{4.5}+\frac{1}{6.7}+\frac{1}{8.9}+\ldots$

A. $\log\left(\frac{2}{e}\right)$

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

C. $\log(2e)$

D. $e - 1$

Answer: B

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16. $\frac{1}{1.2} - \frac{1}{2.3} + \frac{1}{3.4} - \frac{1}{4.5} + \ldots. =$

A. $\log_e 2 - 1$

B. $2\log_e 2 - 1$

C. $2\log_e 2$

D. $2\log_e 2 + 1$

Answer: B

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17. $\frac{1}{1.3}+\frac{1}{2.5}+\frac{1}{3.7}+\frac{1}{4.9}+\ldots=$

A. $2\log_e 2.2$

B. $2-2\log_e 2$

C. $2\log_e 4$

D. $\log_e 4$

Answer: B

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18. $\frac{1}{1.2.3}+\frac{1}{3.4.5}+\frac{1}{5.6.7}+\ldots.$

A. $\log_e 2$

B. $\log_e 3$

C. $\log_e 5$

D. $\log_e 2-1/2$

Answer: D

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19. $\frac{5}{1.2.3}+\frac{7}{3.4.5}+\frac{9}{5.6.7}+\ldots.=$

A. $\log_e\left(\frac{8}{e}\right)$

B. $\log_e\left(\frac{2}{e}\right)$

C. $\log_e\left(\frac{6}{5}\right)$

D. $2-\log_e 2$

Answer: A

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20. The sum of the series $\frac{1}{1.3.5}+\frac{1}{3.5.7}+\frac{1}{5.7.9}+\ldots$ is

A. $3\log_e x$

B. $1/8$

C. $1/9$

D. $1/12$

Answer: D

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21. Sum of the series $\frac{1}{4.5.6} + \frac{1}{5.6.7} + \frac{1}{6.7.8} + \ldots$ upto ∞ is

A. $\frac{1}{20}\log_e e$

B. $\frac{1}{10}\log_e e$

C. $\frac{1}{40}\log_e e$

D. none of these

Answer: C

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22. $\frac{1}{1.3}+\frac{1}{2}\left(\frac{1}{3.5}\right)+\frac{1}{3}\left(\frac{1}{5.7}\right)+\ldots.=$

A. $\log_e\left(\frac{8}{e}\right)$

B. $\log_e\left(\frac{2}{e}\right)$

C. $\log_e\left(\frac{6}{5}\right)$

D. $2-\log_e 2$

Answer: B

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23. $\frac{2}{3}+\frac{1}{2}\left(\frac{2}{3}\right)^2+\frac{1}{3}\left(\frac{2}{3}\right)^3+\ldots.=$

A. $\log_e 2$

B. $\log_e 3$

C. $\log_e 5$

D. $\log_e(3/2)$

Answer: B

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24. $\frac{1}{5}+\frac{1}{2.5^2}+\frac{1}{3.5^3}+\frac{1}{4.5^4}+\ldots\ldots=$

A. $\log_e\left(\frac{8}{e}\right)$

B. $\log_e\left(\frac{2}{e}\right)$

C. $\log_e\left(\frac{5}{4}\right)$

D. $2-\log_e 2$

Answer: C

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25. The sum of the series $\frac{1}{2}\left(\frac{1}{5}\right)^2+\frac{2}{3}\left(\frac{1}{5}\right)^3+\frac{3}{4}\left(\frac{1}{5}\right)^4+\ldots$ is

A. $\frac{1}{4}+\log_e\left(\frac{4}{5}\right)$

B. $\frac{1}{3}+\log_e\left(\frac{2}{3}\right)$

C. $\frac{1}{2}+\log_e\left(\frac{3}{2}\right)$

D. none of these

Answer: A

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26. $\frac{1}{2}-\frac{1}{2}\cdot\frac{1}{2^2}+\frac{1}{3}\cdot\frac{1}{2^3}-\frac{1}{4}\cdot\frac{1}{2^4}+\ldots.=$

