32. PARTIAL FRACTIONS

1. Reduction of proper fraction $\frac{f(x)}{g(x)}$ into a sum of partial fraction depends up on factorization of _____ **[AP EAMCET 21-09-20_Shift-1]**
   1. f(x) alone
   2. g(x) alone
   3. both f(x) and g(x)
   4. factors of f(x) and g(x)

2. If $\frac{x+1}{(2x-1)(3x+1)}=\frac{A}{2x-1}+\frac{B}{3x+1}$ then 16A+9B = **[AP EAMCET 22-09-20_Shift-2]**
   1. 4
   2. 5
   3. 6
   4. 8

3. If $\frac{x^2+5x+7}{(x-3)^3}=\frac{A}{(x-3)}+\frac{B}{(x-3)^2}+\frac{C}{(x-3)^3}$ then $9A-3B+C=$ **[AP EAMCET 23-09-20_Shift-1]**
   1. 2
   2. 5
   3. 7
   4. 9

4. If the partial fraction decomposition of $\frac{x^2+1}{x^3+3x^2+3x+2}$ is $\frac{A}{x+2}+\frac{B}{x^2+x+1}+\frac{C}{(x+2)(x^2+x+1)}$, then $A-B+C=$ **[TS EAMCET 09-09-20_Shift-1]**
   1. 0
   2. 2
   3. 3
   4. 4

5. If $\frac{x^4+3x+1}{(x+1)^2(x-1)}=Ax+B+\frac{C}{x+1}+\frac{D}{(x+1)^2}+\frac{E}{x-1}$ Then $A+B+C+D+E=$ **[TS EAMCET 09-09-20_Shift-2]**
   1. $\frac{3}{2}$
   2. $\frac{9}{2}$
   3. $\frac{5}{2}$
   4. 0

6. If $\frac{4x^2+5x^4+7}{(x^2+1)(x^4+x^2+1)}=\frac{Ax+B}{x^2+1}+\frac{Cx^3+Dx^2+Ex+F}{x^4+x^2+1}$, Then $B+2(D+F+E)-C.A$ **[TS EAMCET 10-09-20_Shift-1]**
   1. 0
   2. 2
   3. 1
   4. -3

7. If $\frac{2x+1}{(x-1)^2(x^2+1)}=\frac{A}{x-1}+\frac{B}{(x-1)^2}+\frac{Cx+D}{x^2+1}$ then $A+B+C+D=$ **[TS EAMCET 10-09-20_Shift-2]**
   1. 1
   2. 2
   3. $\frac{3}{4}$
   4. $\frac{1}{2}$

8. If $\frac{1}{x^4+x^2+1}=\frac{Ax+B}{x^2+x+1}+\frac{Cx+D}{x^2-x+1}$, then $\cos^{-1}(A+B+C+D)=$ **[TS EAMCET 11-09-20_Shift-1]**
   1. $\frac{\pi}{2}$
   2. 0
   3. $\frac{\pi}{6}$
   4. $\frac{\pi}{3}$

9. If the partial fractions decomposition of $\frac{x^4+24x^2+28}{(x^2+1)^3}$ is $\frac{A}{x^2+1}+\frac{B}{(x^2+1)^2}+\frac{C}{(x^2+1)^3}$ then B – 2A + C= **[TS EAMCET 11-09-20_Shift-2]**
   1. 23
   2. 24
   3. 25
   4. 26

10. If $\frac{x^5-5}{x^3+x^2}=f(x)+\frac{A}{x}+\frac{B}{x^2}+\frac{C}{x+1}$, then the larger value of K for which $f(K)+A+B+C=1$, is **[TS EAMCET 14-09-20_Shift-2]**
    1. 3
    2. 2
    3. -2
    4. 4

11. If $\frac{x^4}{(x-1)(x-2)}=f(x)+\frac{A}{x-1}+\frac{B}{x-2}$, then **[AP EAMCET 19-08-2021_Shift-1]**
    1. $f(x)=x^2-3x+7$
    2. $f(x)=x^2+3x+7$
    3. $A+B=17$
    4. $A-B=-18$

12. Which of the following is a partial fraction of $\frac{-x^2+6x+13}{(3x+5)(x^2+4x+4)}=$ **[AP EAMCET 19-08-2021_Shift-2]**

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

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

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

[AP EAMCET 20-08-2021_Shift-1]

1. 5 2. -5

3. -3 4. 3

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

[AP EAMCET 23-08-2021_Shift-1]

1. $\frac{1}{2}$ 2. $\frac{-1}{50}$

3. $\frac{-8}{25}$ 4. $\frac{27}{25}$

15. Which of the following is an improper rational fraction? **[AP EAMCET 24-08-2021_Shift-1]**

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

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

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

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

16. If $\frac{6x^3+7x^2+6x-3}{(x-1)(x+3)(x^2+1)}=\frac{A}{x-1}+\frac{B}{x+3}+\frac{Cx+D}{x^2+1}$ and $n=A+B+C+D$ and ${}^{50}C_n={}^{50}C_r$ then $r=$ _____

[AP EAMCET 24-08-2021_Shift-2]

1. 40 2. 43

3. 35 4. 42

17. If $\frac{x}{(1+x^2)(3-2x)}=\frac{Bx+C}{1+x^2}+\frac{A}{3-2x}$, then 'C' is **[AP EAMCET 25-08-2021_Shift-1]**

1. $\frac{2}{3}$ 2. $\frac{1}{13}$

3. $\frac{-1}{13}$ 4. $\frac{-2}{13}$

18. The partial fraction of $\frac{x^2}{x^2+3x-4}$ is _____

[AP EAMCET 25-08-2021_Shift-2]

