MATHS

BOOKS - DEEPTI MATHS (TELUGU ENGLISH)

PARTIAL FRACTIONS

Solved Examples

1. If $\frac{1-11x}{(x+1)(x+6)(x-4)} = \frac{A}{x+1} + \frac{B}{x+6} + \frac{C}{x-4}$ then B =

A. $\frac{-12}{25}$

B. $\frac{-43}{50}$

C. $\frac{67}{50}$

D. $\frac{-67}{50}$

Answer: C

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2. If $\frac{2x}{x^4+x^2+1} = \frac{A}{x^2-x+1} + \frac{B}{x^2+x+1}$, then AB =

A. -1

B. $1/2$

C. 1

D. 2

Answer: A

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3. If $\frac{26x^2+208x}{(x^2+1)(x+5)} = \frac{41x+3}{x^2+1} + \frac{k}{x+5}$, then k =

A. 15

B. 5

C. -5

D. -15

Answer: D

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4. If $\frac{7x-1}{1-5x+6x^2}$ is expanded in ascending powers of x when $|x| < \frac{1}{3}$ then the coefficient of x^n is

A. $(-5)2^n + 4 \cdot 3^n$

B. $5 \cdot 2^n + (-4)3^n$

C. $-5.2^n + 4 \cdot 3^n$

D. $5.2^n + 4.3^n$

Answer: A

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Exercise 1

1. The remainder obtained when the polynominal $1 + x + x^3 + x^9 + x^{27} + x^{81} + x^{243}$ is divided by x-1 is

A. 3

B. 5

C. 7

D. 11

Answer: C

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2. The remainder obtained when the polynominal $x^{64} + x^{27} + 1$ is divided by x+1 is

A. 1

B. -1

C. 2

D. -2

Answer: A

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3. The remainder obtained when the polynomial $x^3 - 3x^2 + 2x - 3$ is divided by x-2 is

A. 3

B. -3

C. 4

D. -4

Answer: B

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4. The remainder obtained when the polynomial $x^4 - 3x^3 + 9x^2 - 27x + 81$ is divided by x-3 is

A. 81

B. 243

C. 405

D. 18

Answer: A

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5. If the remainders of the polynomial $f(x)$ when divided by $x - 1, x - 2$ are 2, 5 then the remainder of $f(x)$ when divided by $(x - 1)(x - 2)$ is

A. 0

B. 1

C. 2

D. 3x-1

Answer: D

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6. If the remainder of the polynomial $f(x)$ when divided by $x+1$ and $x-1$ are 7, 3 then the remainder of $f(x)$ when devided by x^2-1 is

A. 3x+5

B. 2x+7

C. 2x+5

D. 3x+7

Answer: C

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7. If the remainders of the polynomial $f(x)$ when divided by $x-1, x-2$ are 2, 5 then the remainder of $f(x)$ when divided by $(x-1)(x-2)$ is

A. 11

B. x^2+3x+7

C. x^2-x+1

D. x^2+x+1

Answer: C

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8. The remainder of the polynomial $f(x)$ when divided by $x+1, x+2, x-2$ are 6, 15, 3 the remainder of $f(x)$ when divided by $(x+1)(x+2)(x-2)$ is

A. $2x^2-3x+1$

B. $3x^2-2x+1$

C. $2x^2 - x - 3$

D. $3x^2 - 2x + 1$

Answer: A

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9. Resolve into Partial Fractions

(i) $\frac{5x+1}{(x+2)(x-1)}$

A. $\frac{3}{x+2} + \frac{2}{x-1}$

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

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

D. $\frac{2}{x-2} + \frac{3}{x+1}$

Answer: A

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10. $\dfrac{2x+5}{(x-1)(x-2)} =$

A. $\dfrac{9}{x+2} - \dfrac{7}{x-1}$

B. $\dfrac{9}{x-2} - \dfrac{7}{x-1}$

C. $\dfrac{9}{x+2} - \dfrac{7}{x+1}$

D. $\dfrac{9}{x-2} - \dfrac{7}{x-1}$

Answer: D

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11. Resolve the following into partial fractions.

$$\frac{3x+7}{x^2-3x+2}$$

A. $\dfrac{5}{x-1} + \dfrac{8}{x-2}$

B. $\dfrac{13}{x-2} - \dfrac{10}{x-1}$

C. $\dfrac{8}{x-1} + \dfrac{5}{x-2}$

D. $\dfrac{2}{x-1} + \dfrac{3}{x-2}$

Answer: B

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12. $\frac{1}{a^2 - x^2} =$

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

B. $\frac{1}{3a(a-x)} + \frac{1}{2a(a+x)}$

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

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

Answer: C

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13. $\frac{1}{x^2 - a^2} =$

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

B. $\frac{1}{3a(x-a)} + \frac{1}{2a(x+a)}$

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

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

Answer: C

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14. The partial fractions of $\frac{1}{(x-1)(x+1)(x-2)}$ are