A. $\log_e 2$

B. $\log_e 3$

C. $\log_e 5$

D. $\log_e(3/2)$

Answer: D

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27. $\frac{1}{2}+\frac{3}{2}.\frac{1}{4}+\frac{5}{3}.\frac{1}{8}+\frac{7}{4}.\frac{1}{16}+....=$

A. $\log_e\left(\frac{8}{e}\right)$

B. $\log_e\left(\frac{2}{e}\right)$

C. $\log_e\left(\frac{6}{5}\right)$

D. $2-\log_e 2$

Answer: D

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28. Sum of the series $\frac{1}{2}\left(\frac{1}{2}+\frac{1}{3}\right)-\frac{1}{4}\left(\frac{1}{2^2}+\frac{1}{3^2}\right)+\frac{1}{6}\left(\frac{1}{2^3}+\frac{1}{3^3}\right)-...$ is

A. $\log_e 3$

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

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

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

Answer: B

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29. $\frac{a-b}{a}+\frac{1}{2}\left(\frac{a-b}{a}\right)^2+\frac{1}{3}\left(\frac{a-b}{a}\right)^3+\ldots.=$

A. $\log_e(a/b)$

B. $\log_e(b/a)$

C. $\log_e(a+b)$

D. $\log_e(a-b)$

Answer: A

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30. $(a-1)-\frac{1}{2}(a-1)^2+\frac{1}{3}(a-1)^3-\frac{1}{4}(a-1)^4+\ldots=$

A. log a

B. $\log(a-1)$

C. $\log(1+a)$

D. $\log(1-a)$

Answer: A

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31. $e^{x-1-\frac{1}{2}(x-1)^2+\frac{1}{3}(x-1)^3-\frac{1}{4}(x-1)^4+\ldots}$=

A. $\log(x-1)$

B. $\log x$

C. x

D. none of these

Answer: C

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32. If $S = \frac{(b-1) - \frac{1}{2}(b-1)^2 + \frac{1}{3}(b-1)^3 - \ldots.}{(a-1) - \frac{1}{2}(a-1)^2 + \frac{1}{3}(a-1)^3 - \ldots}$, then S =

A. $\log_e b$

B. $\log_a b$

C. $\log_e a$

D. $\log_b a$

Answer: B

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33. $\frac{1}{x+1} + \frac{1}{2(x+1)^2} + \frac{1}{3(x+1)^3} + \ldots. =$

A. $\log\left[\frac{x}{x+1}\right]$

B. $\log\left[\frac{x+1}{x}\right]$

C. $\log\left[\frac{x+1}{x-1}\right]$

D. $\log\left[\frac{x-1}{x+1}\right]$

Answer: B

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34. $\frac{x}{x+1}+\frac{1}{2}\left(\frac{x}{x+1}\right)^2+\frac{1}{3}\left(\frac{x}{x+1}\right)^3+\ldots.=$

A. $\log(1+x)$

B. $\log(1-x)$

C. $\log x$

D. none

Answer: A

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35. $\frac{2ax}{a^2+x^2}+\frac{1}{3}\left(\frac{2ax}{a^2+x^2}\right)^3+\frac{1}{5}\left(\frac{2ax}{a^2+x^2}\right)^5+\ldots.=$

A. $\log.\ \frac{a+x}{a-x}$

B. $\log. \frac{a-x}{a+x}$

C. $\log. \frac{x+a}{x-a}$

D. $\log. \frac{x-a}{x+a}$

Answer: A

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36. $\left(\frac{2n}{n^2+1}\right) + \frac{1}{3}\left(\frac{2n}{n^2+1}\right)^3 + \frac{1}{5}\left(\frac{2n}{n^2+1}\right)^5 + \ldots. =$

A. $\log. \frac{n+1}{n-1}$

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

C. $\log. \frac{1+n}{1-n}$

D. $\log. \frac{1-n}{1+n}$

Answer: A

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37. $\frac{1}{2x-1}+\frac{1}{3}.\frac{1}{(2x-1)^3}+\frac{1}{5}\frac{1}{(2x-1)^5}+\ldots.=$