1. $1+\frac{-16}{5(x+4)}+\frac{1}{5(x-1)}$

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

3. $1+\frac{-13}{5(x+4)}+\frac{1}{5(x-1)}$

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

19. If $\frac{2x^4-x^3+3x^2-x+4}{x^2-3x+2}=f(x)+\frac{A}{x-1}+\frac{B}{x-2}$ then **[AP EAMCET 20-08-2021_Shift-2]**

1. $f(x)=2x^2+5x+14, A+B=39$

2. $f(x)=2x^2-5x+14, A+B=31$

3. $f(x)=2x^2+5x+14, A+B=31$

4. $f(x)=2x^2+5x+14, A=4, B=35$

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

[AP EAMCET 23-08-2021_Shift-1]

1. $\frac{7}{19}$ 2. $\frac{8}{19}$

3. $\frac{9}{19}$ 4. $\frac{10}{19}$

21. If $\frac{9x-7}{(x+3)(x^2+1)}=\frac{A}{x+3}+\frac{Bx+C}{x^2+1}$ where $A,B,C\in R$, then $A+B+C=$

[TS EAMCET 04-08-2021_Shift-2]

1. $\frac{17}{5}$ 2. $\frac{-6}{5}$

3. $\frac{6}{5}$ 4. $\frac{-17}{5}$

22. For any quadratic polynomial $f(x)$, it is true that $f(x)=f(a)+f'(a)(x-a)+\frac{f''(a)}{2!}(x-a)^2$, where a is any real number. If $\frac{3x^2+4x+7}{(x-2)^3}=\frac{A}{(x-2)^3}+\frac{B}{(x-2)^2}+\frac{C}{(x-2)}$ and $g(x)=3x^2+4x+7$ then $A+B+C=$

[TS EAMCET 04-08-2021_Shift-1]

1. $g(2)+g'(2)+g''(2)$

2. $g''(2)+2g(2)+\frac{g'(1)}{2!}$

3. $g(2)+g'(2)+\frac{g''(2)}{2!}$

4. $2g(2)+2g'(2)+\frac{g''(2)}{2!}$

23. If $\frac{1}{(x-1)(x-2)(x-3)}=\frac{A}{(x-1)}+\frac{B}{(x-2)}+\frac{C}{x-3}$, and $\frac{x}{(x-1)(x-2)(x-3)}=\frac{P}{(x-1)}+\frac{Q}{(x-2)}+\frac{R}{x-3}$ then $A+2B+3C=$

[TS EAMCET 05-08-2021_Shift-1]

1. $P+Q+R$ 2. $P+2Q+3R$

3. $3P+2Q+R$ 4. $AP+BQ+CR$

24. The partial fraction decomposition of $\frac{9x-7}{(x+3)(x^2+1)}$ is

[TS EAMCET 05-08-2021_Shift-2]

1. $\frac{17}{5(x+3)}-\frac{(17x-6)}{5(x^2+1)}$ 2. $\frac{-17}{5(x+3)}-\frac{(17x-6)}{5(x^2+1)}$

3. $\frac{17}{5(x+3)}+\frac{(17x-6)}{5(x^2+1)}$ 4. $\frac{-17}{5(x+3)}+\frac{(17x-6)}{5(x^2+1)}$

25. The partial fraction decomposition of $\frac{3x+1}{(x-1)^2(x+2)}$ is

[TS EAMCET 06-08-2021_Shift-2]

1. $\frac{4}{3}\frac{1}{(x-1)^2}+\frac{5}{9}\frac{1}{(x-1)}+\frac{5}{9}\frac{1}{x+2}$

2. $\frac{-5}{9}\left(\frac{1}{x+2}\right)+\frac{4}{3}.\frac{1}{(x-1)^2}+\frac{2}{x-1}$

3. $\frac{-5}{9}\left(\frac{1}{x+2}\right)+\frac{5}{9}.\frac{1}{x-1}+\frac{4}{3}.\frac{1}{(x-1)^2}$

4. $\frac{-5}{9}\left(\frac{1}{x+2}\right)+\frac{5}{9}\left(\frac{1}{x-1}\right)+\frac{2}{(x-1)^2}$

26. If $\frac{32x^2+186x}{(x^2+1)(x+5)}=\frac{37x+1}{x^2+1}+\frac{\lambda}{x+5}$, then $\frac{\lambda}{2}=$

[TS EAMCET 06-08-2021_Shift-1]

1. -5 2. $\frac{-7}{2}$

3. $\frac{-3}{2}$ 4. $\frac{-5}{2}$

27. If $\frac{x^4+24x^2+28}{(x^2+1)^3}=\frac{Ax+B}{x^2+1}+\frac{Cx+D}{(x^2+1)^2}+\frac{Ex+F}{(x^2+1)^3}$ then the value of $A+B+C+D+E+F=$

[AP EAMCET 04-07-2022_Shift-1]

1. 21 2. 22

3. 28 4. 29

28. *If* $\frac{13x+43}{2x^2+17x+30}=\frac{A}{2x+5}+\frac{B}{x+6}$, *then* $A^2+B^2=$

[AP EAMCET 04-07-2022_Shift-2]

1. 22/3 2. 52

3. 34 4. 18/5

29. $\frac{2x^2+1}{x^3-1}=\frac{A}{x-1}+\frac{Bx+C}{x^2+x+1}\Rightarrow 7A+2B+C=$