A. $\frac{1}{6(x+1)} + \frac{1}{2(x+1)} - \frac{1}{3(x-2)}$

B. $\frac{1}{6(x-1)} - \frac{1}{2(x-1)} + \frac{1}{3(x+2)}$

C. $\frac{1}{6(x+1)} + \frac{1}{2(x-1)} + \frac{1}{3(x+2)}$

D. $\frac{1}{6(x+1)} - \frac{1}{2(x-1)} + \frac{1}{3(x-2)}$

Answer: D

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15. The partial fractions of $\frac{1}{(1-x)(1-2x)(1-3x)}$ are

A. $\frac{1}{2(1+x)}+\frac{4}{1-2x}-\frac{9}{2(1-3x)}$

B. $\frac{1}{2(1-x)}-\frac{4}{1+2x}-\frac{9}{2(1-3x)}$

C. $\frac{1}{2(1-x)}-\frac{4}{1-2x}+\frac{9}{2(1-3x)}$

D. $\frac{1}{2(1+x)}+\frac{4}{1-2x}+\frac{9}{2(1-3x)}$

Answer: C

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16. $\frac{x^2+x+1}{(x-1)(x-2)(x-3)}=\frac{A}{x-1}+\frac{B}{x-2}+\frac{C}{x-3}\Rightarrow A+C=$

A. 4

B. 5

C. 6

D. 8

Answer: D

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17.

$$\frac{1}{x(x+1)(x+2)...(x+n)} = \frac{A_0}{x} + \frac{A_1}{x+1} + \frac{A_2}{x+2} + ... + \frac{A_n}{x+n}, 0 \leq$$

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

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

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

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

Answer: B

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18. $\frac{x+2}{x^3-x} =$

A. $\frac{1}{2(x+1)}+\frac{3}{2(x-1)}-\frac{2}{x}$

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

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

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

Answer: A

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

A. $\frac{1}{9(x-1)}+\frac{7}{9(x+2)}+\frac{2}{9(2x+1)}$

B. $\frac{1}{9(x+1)}+\frac{7}{9(x-2)}-\frac{2}{9(2x-1)}$

C. $\frac{1}{9(x-1)}-\frac{7}{9(x-2)}+\frac{2}{9(2x+1)}$

D. $\frac{1}{9(x-1)}-\frac{7}{9(x+2)}-\frac{2}{9(2x-1)}$

Answer: A

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20. $\dfrac{5x^2 - 3x + 4}{(x+1)(x^2 - 5x + 6)} =$

A. $\dfrac{1}{x+1} + \dfrac{6}{x-2} - \dfrac{10}{x-3}$

B. $\dfrac{1}{x+1} - \dfrac{6}{x-2} + \dfrac{10}{x-3}$

C. $\dfrac{1}{x-1} + \dfrac{6}{x-2} + \dfrac{10}{x-3}$

D. $\dfrac{1}{x+1} - \dfrac{6}{x+2} + \dfrac{10}{x-3}$

Answer: B

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21. Resolve $\dfrac{x^4}{(x-1)(x-2)}$ into partial fractions.

A. $x^2 + 3x + 7 - \dfrac{1}{x-1} + \dfrac{16}{x-2}$

B. $x^2 - 3x + 7 - \dfrac{1}{x-1} + \dfrac{16}{x-2}$

C. $x^2 + 3x - 7 + \dfrac{1}{x-1} + \dfrac{16}{x-2}$

D. $x^2 - 3x + 7 - \frac{1}{x+1} + \frac{16}{x-2}$

Answer: C

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22. Resolve $\frac{x^3}{(2x-1)(x+2)(x-3)}$ into Partial fractions.

A. $\frac{1}{2} + \frac{1}{50(2x-1)} - \frac{8}{25(x+2)} + \frac{27}{25(x-3)}$

B. $\frac{1}{2} - \frac{1}{50(2x-1)} - \frac{8}{25(x+2)} + \frac{27}{25(x-3)}$

C. $\frac{1}{2} + \frac{1}{50(2x-1)} - \frac{8}{25(x+2)} - \frac{27}{25(x-3)}$

D. $\frac{1}{2} - \frac{1}{50(2x-1)} + \frac{8}{25(x+2)} - \frac{27}{25(x+3)}$

Answer: B

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23.

$$\frac{x^3}{(2x-1)(x+2)(x-3)} = A + \frac{B}{2x-1} + \frac{C}{x+2} + \frac{D}{x-3} \Rightarrow A =$$

A. $1/2$

B. $-1/50$

C. $-8/25$

D. $27/25$

Answer: A

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24. $\frac{x^3-5}{x^2-3x+2} =$

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

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

C. $x-3+\frac{4}{x-1}+\frac{3}{x-2}$

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

Answer: B

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25. If $\frac{x^2+x+1}{x^2+2x+1}=A+\frac{B}{x+1}+\frac{C}{(x+1)^2}$ then A - B =