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

B. $\frac{1}{2}\log.\frac{x-1}{x}$

C. $\frac{1}{2}\log.\frac{x}{1-x}$

D. $\frac{1}{2}\log.\frac{1-x}{2}$

Answer: A

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38. $\frac{1}{2x+1}+\frac{1}{3}\frac{1}{(2x+1)^3}+\frac{1}{5}\frac{1}{(2x+1)^5}+\ldots.=$

A. $\frac{1}{2}\log.\frac{x}{x+1}$

B. $\log.\frac{x}{x+1}$

C. $\frac{1}{2}\log.\frac{x}{x-1}$

D. $\frac{1}{2}\log.\frac{x+1}{x}$

Answer: D

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39. $\frac{1}{2n^2-1}+\frac{1}{3(2n^2-1)^3}+\frac{1}{5(2n^2-1)^5}+\ldots.=$

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

B. $\frac{1}{2}\log.\frac{n^2}{n^2-1}$

C. $\log.\frac{n^2-1}{n^2}$

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

Answer: B

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40. If $x>0$ then $\frac{x-1}{x+1}+\frac{1}{2}\frac{x^2-1}{(x+1)^2}+\frac{1}{3}\frac{x^3-1}{(x+1)^3}+\ldots.=$

A. $\log(1+x)$

B. $\log(1-x)$

C. $\log(x-1)$

D. $\log x$

Answer: D

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41. $\log\left(1+x+x^2+\ldots\infty\right)=$

A. $x+\frac{x^2}{2}+\frac{x^3}{3}+\frac{x^4}{4}+\ldots.\infty$

B. $x-\frac{x^2}{2}+\frac{x^3}{3}-\frac{x^4}{4}\ldots.\infty$

C. $1+x+\frac{x^2}{2}+\frac{x^3}{3}+\frac{x^4}{4}+\ldots.\infty$

D. $1-x+\frac{x^2}{2}-\frac{x^3}{3}+\frac{x^4}{4}+\ldots.\infty$

Answer: A

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42. If $|x| < 1$ then $\frac{1}{2}x^2 + \frac{2}{3}x^3 + \frac{3}{4}x^4 + ... =$

A. $\frac{x}{1-x} + \log(1-x)$

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

C. $\frac{x}{1+x} + \log(1+x)$

D. $\frac{x}{1+x} + \log(1-x)$

Answer: A

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43. $\frac{a-1}{a+1} + \frac{1}{3}\left(\frac{a-1}{a+1}\right)^3 + \frac{1}{5}\left(\frac{a-1}{a+1}\right)^5 + ... =$

A. $\log a$

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

C. $2\log a$

D. $\log(1/a)$

Answer: B

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44. If $|x| < 1$ and $y = x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \ldots$, then x =

A. $y + \frac{y^2}{2} + \frac{y^3}{3} + \ldots$

B. $y - \frac{y^2}{2} + \frac{y^3}{3} - \frac{y^4}{4} + \ldots$

C. $y + \frac{y^2}{2!} + \frac{y^3}{3!} + \ldots$

D. $y - \frac{y^2}{2!} + \frac{y^3}{3!} - \frac{y^4}{4!} + \ldots$

Answer: C

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45. If $y = x + \frac{x^2}{2} + \frac{x^3}{3} + \ldots. \infty$, then x =

A. $y - \frac{y^2}{2!} + \frac{y^3}{3!} - \frac{y^4}{4!} +$

B. $y+\frac{y^2}{2!}+\frac{y^3}{3!}+\frac{y^4}{4!}+$

C. $1-y+\frac{y^2}{2!}-\frac{y^3}{3!}+\frac{y^4}{4!}-\ldots.$

D. $1+y+\frac{y^2}{2!}+\frac{y^3}{3!}+\frac{y^4}{4!}+\ldots.$

Answer: A

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46. $|a|<1, b=\sum_{k=1}^{\infty}\frac{a^k}{k}\Rightarrow a=$