[AP EAMCET 05-07-2022_Shift-1]

1. 8 2. 9

3. 10 4. 11

30. If the equivalent partial fraction of $\frac{x^3}{(2x-1)(x+2)(x-3)}$ is of the form

$A+\frac{B}{2x-1}+\frac{C}{x+2}+\frac{D}{x-3}$ then the value of A + B + C=

[AP EAMCET 05-07-2022_Shift-2]

1. –8/25
2. 4/25
3. –1/50
4. 1/2

31. If we resolve the rational fraction $\frac{1}{(1-2x)^2(1-3x)}$ in to partial fractions of the form $\frac{A}{1-3x}+\frac{B}{1-2x}+\frac{C}{(1-2x)^2}$ then what is the min {A, B, C}=

[AP EAMCET 06-07-2022_Shift-1]

1. 1
2. 9
3. –2
4. –6

32. If the equivalent partial fraction of $\frac{x^3}{(2x-1)(x+2)(x-3)}$ is given by $A+\frac{B}{2x-1}+\frac{C}{x+2}+\frac{D}{x-3}$, then the value of C is **[AP EAMCET 06-07-2022_Shift-2]**

1. 1/2
2. -1/50
3. -8/25
4. 27/25

33. If $\frac{4x^3+16x+7}{(x^2+4)^2}=\frac{Ax+B}{x^2+4}+\frac{Cx+D}{(x^2+4)^2}$, then the number of non-zero values in A,B,C,D is

[AP EAMCET 07-07-2022_Shift-1]

1. 1
2. 2
3. 3
4. 4

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

[AP EAMCET 07-07-2022_Shift-2]

1. $\frac{Ax+B}{x^2+1}+\frac{Cx+D}{x^2+3}$ for some A,B,C,D $\in R\setminus\{0\}$
2. $\frac{Ax+B}{x^2+1}+\frac{Cx}{x^2+1}$ *for some* $A,B,C\in R\setminus\{0\}$
3. $\frac{Ax}{x^2+1}+\frac{Bx}{x^2+3}$ *for some* $A,B\in R\setminus\{0\}$
4. $1+\frac{Ax+B}{x^2+1}+\frac{Cx+D}{x^2+3}$ *for some* $A,B,C,D\in R$

35. If $\frac{x}{(x-1)(x^2+1)^2}=\frac{1}{4}\left[\frac{1}{x-1}-\frac{x+1}{x^2+1}\right]+y$, then y =

[AP EAMCET 08-07-2022_Shift-1]

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

36. $\frac{x^2+1}{x^4+4}=\frac{Ax+B}{x^2-2x+2}+\frac{Cx+D}{x^2+2x+2}\Rightarrow 3A+2B+3C=$

[AP EAMCET 08-07-2022_Shift-2]

1. -D
2. D
3. 2D
4. -2D

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

[TS EAMCET 18-07-2022_Shift-1]

1. 1
2. 0
3. -1
4. 5

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

[TS EAMCET 18-07-2022_Shift-1]

1. 3
2. 2
3. 0
4. 1

39. If $\int\frac{x+3}{(x-1)^2(2x-1)}dx=\frac{A}{x-1}+B\log(2x-1)+C\log(x-1)+K$ then A + B + C =

[TS EAMCET 18-07-2022_Shift-2]

1. 3
2. 11
3. - 4
4. - 11

40. If $\frac{x^2+7}{(x^2+1)(x-2)}=\frac{A}{x-2}+\frac{Bx+C}{x^2+1}$, then the determinant of the matrix $\begin{pmatrix}A & B\\ C & \frac{2}{5}\end{pmatrix}$ is

[TS EAMCET 18-07-2022_Shift-2]

1. 5
2. -5
3. $\frac{94}{25}$
4. -2

41. If $\frac{42-13x}{x^2+x-6}=\frac{A}{lx+m}+\frac{B}{px+q}$ where $lm>0$ and $pq<0$ then $\frac{Alp}{Bmq}=$

[TS EAMCET 19-07-2022_Shift-I]

1. $\frac{27}{32}$
2. $\frac{27}{8}$
3. $\frac{8}{243}$
4. $\frac{243}{32}$

42. If $\frac{3x+5}{(x+1)(2x^2+3)}=\frac{A}{x+1}+\frac{Bx+C}{2x^2+3}$ and $f(x)=Ax^3+Bx^2+7x+C$, then $5C-f'(-2)=$

[TS EAMCET 19-07-2022_Shift-I]

1. 19
2. 15
3. 4
4. 34

43. *If* $\frac{d}{dx}\left(\frac{2x+1}{(x+1)^2(x-2)}\right)=\frac{A}{(x-2)^2}+\frac{B}{(x+2)^3}+\frac{C}{(x+1)^2}$ *then* $A+B+C$

[TS EAMCET 19-07-2022_Shift-2]

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

44. *If* $\frac{x^2-2}{(x^2+1)(x^2+3)}=\frac{Ax+B}{x^2+1}+\frac{Cx+D}{x^2+3}$ *then* $D=$

[TS EAMCET 19-07-2022_Shift-2]

1. $\frac{-3}{2}$
2. $\frac{-1}{2}$
3. 2
4. $\frac{5}{2}$

45. If $\frac{2x^2-3x+5}{(x-7)^3}=\frac{A}{x-7}+\frac{B}{(x-7)^2}+\frac{C}{(x-7)^3}$, then 2A−3B+C =

[TS EAMCET 20-07-2022_Shift-1]