A. 4C

B. 4C+1

C. 3C

D. 2C

Answer: D

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26. $\frac{(x-a)(x-b)}{(x-c)(x-d)}=\frac{A}{x-c}-\frac{B}{x-d}+C \Rightarrow C=$

A. 5

B. 4

C. 3

D. 1

Answer: D

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27. If $\frac{A}{x-1}+\frac{B}{x+1}=\frac{6x}{x^2-1}$, then A =

A. 0

B. 1

C. 2

D. 3

Answer: D

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28. $\frac{2x-1}{(x-1)(2x+3)} = \frac{1}{5(x-1)} - \frac{k}{5(2x+3)}$, then k =

A. 0

B. 1

C. 2

D. -8

Answer: D

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29. If $\frac{5x+6}{(2+x)(1-x)} = \frac{11}{3(1-x)} + y$ then y =

A. $\frac{-4}{3(2+x)}$

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

C. $\frac{2}{3(2-x)}$

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

Answer: A

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30. If $\frac{3x+4}{x^2-3x+2} = \frac{A}{x-2} - \frac{B}{x-1}$ then (A, B) =

A. (7, 10)

B. (10, 7)

C. (10, -7)

D. (-10, 7)

Answer: B

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31. If $\frac{2x+3}{(x+1)(x-3)} = \frac{a}{x+1} + \frac{b}{x-3}$, then a + b =

A. 1

B. 2

C. $9/4$

D. $-1/4$

Answer: B

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32. If $\frac{1}{(1-2x)(1+3x)} = \frac{A}{1-2x} + \frac{B}{1+3x}$, then 2B =

A. A

B. 2A

C. 3A

D. $-3A$

Answer: C

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33. $\frac{(x+1)}{(2x-1)(3x+1)} = \frac{A}{(2x-1)} + \frac{B}{(3x+1)} \Rightarrow 16A + 9B =$

A. 4

B. 5

C. 6

D. 8

Answer: C

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34. If $\frac{x^2 - 10x + 13}{(x-1)(x^2 - 5x + 6)} = \frac{A}{x-1} + \frac{B}{x-2} + \frac{C}{x-3}$, then C =

A. -3

B. 2

C. -4

D. 5

Answer: C

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35. If $\frac{x^2+x+1}{x^2+2x+1} = A + \frac{B}{x+1} + \frac{C}{(X+1)^2}$, then $A+B+C =$

A. 0

B. 1

C. 2

D. 3

Answer: B

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36. If $\frac{x^4}{(x-1)(x+2)} = \frac{1}{3(x-1)} - \frac{16}{3(x+2)} + x^2 - x + k$, then k =

A. 0

B. 1

C. 2

D. 3

Answer: D

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37. If $\frac{x^2+2}{(x^2+1)(x^2+3)} = \frac{Ax+B}{x^2+1} + \frac{Cx+D}{x^2+3}$ then $A+C+D=$

A. 0

B. 1

C. $1/2$

D. $2/3$

Answer: C

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38. If $\frac{3x+2}{(x+1)(2x^2+3)} = \frac{A}{x+1} + \frac{Bx+C}{2x^2+3}$, then $A+C-B=$

A. 0

B. 2

C. 3

D. 5

Answer: B

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39. If $\frac{1}{x^2-1} = \frac{1}{k}\left[\frac{1}{x-1} - \frac{1}{x+1}\right]$ then $k=$

A. 2

B. 3

C. 4

D. 5

Answer: A

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40. If $\frac{1}{9-x^2}=\frac{1}{k}\left[\frac{1}{3-x}+\frac{1}{3+x}\right]$ then $k=$

A. 2

B. 4

C. 6

D. 8

Answer: C

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41. If $\frac{3x}{(x-6)(x+a)}=\frac{2}{x-6}+\frac{1}{x+a}$ then $a=$

A. 1

B. 2

C. 3

D. 6

Answer: C

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42. If $\frac{3x}{(x-k)(x+1)} = \frac{2}{x-k} + \frac{1}{x+1}$, then $k =$

A. 8

B. 4

C. 16

D. 2

Answer: D

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43. If $\frac{5x}{(x-2)(x+k)} = \frac{2}{x-2} + \frac{3}{x+k}$ then $k =$

A. 0

B. 1

C. 3

D. -3

Answer: C

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44. If $\frac{2x+3}{(x-3)(x+k)} = \frac{9}{4(x-3)} - \frac{1}{4(x+k)}$ then $k =$

A. 0

B. 1

C. 2

D. -2

Answer: B

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45. If $\frac{3x-6}{(x-6)(x+k)} = \frac{2}{x-6} + \frac{1}{x+k}$ then $k =$

A. 0

B. 1

C. 3

D. -3

Answer: A

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46. If $\frac{x-4}{x^2-5x-2k} = \frac{2}{x-2} - \frac{1}{x+k}$, then $k =$

A. -3

B. -2

C. 2

D. 3

Answer: A

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47. If $\frac{x+1}{(x-a)(x-3)} = \frac{2}{x-a} + \frac{b}{x-3}$, then $(a, b) =$

A. (7, -1)

B. (-4, 1)

C. (4, 1)

D. (-4, -1)

Answer: A

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48. If $\frac{3x}{(x-a)(x-b)} = \frac{2}{x-a} + \frac{1}{x-b}$ then $a:b =$

A. $1:2$

B. $-2:1$

C. $1:3$

D. $3:1$

Answer: B

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49. $\frac{x^2+5x+7}{(x+1)^3} =$

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

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

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

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

Answer: C

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50. Resolve $\frac{x^4+24x^2+28}{(x^2+1)^3}$ into partial fractions.