A. $\sum_{k=1}^{\infty}\frac{(-1)^k b^k}{k}$

B. $\sum_{k=1}^{\infty}\frac{(-1)^{k-1} b^k}{k!}$

C. $\sum_{k=1}^{\infty}\frac{(-1)^k b^k}{(k-1)!}$

D. $\sum_{k=1}^{\infty}\frac{(-1)^{k-1} b^k}{(k+1)!}$

Answer: B

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47. If $y = \frac{1}{2x^2 - 1}$ then $y + \frac{y^3}{3} + \frac{y^5}{5} + \ldots. =$

A. $\frac{1}{x^2} + \frac{1}{2x^4} + \frac{1}{3x^6} + \ldots.$

B. $2\left(\frac{1}{x^2} + \frac{1}{2x^4} + \frac{1}{3x^6} + \ldots.\right)$

C. $\frac{1}{2}\left(\frac{1}{x^2} + \frac{1}{2x^4} + \frac{1}{3x^6} + \ldots.\right)$

D. $-\left(\frac{1}{x^2} + \frac{1}{2x^4} + \frac{1}{3x^6} + \ldots.\right)$

Answer: C

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48. $\frac{1}{x^2} + \frac{1}{2x^4} + \frac{1}{3x^6} + \ldots. =$

A. $2\log x - \log(x+1) - \log(x-1)$

B. $\log(x+1) + \log(x-1) - 2\log x$

C. $2\log x + \log(x+1) - \log(x-1)$

D. $2\log x - \log(x+1) + \log(x-1)$

Answer: A

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49. $\frac{1}{1.3}.\frac{1}{2}+\frac{1}{2.4}.\frac{1}{2^2}+\frac{1}{3.5}.\frac{1}{2^3}+\ldots.=$

A. $\frac{5}{4}+\frac{3}{2}\log.\frac{1}{2}$

B. $\frac{4}{4}+\frac{3}{2}\log 2$

C. $\frac{4}{5}+\frac{3}{2}\log 2$

D. $\frac{4}{5}+\frac{2}{3}\log\left(\frac{1}{2}\right)$

Answer: A

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50. $3x-\frac{5x^2}{2}+\frac{9x^3}{3}-\frac{17x^4}{4}+\ldots.+(-1)^{n-1}\frac{(2^n+1)}{2}x^n+\ldots=$

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

B. $\log_e\left(1+3x+2x^2\right)$

C. $\log\left(1+5x+6x^2\right)$

D. $\log_e\left(1+6x+5x^2\right)$

Answer: B

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51. $5x-\frac{13}{2}x^2+\frac{35}{3}x^3-\frac{97}{4}x^4+\ldots.=$

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

B. $\left(1+3x+2x^2\right)$

C. $\log\left(1+5x+6x^2\right)$

D. $\left(1+6x+5x^2\right)$

Answer: C

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52. The coefficient of x^n in the expansion of $\log_e\left(1+3x+2x^2\right)$ is

A. $(-1)^{n-1}(1+2^n)/n$

B. $(-1)^n\left(1+2^{n-1}\right)/n$

C. $(-1)^{n-1}2^n/n$

D. $(-1)^n(2^n-1)/n$

Answer: A

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53. The coefficient of x^n in the expansion of $\log\ (1-5x+6x)^2$ is

A. $\frac{2^n+3^n}{n}$

B. $\frac{2^n-3^n}{n}$

C. $\frac{3^n-2^n}{2}$

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

Answer: D

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54. If $n = 3m$ then the coefficient of x^n in the expansion of $\log\left(1 + x + x^2\right)$ is

A. n

B. $1/n$

C. $2/n$

D. $-2/n$

Answer: B

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55. If $n = 3m$ then the coefficient of x^n in the expansion of $\log\left(1 + x + x^2\right)$ is