1. 0
2. 27
3. 11
4. 15

46. If $\frac{3x^2+ax+3}{(2x+3)(x^2+2)}=\frac{3}{2x+3}+\frac{Bx+C}{x^2+2}$ then a(B+C)=

[TS EAMCET 20-07-2022_Shift-1]

1. −2
2. 3
3. −3
4. 2

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

[TS EAMCET 20-07-2022_Shift-2]

1. 3 B
2. 2 B
3. 0
4. B

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

[TS EAMCET 20-07-2022_Shift-2]

1. 0
2. 1
3. −1
4. 2

49 If $\frac{2x^2+5x+6}{(x+2)^3}=\frac{a}{x+2}+\frac{b}{(x+2)^2}+\frac{c}{(x+2)^3}$, then a.b + b.c + c.a = **[15th May 2023 Shift 1]**

1. 28
2. 14
3. -10
4. -8

50 If $\frac{x+2}{x^2-3}$ is one of the partial fractions of $\frac{3x^3-x^2-2x+17}{x^4+x^2-12}$, then the other partial fraction of it is **[15th May 2023 Shift 2]**

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

51 *If* $\frac{x^4-6x^3+9x^2+5x-20}{x^2-x-2}$

$f(x)+\frac{a}{x+p}+\frac{b}{x+q}$

then 2 (a +b) **[16th May 2023 Shift 1]**

1. f(7) 2. f(6)
3. f(5) 4. f(4)

52 If $\frac{-x^2+6x+1}{(x-1)^2(x^2+2)}=\frac{A}{x-1}+\frac{B}{(x-1)^2}+\frac{Cx-3}{x^2+2}$, then A+B+C=

[16th May 2023 Shift 2]

1. 7 2. 5
3. 3 4. 2

53 If $\frac{17x-2}{12x^2-x-20}=\frac{A}{ax+5}+\frac{B}{3x+b}$ then a.A+b.B= **[17th May 2023 Shift 1]**

1. 0 2. 4
3. 7 4. 10

54 If $\frac{6x^3+7x^2-14x+11}{6x^3+x^2-10x+3}=a+\frac{b}{x+p}+\frac{c}{qx+3}+\frac{d}{3x+p}$

then $\frac{a+b}{p+q}=$ **[17th May 2023 Shift 2]**

1. 2 2. 3
3. $-\frac{2}{5}$ 4. $\frac{2}{3}$

55 If $\frac{x^2-7x+2}{x^4+3x^2+4}=\frac{Ax+B}{x^2+ax+2}+\frac{Cx+D}{x^2+bx+2}$ and a > b, then B+D= **[18th May2023 shift -1]**

1. a +b 2. 2a + b
3. a + 2b 4. a – b

56 Let x be a real number and -2<x<2. When $\frac{x+1}{(x+3)(x-2)}$ is expanded in powers of x, then the coefficient of x^3 is **[18th May 2023 Shift 2]**

1. $-\frac{55}{1296}$ 2. $-\frac{97}{216}$
3. $-\frac{13}{216}$ 4. $-\frac{119}{1800}$

57 *if* $\frac{k}{kx+3}+\frac{3}{3x-k}=\frac{12x+5}{(kx+3)(3x-k)}, \forall x\in R-\left\{\frac{-3}{k},\frac{k}{3}\right\}$, then both the roots of the equation $kx^2-7x+3=0$ are **[19th May 2023 Shift 1]**

1. Rational numbers 2. Irrational numbers
3. Complex numbers 4. Integers

58 If $\frac{x^4}{(x-1)(x-2)(x-3)}=p(x)+\frac{A}{x-1}+\frac{B}{x-2}+\frac{C}{x-3}$, *then* $p\left(\frac{3}{2}\right)+C=$

[12TH MAY 2023 SHIFT-1]

1. 0 2. 8
3. $-\frac{17}{2}$ 4. 48

59 If $\frac{x+1}{\left(x^2+1\right)(x-1)^2}=\frac{Ax+B}{x^2+1}+\frac{C}{(x-1)}+\frac{D}{(x-1)^2}$, then $A+B+C+D=$

[12TH MAY 2023 SHIFT -2]

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

60 If $\frac{6x^4+13x^3+2x^2-x+3}{2x^2+3x-2}=f(x)+\frac{A}{ax-1}+\frac{B}{x+b}$, *then* $f(1)+a.B+b.A=$

[13TH MAY 2023 SHIFT-1]

1. 8 2. 12
3. 4 4. 6

61 If $\frac{3x+2}{(x+1)\left(2x^2+3\right)}=\frac{A}{x+1}+\frac{Bx+C}{2x^2+3}$, *then* A-B+C = **[EAPCET 14-05-23 SHIFT-1]**

1. 2 2. 1
3. 3 4. 6

62 If $\frac{2x^3+3x^2+3x+5}{\left(x^2+1\right)\left(x^2+2\right)}$ is expanded in terms of the powers of x, then the coefficient of x^5 is **[EAPCET 13-05-23 SHIFT-2]**

1. 0 2. $-\frac{5}{4}$
3. $\frac{17}{8}$ 4. $\frac{9}{8}$

KEY

1)	2	**2)**	3	**3)**	3	**4)**	4	**5)**	3
6)	1	**7)**	4	**8)**	2	**9)**	3	**10)**	1