A. $\frac{1}{x^2+1}+\frac{22}{(x^2+1)^2}+\frac{5}{(x^2+1)^3}$

B. $\frac{1}{x^2+1}+\frac{22}{(x^2+1)^2}-\frac{5}{(x^2+1)^2}$

C. $\frac{1}{x^2+1}-\frac{22}{(x^2+1)^2}-\frac{5}{(x^2+1)^2}$

D. $\frac{2}{x^2+1}-\frac{15}{(x^2+1)^2}+\frac{10}{(x^2+1)^2}$

Answer: A

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51. The partial fractions of $\frac{x^4+18x^2+22}{(x^2+2)^3}$ are

A. $\frac{1}{(x^2+2)^2}+\frac{14}{(x^2+5)^3}$

B. $\frac{1}{(x^2+2)}+\frac{14}{(x^2+2)^2}-\frac{10}{(x^2+2)^3}$

C. $\frac{1}{x+1}+\frac{5}{(x^2+3)^2}+\frac{11}{(x^2+2)^3}$

D. none

Answer: B

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52.

$$\frac{3x^2+x+1}{(x-1)^4}=\frac{a}{x-1}+\frac{b}{(x-1)^2}+\frac{c}{(x-1)^3}+\frac{d}{(x-1)^4}\Rightarrow\begin{bmatrix}a & b\\ c & d\end{bmatrix}=$$

A. $\begin{bmatrix}3 & 7\\ 5 & 0\end{bmatrix}$

B. $\begin{bmatrix}0 & 3\\ 7 & 5\end{bmatrix}$

C. $\begin{bmatrix}0 & 7\\ 3 & 5\end{bmatrix}$

D. $\begin{bmatrix}3 & 5\\ 7 & 0\end{bmatrix}$

Answer: B

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53. Resolve the following into partial fractions.

$$\frac{3x^2 - 8x^2 + 10}{(x-1)^4}$$

A. $\frac{3}{x-1} + \frac{1}{(x-1)^2} - \frac{7}{(x-1)^3} + \frac{5}{(x-1)^4}$

B. $\frac{3}{x-1} - \frac{1}{(x-1)^2} + \frac{7}{(x-1)^3} - \frac{5}{(x-1)^4}$

C. $\frac{3}{x-1} + \frac{1}{(x-1)^2} + \frac{7}{(x-1)^3} + \frac{5}{(x-1)^4}$

D. $\frac{3}{x-1} - \frac{1}{(X-1)^2} - \frac{7}{(x-1)^3} - \frac{5}{(x-1)^4}$

Answer: A

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54. The partial fractions of $\frac{2x^3 + 3x^2 + 5x + 7}{(x+1)^5}$ are

A. $\frac{2}{(x+1)^2} - \frac{5}{(x+1)^3} + \frac{3}{(x+1)^4} + \frac{2}{(x+1)^5}$

B. $\frac{3}{(x+1)^2} - \frac{2}{(x+1)^3} + \frac{5}{(x+1)^4} + \frac{3}{(x+1)^5}$

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

D. $\frac{2}{(x+1)^2} - \frac{3}{(x+1)^3} + \frac{5}{(x+1)^4} + \frac{3}{(x+1)^5}$

Answer: D

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55. If $\frac{x^2+5}{(x^2+2)^2} = \frac{1}{x^2+2} + \frac{k}{(x^2+2)^2}$ then $k =$

A. 1

B. 2

C. 3

D. 4

Answer: C

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56. If $\frac{x^2+2x+3}{x^3} = \frac{A}{x} + \frac{B}{x^2} + \frac{C}{x^3}$, then $A + B - C =$

A. 0

B. 1

C. 2

D. 3

Answer: A

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57. If

$$\frac{x^2-5x+7}{(x-1)^3} = \frac{A}{x-1} + \frac{B}{(x-1)^2} + \frac{C}{(x-1)^3} \text{ then } A + B - C =$$

A. 5

B. 3

C. 0

D. -5

Answer: D

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58. If $\frac{3x^2+x+1}{(x-1)^4} = \frac{A}{x-1} + \frac{B}{(x-1)^2} + \frac{C}{(x-1)^3} + \frac{D}{(x-1)^4}$ then $A+B$

A. 0

B. 15

C. 1

D. 10

Answer: C

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59. $\frac{x+1}{x^4(x+2)} = \frac{A}{x} + \frac{B}{x^2} + \frac{C}{x^3} + \frac{D}{x^4} + \frac{E}{x+2} \Rightarrow B + D + E =$