A. n

B. $1/n$

C. $2/n$

D. $-2/n$

Answer: D

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56. The expansion of $\log. \frac{1+x+x^2}{1-x+x^2}$ as ascending powers of x is

A. $x - \frac{2}{3}x^3 + \frac{x^5}{5} + \frac{x^7}{7} - \frac{2}{9}x^9 \ldots.$

B. $x + \frac{2}{3}x^3 + \frac{x^5}{5} + \frac{x^7}{7} + \frac{2}{9}x^9 \ldots.$

C. $2\left[x - \frac{2}{3}x^3 + \frac{x^5}{5} + \frac{x^7}{7} - \frac{2}{9}x^9 \ldots.\right]$

D. $2\left[x + \frac{2}{3}x^3 + \frac{x^5}{5} + \frac{x^7}{7} + \frac{2}{9}x^9 \ldots.\right]$

Answer: C

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57. If $|x| < 1$, the coefficient of x^3 in the expansion of $\log\left(1 + x + x^2\right)$ in ascending power of x, is

A. $2/3$

B. $4/3$

C. $-2/3$

D. $-4/3$

Answer: C

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58. If x is very small and neglecting x^3 and higher powers of x then the expansion of $\log\left(1 + x^2\right) - \log(1 + x) - \log(1 - x)$ as ascending powers of x is

A. $2x$

B. $2x^2$

C. $1+2x$

D. $1-x^2$

Answer: B

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59. $\frac{x}{1.2}+\frac{x^2}{3.4}+\frac{x^3}{5.6}+\ldots.=$

A. $\frac{\sqrt{x}}{2}\log.\frac{1+\sqrt{x}}{1-\sqrt{x}}+\frac{1}{2}\log(1-x)$

B. $\frac{\sqrt{x}}{2}\log.\frac{1-\sqrt{x}}{1+\sqrt{x}}+\log(1-x)$

C. $\frac{\sqrt{x}}{2}\log.\frac{1+\sqrt{x}}{1-\sqrt{x}}+\log(x-1)$

D. $\frac{\sqrt{x}}{2}\log.\frac{1-\sqrt{x}}{1+\sqrt{x}}+\log(x-1)$

Answer: A

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60. $\sum_{n=1}^{\infty} \frac{x^n}{n+2} =$

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

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

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

D. $\frac{1}{x^2}\log(1+x)$

Answer: C

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61. $\sum_{n=1}^{\infty} \frac{x^{n+1/2}}{n+1} =$

A. $\frac{1}{\sqrt{x}}[x + \log(1-x)]$

B. $-\frac{1}{\sqrt{x}}[x + \log(1-x)]$

C. $\frac{1}{x}[x + \log(1-x)]$

D. $-\frac{1}{x}[x + \log(1-x)]$

Answer: B

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62. $\sin^2\theta + \frac{1}{2}\sin^4\theta + \frac{1}{3}\sin^6\theta + ... =$

A. $2\log\sin\theta$

B. $2\log\cos\theta$

C. $2\log\sec\theta$

D. $2\log\cos ec\theta$

Answer: C

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63. $\cos^2\theta + \frac{1}{2}\cos^4\theta + \frac{1}{3}\cos^6\theta + ... =$

A. $2\log\sin\theta$

B. $2\log\cos\theta$

C. $2\log\sec\theta$

D. $2\log\cos ec\theta$

Answer: D

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64. $\tan^2\theta - \frac{1}{2}\tan^4\theta + \frac{1}{3}\tan^6\theta - \frac{1}{4}\tan^8\theta + ... =$

A. $2\log\sin\theta$

B. $2\log\cos\theta$

C. $2\log\sec\theta$

D. $2\log\cos ec\theta$

Answer: C

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65. $\cos\theta + \frac{1}{3}\cos^3\theta + \frac{1}{5}\cos^5\theta + ... =$

A. $\log\tan\theta$

B. $\log\cot\theta$

C. $\log\tan(\theta/2)$

D. $\log\cot(\theta/2)$

Answer: D

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66. $\sin 2\theta + \frac{1}{3}\sin^3 2\theta + \frac{1}{5}\sin^5 2\theta + ... =$