11)	2	**12)**	2	**13)**	2	**14)**	1	**15)**	4
16)	4	**17)**	4	**18)**	1	**19)**	3	**20)**	2
21)	2	**22)**	3	**23)**	1	**24)**	4	**25)**	3
26)	4	**27)**	3	**28)**	3	**29)**	2	**30)**	2
31)	4	**32)**	3	**33)**	2	**34)**	4	**35)**	1
36)	3	**37)**	3	**38)**	4	**39)**	3	**40)**	4
41)	1	**42)**	3	**43)**	1	**44)**	4	**45)**	3
46)	4	**47)**	4	**48)**	4	**49)**	3	**50)**	3
51)	4	**52)**	4	**53)**	2	**54)**	1	**55)**	2
56)	1	**57)**	1	**58)**	4	**59)**	2	**60)**	1
61)	1	**62)**	4						

SOLUTIONS

1. From concept i.e., g(x) alone

2. $\dfrac{x+1}{(2x-1)(3x+1)}=\dfrac{A}{2x-1}+\dfrac{B}{3x+1}$

$x+1=A(3x+1)+B(2x-1)$

$\Rightarrow A=\dfrac{3}{5},B=\dfrac{-2}{5}$

$\therefore 16A+9B=6$

3. $x^2+5x+7=A(x-3)^2+B(x-3)+C$

$A=1,\ -3A+B=5\Rightarrow B=8$

$9A-3B+C=7$

4. $X^2+1=A(x^2+x+1)+B(x+2)+C$

A=1 A+B=0 A+2B+C=1

B=-1 1-2+C=1

C=2

A-B+C=1+1+2=4

5. $\dfrac{x^4+3x+1}{(x+1)^2(x-1)}=x-1+\dfrac{C}{x+1}+\dfrac{D}{(x+1)^2}+\dfrac{E}{(x-1)}$

$x^4+3x+1=(x+1)^2(x-1)^2+$

$C(x+1)(x-1)+D(x-1)+E(x+1)^2$

A=1,B=-1,C=3/4,D=1/2,E=5/4

A+B+C+D+E=1-1+3/4+1/2+5/4=5/2

6. $4x^2+5x^4+7=(Ax+B)(x^4+x^2+1)+$

$(Cx^3+Dx^2+Ex+F)(x^2+1)$

Comparing like coefficients on both sides, we get

$A=0,\mathrm{B}=8,\mathrm{C}=0,\mathrm{D}=-3,\mathrm{E}=0,\mathrm{F}=-1$

$B+2(D+F+E)-C.A=0$

7. $2x+1=A(x-1)(x^2+1)+B(x^2+1)+(Cx+D)(x-1)^2$

Comparing $x^3,x^2,x,$constant terms on both sides, we get

$A=\dfrac{-1}{2},B=\dfrac{3}{2},C=\dfrac{1}{2},D=-1$

$A+B+C+D=\dfrac{1}{2}$

8. given $\dfrac{1}{x^4+x^2+1}=\dfrac{Ax+B}{x^2+x+1}+\dfrac{Cx+D}{x^2-x+1}$,

by simplifying weget

$A=\dfrac{1}{2},B=\dfrac{1}{2},C=\dfrac{-1}{2}\ and\ D=\dfrac{1}{2}$

$\cos^{-1}(A+B+C+D)=\cos^{-1}(1)=0$

9. Put

$x^2+1=y\Rightarrow x^2=y-1$

$\dfrac{(y-1)^2+24(y-1)+28}{y^3}=\dfrac{y^2-2y+1+24y-24+28}{y^3}$

$=\dfrac{y^2+22y+5}{y^3}=\dfrac{1}{y}+\dfrac{22}{y^2}+\dfrac{5}{y^3}$

$\dfrac{x^4+24x^2+28}{(x^2+1)^3}=\dfrac{1}{x^2+1}+\dfrac{22}{(x^2+1)^2}+\dfrac{5}{(x^2+1)^3}$

$A=1,B=22,C=5$

$B-2A+C=22-2+5=25$

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

$\dfrac{-x^2-5}{x^3+x^2}=\dfrac{A}{x}+\dfrac{B}{x^2}+\dfrac{C}{x+1}$

$-x^2-5=Ax(x+1)+B(x+1)+cx^2$

$A=5,B=-5,C=6$

$f(k)+A+B+C=1$

$f(k)=7$

$k^2-k-6=0\Rightarrow k=3,-2$

11. $\dfrac{x^4}{(x-1)(x-2)}=x^2+3x+7-\dfrac{1}{x-1}+\dfrac{16}{x-2}$

12. $\dfrac{-x^2+6x+13}{(3x+5)(x+2)^2}=\dfrac{A}{3x+5}+\dfrac{B}{x+2}+\dfrac{C}{(x+2)^2}$

$A=-2, B=-1, C=3$

13. $3x-2=A(x+1)(x+3)+B(x+3)+C(x+1)^2$

$A=\frac{11}{4}; B=-\frac{5}{2}; C=\frac{-11}{4}$

$4A+2B+4C=11-5-11=-5$

14. $A=\frac{x^3 \text{ Coefficient in numerator}}{x^3 \text{ Coefficient in denominator}}=\frac{1}{2}$

15. If the degree of the numerator is greater than or equal to degree of denominator then it is improper fraction.

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

16. $\frac{6x^3+7x^2+6x-3}{(x-1)(x+3)(x^2+1)}=\frac{A}{x-1}+\frac{B}{x+3}\frac{Cx+D}{x^2+1}$