A. A+C

B. A-C

C. 2A+C

D. 2A+2C

Answer: A

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60. $\frac{1}{(x-1)^2(x+1)} =$

A. $\frac{1}{4(x+1)} - \frac{1}{4(x-1)} + \frac{1}{2(x-1)^2}$

B. $\frac{1}{4(x-1)} - \frac{1}{4(x+1)} + \frac{1}{2(x-1)^2}$

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

D. $\frac{1}{4(x+1)} - \frac{1}{4(x+1)} + \frac{1}{2(x-1)^2}$

Answer: A

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61. $\frac{x+1}{(x-1)^2(x-2)} =$

A. $\frac{3}{x-2} - \frac{3}{x-1} - \frac{2}{(x-1)^2}$

B. $\frac{2}{x-2} - \frac{3}{x-1} - \frac{2}{(x-1)^2}$

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

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

Answer: A

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

A. $\frac{11}{x+1} + \frac{9}{(x+1)^2} - \frac{11}{x} + \frac{4}{x^2}$

B. $\frac{4}{x+1}+\frac{11}{(x+1)^2}-\frac{9}{x}+\frac{11}{x^2}$

C. $\frac{9}{x+1}+\frac{4}{(x+1)^2}-\frac{11}{x}+\frac{4}{x^2}$

D. $\frac{11}{x+1}+\frac{9}{(x+1)^2}-\frac{11}{x}+\frac{4}{x^2}$

Answer: A

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63. $\frac{x^4+2}{(x-1)^2(x+1)}=$

A. $x+1+\frac{3}{4(x-1)}+\frac{3}{2(x-1)^2}+\frac{5}{4(x+1)}$

B. $x+1+\frac{5}{4(x-1)}+\frac{3}{2(x-1)^2}+\frac{5}{4(x+1)}$

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

D. $x+1+\frac{5}{4(x-1)}+\frac{5}{2(x-1)^2}+\frac{3}{4(x+1)}$

Answer: C

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64. Resolve the following into partial fractions.

$$\frac{2X^2 + 2x + 1}{x^3 + x^2}$$

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

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

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

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

Answer: D

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65. If

$$\frac{x^4 + 3x + 1}{(x+1)^2(x-1)} = Ax + B + \frac{C}{x+1} + \frac{D}{(x+1)^2} + \frac{E}{x-1} \text{ then } A + D$$

A. 2

B. 2

C. $3/2$

D. 0

Answer: C

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66. If $\frac{x^4+2}{(x-1)^2(x+1)} = Ax + B + \frac{C}{x-1} + \frac{D}{(x-1)^2} + \frac{E}{x+1}$ then $A + D$

A. 0

B. 1

C. $3/4$

D. $3/2$

Answer: B

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67. If $\frac{3x+4}{(x+1)^2(x-1)} = \frac{A}{x-1} + \frac{B}{x+1} + \frac{C}{(x+1)^2}$ then $A =$

A. $-1/2$

B. $15/4$

C. $7/4$

D. $-1/4$

Answer: C

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

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

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

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

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

Answer: C

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69. $\frac{42-19x}{(x^2+1)(x-4)} =$

A. $\frac{2x-11}{x^2-1} - \frac{2}{x+4}$

B. $\frac{2x-11}{x^2+1} - \frac{2}{x-4}$

C. $\frac{2x+11}{x^2+1} - \frac{2}{x+4}$

D. $\frac{2x+11}{x^2-1} - \frac{2}{x-4}$

Answer: B

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70. $\frac{x+2}{x(x^2+1)} =$

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

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

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

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

Answer: D

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71. Resolve the following into partial fractions.

$$\frac{2x-1}{(1-x-x^2)(x+2)}$$

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

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

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

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

Answer: C

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72. $\frac{3x+1}{1-x^3} =$

A. $\frac{4}{3(1+x)} + \frac{4x-1}{3(1+x-x^2)}$

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

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

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

Answer: C

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73. $\frac{1}{(x-a)(x^2+b)} =$

A. $\frac{1}{(a^2+b)(x-a)} + \frac{x+a}{(a^2-b)(x^2+b)}$

B. $\frac{1}{(a^2+b)(x+a)} - \frac{x+a}{(a^2+b)(x^2+b)}$

C. $\frac{1}{(a^2-b)(x+a)} + \frac{x+a}{(a^2+b)(x^2-b)}$

D. $\frac{1}{(a^2+b)(x-a)} - \frac{x+a}{(a^2+b)(x^2+b)}$

Answer: D

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74. $\frac{1}{x^4+1} =$

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

B. $\frac{x+\sqrt{2}}{2\sqrt{2}\left(x^2+\sqrt{2}x+1\right)} + \frac{\sqrt{2}-x}{2\sqrt{2}\left(x^2-\sqrt{2}x+1\right)}$

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

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

Answer: B

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75. $\frac{1}{x^4+x^2+1} =$

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

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

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

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

Answer: C

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76. If $\frac{1}{x^4+x^2+1}=\frac{Ax+B}{x^2+x+1}+\frac{Cx+D}{x^2-x+1}$ then $C+D=$