A. $\log\tan\theta$

B. logtan((pi)/(4)+theta)`

C. logtan((pi)/(4)-theta)`

D. $\log\tan.\frac{\theta}{2}$

Answer: B

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67. $\cos 2\theta + \frac{1}{3}\cos^3 2\theta + \frac{1}{5}\cos^5 2\theta + \ldots. =$

A. $\log \tan \theta$

B. $\log \tan\left(\frac{\pi}{4} + \theta\right)$

C. $\log \tan\left(\frac{\pi}{4} - \theta\right)$

D. $\log. \cot \theta$

Answer: D

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68. $\tan \theta + \frac{1}{3}\tan^3 \theta + \frac{1}{5}\tan^5 \theta + \ldots. =$

A. $\log \tan \theta$

B. $\frac{1}{2}\log\tan\left(\frac{\pi}{4}+\theta\right)$

C. $\frac{1}{2}\log\tan\left(\frac{\pi}{4}-\theta\right)$

D. $\log\cot\theta$

Answer: B

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69. The sum of the series $\log_4 2 - \log_8 2 + \log_{16} 2 - \ldots.$ is

A. e^2

B. $\log_2 2 + 1$

C. $\log_e 3 - 2$

D. $1 - \log_e 2$

Answer: D

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70. If x,y,z are three consecutive positive integers then

$$\frac{1}{2}\log_e x + \frac{1}{2}\log_e z + \frac{1}{2xz+1} + \frac{1}{3}\left(\frac{1}{2xz+1}\right)^3 + \ldots. =$$

A. $\log_e x$

B. $\log_e y$

C. $\log_e z$

D. none

Answer: B

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Exercise 2 Set 1

1. The coefficient of x^n in $\frac{1+x}{1!} + \frac{(1+x)^2}{2!} + \frac{(1+x)^3}{3!} + \ldots.$

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II true

Answer: A

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2. $I: \frac{2}{1!} + \frac{4}{3!} + \frac{6}{5!} + ... = e - 1$

II : $\frac{3}{2!} + \frac{5}{4!} + \frac{7}{6!} + \frac{9}{8!} + ... = e - 1$

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II true

Answer: B

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3. $I: \frac{1}{1!}+\frac{1+2}{2!}+\frac{1+2+2^2}{3!}+\ldots. = e^2 - e$

$II: \frac{2}{2!}+\frac{2+4}{3!}+\frac{2+4+6}{4!}+\ldots. = e$

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II true

Answer: C

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4. $I: 2\left[\left(\frac{1}{3}\right)+\frac{1}{3}\left(\frac{1}{3}\right)^3+\frac{1}{5}\left(\frac{1}{3}\right)^5+\ldots\right] = \log_e 2$

$II: 2\left[\left(\frac{1}{2}\right)+\frac{1}{3}\left(\frac{1}{2}\right)^3+\frac{1}{5}\left(\frac{1}{2}\right)^5+\ldots\right] = \log_e 2$

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II true

Answer: A

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5. $I: \frac{1}{1.2} + \frac{1}{3.4} + \frac{1}{5.6} + ... \log_e 2$

$II: \frac{1}{1.2} - \frac{1}{2.3} + \frac{1}{3.4} - \frac{1}{4.5} + ... = 2\log_e 2 - 1$

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II true

Answer: C

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6. I : If $y = x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \ldots.$ then $x = y + \frac{y^2}{2!} + \frac{y^3}{3!} + \ldots.$

II : If $y = x + \frac{x^2}{2} + \frac{x^3}{3} + \ldots. \infty$, then $x = y - \frac{y^2}{2!} + \frac{y^3}{3!} - \frac{y^4}{4!} + \ldots.$