$A=2, B=3, C=1, D=2$

$n=A+B+C+D=8$

$50_{C_n}=50_{C_r} \Rightarrow 50_{C_8}=50_{C_r}$

$r=8\ (or)\ 50=r+8$

$\Rightarrow r=42$

17. $\frac{x}{(1+x^2)(3-2x)}=\frac{Bx+C}{1+x^2}+\frac{A}{3-2x}$

$x=(Bx+C)(3-2x)+A(1+x^2)$

Compare x^2, x, constant terms on both sides

$A-2B=0 \quad 3B-2C=1 \quad 3C+A=0$

On solving we get $C=\frac{-1}{13}$

18. $\frac{x^2}{x^2+3x-4}=1+\frac{A}{x+4}+\frac{B}{x-1}$

$x^2=x^2+3x-4+A(x-1)+B(x+4)$

put $x=1$

$\Rightarrow 1=1+3-4+A(0)+B(5)$

$B=\frac{1}{5}$

put $x=-4$

$16=16-12-4+A(-5)+B(0)$

$\frac{16}{-5}=A$

$\frac{x^2}{x^2+3x-4}=1-\frac{16}{5(x+4)}+\frac{1}{5(x-1)}$

19. $x^2-3x+2\overline{)2x^4-x^3+3x^2-x+4}\ (2x^2+5x+14$

$2x^4-6x^3+4x^2$

$5x^3-x^2-x$

$5x^3-15x^2+10x$

$14x^2-11x+4$

$14x^2-42x+28$

$31x-24$

$\frac{2x^4-x^3+3x^2-x+4}{x^2-3x+2}=2x^2+5x+14+\frac{31x-24}{(x-1)(x-2)}$

Again $\frac{31x-24}{(x-1)(x-2)}=\frac{A}{x-1}+\frac{B}{x-2}$

$A=\frac{31(1)-24}{1-2}=\frac{7}{-1}=-7$

$B=\frac{62-24}{1}=38$

$A+B=-7+38=31$

20. $\frac{1}{(3-5x)(2+3x)}=\frac{A}{3-5x}+\frac{B}{2+3x}$

$A=\frac{1}{2+3\left(\frac{3}{5}\right)}=\frac{5}{19}$

$B=\frac{1}{3-5\left(-\frac{2}{3}\right)}=\frac{3}{9+10}=\frac{3}{19}$

$A+B=\frac{8}{19}$

21. $\frac{9x-7}{(x+3)(x^2+1)}=\frac{A}{x+3}+\frac{Bx+C}{x^2+1}$

$9x-7=A(x^2+1)+(Bx+C)(x+3)$

Comparing and solve we get

$A+B=0, C=-6/5$

$A+B+C=-6/5$

22. $$= \frac{12+3t^2+12t+4t+8+7}{t^3}$$

$$= \frac{3t^2+16t+27}{t^3}$$

$$= \frac{27}{t^3}+\frac{16}{t^2}+\frac{3}{t}$$

$$= \frac{27}{(x-2)^3}+\frac{16}{(x-2)^2}+\frac{3}{x-2}$$

$A = 27, B = 16, C = 3$

$A + B + C = 46$

$$g(2)+g^1(2)+\frac{g^{11}(2)}{2!}$$

$= 27+16+3$

23. Given $\frac{1}{(x-1)(x-2)(x-3)} = \frac{A}{(x-1)}+\frac{B}{(x-2)}+\frac{C}{x-3}$

$\Rightarrow 1 = A(x-2)(x-3)+B(x-1)(x-3)+C(x-1)(x-2)$

$$\Rightarrow A = \frac{1}{2}, B = -1, C = \frac{1}{2}$$

And also given that,

$$\frac{x}{(x-1)(x-2)(x-3)} = \frac{P}{(x-1)}+\frac{Q}{(x-2)}+\frac{R}{x-3}$$

$\Rightarrow x = P(x-2)(x-3)+Q(x-1)(x-3)+R(x-1)(x-2)$

$\Rightarrow P = \frac{1}{2}, R = \frac{3}{2}, Q = -2$

Now, $A+2B+3C = 0 = P+Q+R$

24. $$\frac{9x-7}{(x+3)(x^2+1)} = \frac{A}{x+3}+\frac{Bx+C}{x^2+1}$$

On solving $A = \frac{-17}{5}, B = \frac{17}{5}, C = \frac{-6}{5}$

$$\frac{9x-7}{(x+3)(x^2+1)} = \frac{-17}{5(x+3)}+\frac{17x-6}{5(x^2+1)}$$

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

$3x+1 = A(x-1)(x+2)+B(x+2)+C(x-1)^2 \ldots(1)$

Put $x = 1 \Rightarrow B = \frac{4}{3}$

Put $x = -2 \Rightarrow C = \frac{-5}{9}$

Put $x = 0 \Rightarrow A = \frac{5}{9}$

$$\frac{3x+1}{(x-1)^2(x+2)} = \frac{5}{9(x-1)}+\frac{4}{3(x-1)^2}-\frac{5}{9(x+2)}$$

26. $$\frac{32x^2+186x}{(x^2+1)(x+5)} = \frac{37x+1}{x^2+1}+\frac{\lambda}{x+5}$$