A. -1

B. 1

C. 2

D. 0

Answer: D

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77. If $\frac{2x+1}{(x-1)(x^2+1)} = \frac{A}{x-1} + \frac{Bx+C}{x^2+1}$ then $A+B+C=$

A. $1/4$

B. 3

C. $1/2$

D. 4

Answer: C

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78. If $\frac{2x^2+3x+4}{(x-1)(x^2+2)} = \frac{A}{x-1} + \frac{Bx+C}{x^2+2}$, then $B=$

A. 0

B. 1

C. -1

D. 2

Answer: C

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79. If $\frac{A}{x}+\frac{Bx}{x^2+1}=\frac{5x^2+2}{x^3+x}$, then $B=$

A. 1

B. 2

C. 3

D. 4

Answer: C

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80. If $\frac{(x+1)^2}{x^3+x}=\frac{A}{x}+\frac{Bx+C}{x^2+1}$ then $\sin^{-1}\left(\frac{A}{C}\right)=$

A. $\frac{\pi}{6}$

B. $\frac{\pi}{4}$

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

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

Answer: A

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81. $\frac{2x^3+x^2-5}{x^4-25} = \frac{Ax+B}{x^2-5} + \frac{Cx+1}{x^2+5} \Rightarrow (A, B, C) =$

A. (1, 1, 0)

B. (1, 0, 1)

C. (1, 2, 1)

D. (1, 1, 1)

Answer: B

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82. If $\frac{ax-1}{(1-x+x^2)(2+x)} = \frac{x}{1-x+x^2} - \frac{1}{2+x}$ then $a =$

A. 2

B. 3

C. -3

D. -2

Answer: B

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83. If $\frac{3x^3-2x^2-1}{x^4+x^2+1} = \frac{Ax+B}{x^2+x+1} + \frac{Cx+D}{x^2+kx+1}$ then $k =$

A. 0

B. 1

C. -1

D. 2

Answer: C

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84. $\frac{x}{(x-1)(x^2+1)^2} =$

A. $\frac{1}{4(x-1)} - \frac{x-1}{4(x^2+1)} + \frac{1+x}{2(x^2-1)^2}$

B. $\frac{1}{4(x+1)} - \frac{x+1}{4(x^2+1)} + \frac{1+x}{2(x^2-1)^2}$

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

D. $\frac{1}{4(x+1)} - \frac{x-1}{4(x^2+1)} + \frac{1-x}{2(x^2+1)^2}$

Answer: C

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

A. $\frac{1}{100(x-3)} - \frac{x+3}{100(x^2+1)} - \frac{x+3}{10(x^2+1)^2}$

B. $\frac{1}{100(x+3)} - \frac{x+3}{100(x^2+1)} - \frac{x+3}{10(x^2+1)^2}$

C. $\frac{1}{100(x-3)} - \frac{x+3}{100(x^2-1)} - \frac{x+3}{10(x^2-1)^2}$

D. $\frac{1}{100(x+3)} - \frac{x+3}{100(x^2-1)} - \frac{x+3}{10(x^2+1)^2}$

Answer: A

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

A. $\frac{x+1}{4(x^2+1)} + \frac{x+5}{2(x^2+1)^2} - \frac{1}{4(x-1)}$

B. $\frac{x+1}{4(x^2+1)} + \frac{x-5}{2(x^2+1)^2} - \frac{1}{4(x-1)}$

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

D. $\frac{x+1}{4(x^2-1)} + \frac{x+5}{2(x^2+1)^2} - \frac{1}{4(x-1)}$

Answer: A

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87. If $\frac{1}{(ax+b)(cx+d)} = \frac{A}{ax+b} + \frac{B}{cx+d}$ then $\frac{1}{(ax+b)^2(cx+d)} =$

A. $\frac{A}{(ax-b)^2} + \frac{AB}{ax-b} + \frac{B^2}{cx+d}$

B. $\frac{A}{(ax+b)^2} + \frac{AB}{ax-b} + \frac{B^2}{cx+d}$

C. $\frac{A}{(ax+b)^2} + \frac{AB}{ax+b} + \frac{B^2}{cx+d}$

D. $\frac{A}{(ax-b)^2} + \frac{AB}{ax+b} + \frac{B^2}{cx-d}$

Answer: C

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88. If $\frac{1}{(x-a)(x^2+b)} = \frac{A}{x-a} + \frac{Bx+C}{x^2+b}$ then $\frac{1}{(x-a)(x^2+b)^2} =$