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II true

Answer: B

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Exercise 2 Set 2

1. If $1 + \frac{2}{1!} + \frac{4}{2!} + \frac{8}{3!} + \ldots. = e^a, 1 + \frac{4}{1!} + \frac{16}{2!} + \frac{64}{3!} + \ldots. = e^b, 1 - \frac{2}{1!}$

then the ascending order of a, b, c is

A. a,b,c

B. b,c,a

C. c,a,b

D. a,c,b

Answer: C

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2. If

$$1^2+\frac{2^2}{2!}+\frac{3^2}{3!}+\frac{4^2}{4!}+\ldots.=ae,\ \frac{1^2.2}{1!}+\frac{2^2.3}{2!}+\frac{3^2.4}{3!}+\ldots=be,\ \frac{1}{2!}+\frac{1}{}$$

then the descending order of a,b,c is

A. a,b,c

B. b,a,c

C. c,a,b

D. a,c,b

Answer: C

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3. If a, b, c are the fifth terms of $\log_e(3/2), \log_e(4/3), \log_e(6/5)$ then the ascending order of a, b, c is

A. a,b,c

B. b,c,a

C. c,a,b

D. a,c,b

Answer: A

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4. If

$$\frac{3}{4}+\frac{1}{3}\left(\frac{3}{4}\right)^3+\frac{1}{5}\left(\frac{3}{4}\right)^5+\ldots.=\log_e a, \frac{1}{3}+\frac{1}{3.3^3}+\frac{1}{5.3^5}+\frac{1}{7.3^7}+\ldots.$$

$1+\frac{1}{3.2^2}+\frac{1}{5.2^4}+\frac{1}{7.2^6}+\ldots.=\log_e c$ then the ascending order of a, b, c is

A. a,b,c

B. b,a,c

C. c,a,b

D. a,c,b

Answer: B

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5. $\frac{1}{1.3}+\frac{1}{2}\left(\frac{1}{3.5}\right)+\frac{1}{3}\left(\frac{1}{5.7}\right)+\ldots.=$

A. a,b,c

B. b,c,a

C. c,a,b

D. a,c,b

Answer: B

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Exercise 2 Set 3

1. Match the following

I. The $(n+1)$th term in the expansion of e^5 is	a) $\frac{(-3x)^n}{n!}$
II. The $(n+1)$th term in the expansion of e^{4x} is	b) $\frac{(-2)^n}{n!}$
III. The $(n+1)$th term in the expansion of e^{-2} is	c) $\frac{(4x)^n}{n!}$
IV. The $(n+1)$th term in the expansion of e^{-3x} is	d) $\frac{5^n}{n!}$

A. c,d,a,b

B. b,a,d,c

C. c,a,b,d

D. d,c,b,a

Answer: D

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2. Match the following

I. $1+\frac{1}{2!}+\frac{1}{4!}+\frac{1}{6!}+\cdots\cdots=$	a) $\frac{1}{2}(e-e^{-1})$
II. $1-\frac{1}{3!}+\frac{1}{5!}-\cdots\cdots$	b) $\frac{1}{2}(e+e^{-1})$
III. $\frac{3}{2!}+\frac{5}{4!}+\frac{7}{6!}+\frac{9}{8!}+\cdots\cdots=$	c) $\frac{e}{2}$
IV. $1+\frac{2}{3!}+\frac{3}{5!}+\frac{4}{7!}+\cdots\cdots=$	d) $e-1$

A. c,d,a,b

B. b,a,d,c

C. c,a,b,d

D. d,c,b,a

Answer: B

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3.

I. $1+\frac{2x}{1!}+\frac{3x^2}{2!}+\frac{4x^2}{3!}+\ldots.=$	a) $(x^2+7x+8)\,e^x-8$
II. $1\cdot2+\frac{2\cdot3}{1!}x+\frac{3\cdot4}{2!}x^2+\ldots.=$	b) $(x+1)\,e^x$
III. $\frac{3\cdot5}{1!}x+\frac{4\cdot6}{2!}x^2+\frac{5\cdot7}{3!}x^3+\ldots.=$	c) $(x^2+4x+2)\,e^x$

A. a,c,b

B. b,c,a

C. c,a,b

D. c,b,a

Answer: B

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4.