Sub. $x = -5$

$$\lambda = \frac{32(-5)^2+186(-5)}{(-5)^2+1} = \frac{-130}{26}$$

$$\frac{\lambda}{2} = \frac{-5}{2}$$

27. $x^4+24x^2+28 = (Ax+B)(x^2+1)^2+(Cx+D)(x^2+1)+(Ex+F)$

Compare like terms

28. $13x+43 = A(x+6)+B(2x+5)$

By comparing like terms on both sides

$\Rightarrow A = 3, B = 5$

$A^2+B^2 = 3^2+5^2 = 34$

29. $2x^2+1 = A(x^2+x+1)+(Bx+C)(x-1)$

By comparing like terms

$\Rightarrow A = 1, B = 1, C = 0$

$7A+2B+C = 7(1)+2(1)+0 = 9$

30. Divide Nr by Dr

31. $1 = A(1-2x)^2+B(1-2x)(1-3x)+C(1-3x)$

By comparing like terms

$A = 9, B = -6, C = -2$

32. Divide Nr by Dr

33. $4x^3+16x+7 = (Ax+B)(x^2+4)+(Cx+0)$

By comparing like terms

$A = 4, B = 0, C = 0, D = 7$

34. Divide Nr by Dr

35. $$y = \frac{x}{(x-1)(x^2+1)^2}-\frac{1}{4}\left[\frac{1}{x-1}-\frac{x+1}{x^2+1}\right]$$

Simplify

36. $x^2+1 = (Ax+B)(x^2+2x+2)+(Cx+D)(x^2-2x+2)$

Comparing like terms on both sides

37. $x^2-3x+2=A(x-3)^2+B(x-3)(x-4)+C(x-4)$

By comparing like terms on both sides

$A+6, B=-5, C=-2$

$A+B+C=6-5-2=-1$

38. $x^2+3=(Ax+B)(x^2+2)+(Cx+D)(x^2+1)$

By comparing $x^3 \rightarrow A+C=0$

$x^2 \rightarrow B+D=1$

$A+B+C+D=1$

39. Apply definition on both sides

40. $x^2+7=A(x^2+1)+(Bx+C)(x-2)$

By comparing like terms

$A=\frac{11}{5}, B=\frac{-6}{5}, C=\frac{-12}{5}$

41. $\frac{42-13x}{(x-2)(x+3)}=\frac{A}{x+3}+\frac{B}{x-2}$

$42-13x=A(x-2)+B(x+3)$

By comparing like terms

$A=\frac{-81}{5}, B=\frac{16}{5}$

$lx+m \rightarrow x+3, px+q \rightarrow x-2$

$\frac{Alp}{Bmq}=\frac{-\frac{81}{5}\times 1\times 1}{\frac{16}{5}\times 3\times(-2)}=\frac{27}{32}$

42. $3x+5=A(2x^2+3)+(Bx+C)(x+1)$

By comparing like terms

$A=\frac{2}{5}, B=\frac{-4}{5}, C=\frac{19}{5}$

$f'(x)=\frac{2}{5}(3x^2)-\frac{4}{5}(2x)+7$

$5C=f'(-2)=19-15=4$

43. Apply integration on both sides

44. $x^2-2=(Ax+B)(x^2+3)+(Cx+D)(x^2+1)$

By comparing like terms

$A=0, B=-3/2, C=0, D=5/2$

45. Put $x-7=t$

46. $3x^2+ax+3=3(x^2+2)+(Bx+C)(2x+3)$

By comparing like terms

$x^2 \rightarrow 3+2B=3 \Rightarrow B=0$

$x \rightarrow a=3B+2C$

Constant $\rightarrow 3=6+3C \Rightarrow C=1$

$\Rightarrow a=3(0)+2(-1)=-2$

$a(B+C)=-2(0-1)=2$

47. $x-2=Ax(2x-3)+B(2x-3)+C(x^2)$

Comparing like terms

48. $x^2-x+1=(Ax+B)(x^2+x+1)+(Cx+D)(x^2+1)$

Compare like terms

$A=0, B=-1, C=0, B=-1$

49 $2x^2+5x+6=a(x+2)^2+b(x+2)+c$

$a=2 \quad 4a+b=5 \qquad 4a+2b+c=6$

$b=-3 \qquad 8-6+c=6$

$c=4$

$a.b+b.c+c.a=-6-12+8=-10$

50 $\frac{3x^3-x^2-2x+17}{(x^2+4)(x^2-3)}=\frac{AX+B}{x^2+4}+\frac{x-2}{x^2-3}$

$\Rightarrow(1+A)x^3+(B+2)x^2+(4-3A)x+8-3B$

$=3x^3-x^2-2x+17$

$A+1=3 \qquad B+2=-1$

$A=2 \qquad B=-3$

Requried fraction $\frac{2x-3}{x^2+4}$

51 $\frac{x^4-6x^3+9x^2+5x-20}{x^2-x-2}$

$=x^2-5x+6+\frac{x-8}{(x-2)(x+1)}$

$\frac{x-8}{(x-2)(x+1)}=\frac{a}{x-2}+\frac{b}{x+1}$

Find a and b.

52 $-x^2+6x+1=A(x-1)(x^2+2)+B(x^2+2)$

$+C(x-3)(x-1)^2$

Comparing the co–efficient on B's

We get A=0, B=2, c=0

Now A+B+C=0+2+0=2

53. $\dfrac{17x-2}{12x^2-x-20}=\dfrac{A}{ax+5}+\dfrac{B}{3x+b}$

$\dfrac{17x-2}{(4x+5)(3x-4)}=\dfrac{A}{ax+5}+\dfrac{B}{3x+b}$

Here $a=4,\ b=-4$

$17x-2=A(3x-4)+B(4x+B)$

$\therefore A=3,\ B=2$

Consider $aA+bB=4(3)-4(2)$

$=4$

54 $Quetient\ (a)=\dfrac{coefficient\ of\ x^3\ in\ Nr}{coefficient\ of\ x^3\ in\ Dr}=\dfrac{6}{6}=1$