A. $\frac{A^2}{x-a} + \frac{A(Bx+C)}{x^2+b} + \frac{Bx+C}{(x^2+b)^2}$

B. $\frac{A^2}{x+a} + \frac{A(Bx-C)}{x^2+b} + \frac{Bx+C}{(x^2-b)^2}$

C. $\frac{A^2}{x+a}+\frac{A(Bx+C)}{x^2+b}+\frac{Bx-C}{(x^2+b)^2}$

D. $\frac{A^2}{x-a}+\frac{A(Bx-C)}{x^2-b}+\frac{Bx+C}{(x^2-b)^2}$

Answer: A

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89. To find the coefficient of x^4 in the expansion of $\frac{3x}{(x-2)(x-1)}$, the interval in which the expansion is valid, is

A. $-2<x<\infty$

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

C. $-1<x<1$

D. $-\infty<x<\infty$

Answer: C

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90. The coefficient of x^3 in $\frac{5x+6}{(2+x)(1-x)}$ is

A. $15/2$

B. $15/4$

C. $5/2$

D. $5/4$

Answer: B

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91. If $|x|<1$ then the coefficient of x^2 in the expansion of $\frac{3x}{(x-2)(x+1)}$ is

A. $\frac{33}{32}$

B. $-\frac{33}{32}$

C. $\frac{31}{32}$

D. $-\frac{31}{32}$

Answer: B

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92. The coefficient of x^n in the expansion of $\frac{1}{x^2-5x+6}$ for $|x|<1$ is

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

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

C. $\frac{1}{2^{n+1}}-\frac{1}{3^{n-1}}$

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

Answer: C

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93. The coefficient of x^n in $\frac{x-4}{x^2-5x+6}$ is

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

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

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

D. $\frac{1}{5^{n+1}}+\frac{1}{3^n}$

Answer: A

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94. If $\frac{x-4}{x^2-5x+6}$ can be expanded in the ascending powers of x, then the coefficient of x^3 is

A. $\frac{-73}{648}$

B. $\frac{73}{648}$

C. $\frac{71}{648}$

D. $\frac{-71}{648}$

Answer: A

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95. The coefficient of x^n in $\frac{x}{(x-a)(x-b)}$ is

A. $\frac{a^n+b^n}{a-b} \cdot \frac{1}{a^n b^n}$

B. $\frac{a^n-b^n}{a-b} \cdot \frac{1}{a^n b^n}$

C. $\frac{a^n-b^n}{a+b} \cdot \frac{1}{a^n b^n}$

D. $\frac{a^n-b^n}{a-b} a^n b^n$

Answer: B

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96. The coefficient of x^n in $\frac{1}{(1-2x)(1-3x)}$ is

A. $3^{n+1}-2^{n+1}$

B. $3^{n+1}+2^{n+1}$

C. $3^{n+1}-2^{n-1}$

D. $3^{n-1}+2^{n-1}$

Answer: A

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97. For $|x| < \frac{1}{5}$, the coefficient of x^3 in the expansion of $\frac{1}{(1-5x)(1-4x)}$ is

A. 369

B. 370

C. 371

D. 372

Answer: A

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98. If the expansion in powers of x of the function $\frac{1}{(1-ax)(1-bx)}$ is $a_0 + a_1x + a_2x^2 + a_3x^3 + \ldots . + a_n$ then coefficient of x^n is

A. $\frac{a^{n+1}-b^{n+1}}{b-a}$

B. $\frac{b^{n+1}-a^{n+1}}{b-a}$

C. $\frac{b^n-a^n}{b-a}$

D. $\frac{a^n-b^n}{b-a}$

Answer: B

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99. The coefficient of x^n in $\frac{1}{(1-x)(1-2x)(1-3x)}$ is

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

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

C. $\frac{3^{n+2}-2^{n+3}-1}{2}$

D. $\frac{3^{n+2}+2^{n+3}+1}{2}$

Answer: A

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100. The coefficient of x^n in $\frac{(1+x)(1-2x)(1-3x)}{(1-x)(1-2x)(1-3x)}$ is

A. $12 - 30 \cdot 2^n + 20 \cdot 3^n$

B. $12 + 30 \cdot 2^n + 20 \cdot 3^n$

C. $12 + 30 \cdot 2^n - 20 \cdot 3^n$

D. $12 - 30 \cdot 2^n + 20 \cdot 3^n$

Answer: A

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101. The coefficient of x^n in $\frac{x+1}{(x-1)^2(x-2)}$ is

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

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

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

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

Answer: A

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102. The coefficient of x^n in $\frac{x+1}{(x-1)^2(x-2)}$ is

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

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

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

D. $1 + 2n - \frac{3}{2^{n-1}}$

Answer: A

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103. For $|x| < 1$, the constant term in the expansion of $\frac{1}{(x-1)^2(x-2)}$ is :

A. 2

B. 1

C. 0

D. $-1/2$

Answer: D

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104. The coefficient of x^5 in $\frac{x^2+1}{(x^2+4)(x-2)}$ is

A. $\frac{-1}{199}$

B. $\frac{-1}{198}$

C. $\frac{-1}{277}$

D. $\frac{-1}{256}$

Answer: D

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105. The coefficient of x^4 in $\frac{3x^2+2x}{(x^2+2)(x-3)}$ is

A. $\frac{75}{326}$

B. $\frac{77}{324}$

C. $\frac{66}{248}$

D. $\frac{58}{226}$

Answer: B

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Exercise 2 Set 1

1. The remainder obtained when the polynominal $1 + x + x^3 + x^9 + x^{27} + x^{81} + x^{243}$ is divided by x-1 is

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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2. I : The partial fractions of $\frac{2x+3}{(x+1)(x-3)}$ are $\frac{9}{4(x-3)} - \frac{1}{4(x+1)}$.