Match the following.

I. $2\left[\left(\frac{1}{3}\right)+\frac{1}{3}\left(\frac{1}{3}\right)^3+\frac{1}{5}\left(\frac{1}{3}\right)^5+\cdots\right]=$	a) $\log_e 3$
II. $2\left[\left(\frac{1}{2}\right)+\frac{1}{3}\left(\frac{1}{2}\right)^3+\frac{1}{5}\left(\frac{1}{2}\right)^5+\cdots\right]=$	b) $\log_e 5$
III. $2\left[\left(\frac{2}{3}\right)+\frac{1}{3}\left(\frac{2}{3}\right)^3+\frac{1}{5}\left(\frac{2}{3}\right)^5+\cdots\right]=$	c) $\log_e 2$

A. a,c,b

B. b,c,a

C. c,a,b

D. c,b,a

Answer: C

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5. Match the following.

I. $\frac{1}{1\cdot3}+\frac{1}{2}\left(\frac{1}{3\cdot5}\right)+\frac{1}{3}\left(\frac{1}{5\cdot7}\right)+\ldots.=$	a) $\frac{1}{2}\log_e 2$
II. $\frac{1}{2}\left(\frac{1}{5}\right)^2+\frac{2}{3}\left(\frac{1}{5}\right)^3+\frac{3}{4}\left(\frac{1}{5}\right)^4+\cdots$	b) $\log_e\left(\frac{2}{e}\right)$
III. $\frac{1}{2}\left(\frac{1}{2}+\frac{1}{3}\right)-\frac{1}{4}\left(\frac{1}{2^2}+\frac{1}{3^2}\right)+\frac{1}{6}\left(\frac{1}{2^3}+\frac{1}{3^3}\right)-\cdots$	c) $\frac{1}{4}+\log_e\left(\frac{4}{5}\right)$

A. a,c,b

B. b,c,a

C. c,a,b

D. c,b,a

Answer: B

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Exercise 2 Set 4

1. A : The value of e lies between 2 and 3.

R : $e = 1 + \frac{1}{1!} + \frac{1}{2!} + \frac{1}{3!} + \ldots.$

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true but R is not correct explanation of A

C. A is true but R is false

D. A is false but R is true

Answer: A

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2. A : $\log_e 3 + \frac{(\log_e 3)^2}{2!} + \frac{(\log_e 3)^3}{3!} + ... = 2$

R : If $x, a \in R$ and $a > 0$ then $a^x = 1 + x \log_e a + \frac{x^2}{2!}(\log_e a)^2 + \frac{x^3}{3!}(\log_e a)^3$

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true but R is not correct explanation of A

C. A is true but R is false

D. A is false but R is true

Answer: A

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3. A : `(3^(2))/(2!)+(3^(4))/(4!)+(3^(6))/(6!)+...=cosh3-1." "R:coshx=1+(x^(2))/(2!)+(x^(4))/(4!)+....

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true but R is not correct explanation of A

C. A is true but R is false

D. A is false but R is true

Answer: A

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4. A : $\frac{1}{2} - \frac{1}{2}.\frac{1}{2^2} + \frac{1}{3}.\frac{1}{2^3} - \frac{1}{4}.\frac{1}{2^4} + ... = \log_e\left(\frac{3}{2}\right)$

R : $\log_e(1+x) = x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + ...$

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true but R is not correct explanation of A

C. A is true but R is false

D. A is false but R is true

Answer: A

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5. A : $\frac{a-b}{a}+\frac{1}{2}\left(\frac{a-b}{a}\right)^2+\frac{1}{3}\left(\frac{a-b}{a}\right)^3+\ldots.=\log_e\left(\frac{a}{b}\right)$

R : $\log_e(1-x)=-x-\frac{x^2}{2}-\frac{x^3}{3}-\frac{x^4}{4}-\ldots.$

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true but R is not correct explanation of A

C. A is true but R is false

D. A is false but R is true

Answer: A

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