$Also\ 6x^3+x^2-10x+3=(x+p)(qx+3)(3x+p)$

$=(3qx^3+(pq+9+3pq)x^2+.....$

Equating like terms, we get

$\therefore 3q=6\Rightarrow q=2,$

$8p+9=1\Rightarrow 8p=-8\Rightarrow p=-1$

$put\ x=-p=1\ then\ b=\dfrac{6+7-14+11}{(2+3)(3-1)}$

$=\dfrac{10}{10}=1$

$\therefore\dfrac{a+b}{p+q}=\dfrac{1+1}{-1+2}=\dfrac{2}{1}=2$

55 $x^4+3x^2+4=\left(x^2+2\right)^2-x^2$

$=\left(x^2+2+x\right)\left(x^2+2-x\right)$

$\dfrac{x^2-2x+2}{\left(x^2+x+2\right)\left(x^2-x+2\right)}=\dfrac{Ax+B}{x^2+x+2}+\dfrac{Cx+D}{x^2-x+2}$

Here a=1 b= -1

$\rightarrow\dfrac{2}{4}=\dfrac{B}{2}+\dfrac{D}{2}$

Put x=0

$\boxed{B+D=1}$

2A+B=2(1)-1=1

B+D=2a+b

56 By partial fractions, we get A = $\dfrac{2}{5}, B=\dfrac{3}{5}$

$\dfrac{x+1}{(x+3)(x-2)}=\dfrac{1}{5}\left[\dfrac{2}{x+3}+\dfrac{3}{x-2}\right]$

$=\dfrac{1}{5}\left[\dfrac{2}{3}\left(1+\dfrac{x}{3}\right)^{-1}-\dfrac{3}{2}\left(1-\dfrac{x}{2}\right)^{-1}\right]$

$\Rightarrow\frac{1}{5}\left[\frac{2}{3}\left(1-\frac{x}{3}+\left(\frac{x}{3}\right)^2-\left(\frac{x}{3}\right)^3+....\right)-\frac{3}{2}\left(1+\frac{x}{2}+\left(\frac{x}{2}\right)^2+\left(\frac{x}{2}\right)^3.....\right)\right]$

For x3coeff, $\dfrac{1}{5}\left[\dfrac{2}{3}\times\dfrac{-1}{27}-\dfrac{3}{2}\times\dfrac{1}{8}\right]=\dfrac{-55}{1296}$

57 $put\ x=0$

$\dfrac{k}{3}-\dfrac{3}{k}=\dfrac{5}{-3k}$

$K^2-9=-5\Rightarrow K^2=4\Rightarrow\boxed{k=2}$

$2x^2-7x+3=0$

$\Delta=49-24=25>0$

It is a perfect square then roots are rational

58 $\dfrac{x^4}{(x-1)(x-2)(x-3)}=x+6+\dfrac{A}{x-1}+\dfrac{B}{x-2}+\dfrac{c}{x-3}$

$\therefore p(x)=x+6$

$x^4=x(x-1)(x-2)(x-3)+A(x-2)(x-3)$

$+B(x-1)(x-3)+c(x-1)(x-2)$

put x = 3

$3^4=0+A(B)+B(0)+C(3-1)(3-2)$

$81=2C$

$C=81/2$

$\therefore p(x)=x+6$

$p\left(\dfrac{3}{2}\right)+C=\dfrac{3}{2}+6+\dfrac{81}{2}$

$=48$

59 $\dfrac{x+1}{\left(x^2+1\right)(x-1)^2}=\dfrac{Ax+B}{x^2+1}+\dfrac{C}{x-1}+\dfrac{D}{(x-1)^2}$

$$D=1 \quad , A=\frac{1}{2}, C=\frac{-1}{2}, B=-\frac{1}{2}$$

$$A+B+C+D=\frac{1}{2}-\frac{1}{2}-\frac{1}{2}+1=\frac{1}{2}$$

60 $$\frac{6x^4+13x^3+2x^2-x+3}{2x^2+3x-2}=3x^2+2x+1+\frac{A}{2x-1}+\frac{B}{x+2}$$

By solving $A=2, \mathrm{B}=-1, \mathrm{f}(1)=6$

By comparing $a=2, b=2$

$\Rightarrow f(1)+a.\mathrm{B}+\mathrm{b}.\mathrm{A}=8$

61 $$\frac{3x+2}{(x+1)(2x^2+3)}=\frac{A}{x+1}+\frac{Bx+C}{2x^2+3}$$

$$=\frac{-1/5}{x+1}+\frac{\frac{2}{5}x+\frac{13}{5}}{2x^2+3}$$

$$\mathrm{A}=\frac{-1}{5}, \; B=\frac{2}{5}, \; C=\frac{13}{5}$$

$$\mathrm{A\text{-}B+C}=\frac{-1}{5}-\frac{2}{5}+\frac{13}{5}=\frac{10}{5}=2$$

62 Apply partial fractions . we get

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

$$=(x+2)(1+x^2)^{-1}+(1+x)(2+x^2)^{-1}$$

$$=(x+2)\left[1-x^2+x^4-x^6\right]$$

$$+\frac{1}{2}(1+x)\left[1-\frac{x^2}{2}+\frac{x^4}{4}-\frac{x^6}{8}\right]$$

$$coeffi.of\ x^5=1+\frac{1}{2}.\frac{1}{4}$$

$$=1+\frac{1}{8}=\frac{9}{8}$$