II : The partial fractions of $\frac{2}{(x+1)(x+3)}$ are $\frac{1}{x+1} - \frac{1}{x+3}$.

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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3. I : If $\frac{x^2+x+1}{x^2+2x+1} = A + \frac{B}{x+1} + \frac{C}{(x+1)^2}$ then $A+B+C=0.$

II : If $\frac{x^2+2x+3}{x^3} = \frac{A}{x} + \frac{B}{x}(2) + \frac{C}{x^3}$ then $A+B-C=0.$

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 $\frac{x^2+5x+7}{(x-1)^3} = \frac{A}{x-1} + \frac{B}{(x-1)^2} + \frac{C}{(x-1)^3}$ then the ascending order of A, B, C is

A. A, B, C

B. B, C, A

C. C, A, B

D. B, A, C

Answer: A

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2. If $\frac{2x^2+3x+4}{(x-1)(x^2+2)} = \frac{A}{x-1} + \frac{Bx+C}{x^2+2}$ then the ascending order of A, B, C is

A. A, B, C

B. B, C, A

C. C, A, B

D. B, A, C

Answer: B

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3. If $\frac{x^2+13x+15}{(2x+3)(x+3)^2}=\frac{A}{2x+3}+\frac{B}{x+3}+\frac{C}{(x+3)^2}$ then the descending order of A, B, C is

A. A, B, C

B. B, C, A

C. C, B, A

D. B, A, C

Answer: C

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Exercise 2 Set 3

1. Match the following.

I. If $\frac{3x}{(x-6)(x+k)} = \frac{2}{x-6} + \frac{1}{x+k}$ then $k =$	a) 0
II. If $\frac{3x-6}{(x-6)(x+k)} = \frac{2}{x-6} + \frac{1}{x+k}$ then $k =$	b) 3
III. If $\frac{x-4}{x^2-5x-2k} = \frac{2}{x-2} - \frac{1}{x+k}$ then $k =$	c) -1
IV. If $\frac{3x^3-2x^2-1}{x^4+x^2+1} = \frac{Ax+B}{x^2+x+1} + \frac{Cx+D}{x^2+kx+1}$ then $k =$	d) -3

A. c, d, a, b

B. b, a, d, c

C. c, a, b, d

D. c, b, a, d

Answer: B

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2. Match the following.

I. If $\frac{5x^2+2}{x^3+x} = \frac{A}{x} + \frac{Bx}{x^2+1}$ then $B =$	a) 2
II. If $\frac{4x}{x^2-1} = \frac{A}{x-1} + \frac{B}{x+1}$ then $A =$	b) 3
III. If $\frac{3x+2}{2-x-x^2} = \frac{A}{2+x} + \frac{B}{1-x}$ then $A =$	c) $-3/2$
IV. If $\frac{2x+1}{(x-1)(x^2+1)} = \frac{A}{x-1} + \frac{Bx+C}{x^2+1}$ then $B =$	d) $-4/3$

A. c, d, a, b

B. b, a, d, c

C. c, a, b, d

D. c, b, a, d

Answer: B

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3. If

$$\frac{2x^3+3x^2+5x+7}{(x+1)^5} = \frac{A}{(x+1)^2} + \frac{B}{(x+1)^3} + \frac{C}{(x+1)^4} + \frac{D}{(x+1)^5}$$

then match the following.

$I.\ A =$ a) -3
$II.\ B =$ b) 2
$III.\ C =$ C) 3
$IV.\ D =$ d) 5

A. c, d, a, b

B. b, a, d, c

C. c, a, b, d

D. c, b, a, d

Answer: B

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Exercise 2 Set 4

1. A : If $\frac{5x+1}{(x+2)(x-1)} = \frac{A}{X+2} + \frac{B}{x-1}$ then $A = 3, B = 2.$

R : $\frac{px+q}{(x-a)(x-b)} = \frac{pa+q}{(x-a)(a-b)} + \frac{pb+q}{(b-a)(x-b)}.$

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 : If $\frac{1}{(x-2)(x^2+1)} = \frac{A}{x-2} + \frac{Bx+C}{x^2+1}$ then $A = \frac{1}{5}, B = -\frac{1}{5}, C = -$

.

R : $\frac{1}{(x-a)(x^2+b)} = \frac{1}{a^2+b}\left[\frac{1}{x-a} - \frac{x+a}{x^2+b}\right]$

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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