Assignment

Introduction, Non-repeated linear factors in Denominator

Basic Level

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

(a) 3   (b) 5   (c) 7   (d) 11

2. If $\dfrac{1}{x(x+1)(x+2).....(x+n)} = \dfrac{A_0}{x} + \dfrac{A_1}{x+1} + \dfrac{A_2}{x+2} + ... + \dfrac{A_n}{x+n}$ then $A_r =$

(a) $\dfrac{r!(-1)^r}{(n-r)!}$ (b) $\dfrac{(-1)^r}{r!(n-r)!}$ (c) $\dfrac{1}{r!(n-r)!}$ (d) None of these

3. $\dfrac{x+1}{(x-1)(x-2)(x-3)} = $ **[IIT 1996]**

(a) $\dfrac{1}{x-1} + \dfrac{3}{x-2} + \dfrac{1}{x-3}$ (b) $-\dfrac{3}{x-1} + \dfrac{1}{x-2} + \dfrac{2}{x-3}$

(c) $\dfrac{1}{x-1} - \dfrac{3}{x-2} + \dfrac{2}{x-3}$ (d) None of these

4. If $\dfrac{ax^2 + bx + c}{(x-1)(x+2)(2x+3)} = \dfrac{3}{x-1} + \dfrac{2}{x+2} - \dfrac{5}{2x+3}$, then

(a) $a = 5$ (b) $b = -18$ (c) $c = 22$ (d) None of these

5. If $\dfrac{(e^x + 2)}{(e^x - 1)(2e^x - 3)} = -\dfrac{3}{e^x - 1} + \dfrac{B}{2e^x - 3}$, then $B = $

(a) 1   (b) 3   (c) 5   (d) 7

6. If $\dfrac{3x+4}{x^2 - 3x + 2} = \dfrac{A}{x-2} - \dfrac{B}{x-1}$, then $(A, B) = $ **[EAMCET 1996]**

(a) $(7, 10)$ (b) $(10, 7)$ (c) $(10, -7)$ (d) $(-10, 7)$

Advance Level

7. If the remainders of the polynomial $f(x)$ when divided by $x+1, x-2, x+2$ are 6, 3, 15 then 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) $3x^2 - 2x + 1$

8. If $\dfrac{1 - \cos x}{\cos x (1 + \cos x)} = \dfrac{\sin \alpha}{\cos x} - \dfrac{2}{1 + \cos x}$, then $\alpha = $

(a) $\dfrac{\pi}{8}$ (b) $\dfrac{\pi}{4}$ (c) $\dfrac{\pi}{2}$ (d) π

9. If $\dfrac{x^2}{(x^2+a^2)(x^2+b^2)} = K\left(\dfrac{a^2}{x^2+a^2} - \dfrac{b^2}{x^2+b^2}\right)$ then $K =$

(a) $a^2 - b^2$ 　　　　　(b) $\dfrac{1}{a+b}$ 　　　　　(c) $\dfrac{1}{a-b}$ 　　　　　(d) $\dfrac{1}{a^2-b^2}$

Repeated linear factors in Denominator

Basic Level

10. If $\dfrac{9}{(x-1)(x+2)^2} = \dfrac{A}{x-1} + \dfrac{B}{x+2} + \dfrac{C}{(x+2)^2}$ then $A - B - C =$

(a) 3 　　　　　(b) – 1 　　　　　(c) 5 　　　　　(d) None of these

11. If $\dfrac{ax+b}{(3x+4)^2} = \dfrac{1}{3x+4} - \dfrac{3}{(3x+4)^2}$ then

(a) $a=2$ 　　　　　(b) $b=1$ 　　　　　(c) $a=3$ 　　　　　(d) $b=4$

12. $\dfrac{x^2+13x+15}{(2x+3)(x+3)^2} =$

(a) $\dfrac{1}{x+3} - \dfrac{1}{2x+3} + \dfrac{5}{(x+3)^2}$ (b) $\dfrac{1}{2x+3} - \dfrac{1}{x+3} + \dfrac{5}{(x+3)^2}$ 　(c) $\dfrac{1}{2x+3} + \dfrac{1}{x+3} - \dfrac{5}{(x+3)^2}$ 　(d) $\dfrac{1}{2x+3} - \dfrac{1}{x+3} - \dfrac{5}{(x+3)^2}$

13. The partial fractions of $\dfrac{3x^3 - 8x^2 + 10}{(x-1)^4}$ is

(a) $\dfrac{3}{(x-1)} + \dfrac{1}{(x-1)^2} + \dfrac{7}{(x-1)^3} + \dfrac{5}{(x-1)^4}$ 　　　　　(b) $\dfrac{3}{(x-1)} + \dfrac{1}{(x-1)^2} - \dfrac{7}{(x-1)^3} + \dfrac{5}{(x-1)^4}$

(c) $\dfrac{3}{(x-1)} + \dfrac{1}{(x-1)^2} - \dfrac{7}{(x-1)^3} + \dfrac{5}{(x-1)^4}$ 　　　　　(d) None of these

Advance Level

14. The partial fractions of $\dfrac{x^4 + 24x^2 + 28}{(x^2+1)^3}$ are 　　　　　　　　　　　　　　　　　**[EAMCET 1986]**

(a) $\dfrac{1}{(x^2+1)} + \dfrac{22}{(x^2+1)^2} + \dfrac{5}{(x^2+1)^3}$ 　　　　　(b) $\dfrac{1}{(x^2+1)} + \dfrac{22}{(x^2+1)^2} - \dfrac{5}{(x^2+1)^2}$

(c) $\dfrac{1}{(x^2+1)} - \dfrac{22}{(x^2+1)^2} - \dfrac{5}{(x^2+1)^3}$ 　　　　　(d) None of these

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Non-repeated quadratic factors in Denominator

Basic Level

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

(a) $A=1, B=0, C=2$ 　　　　　(b) $A=1, B=0, C=-2$

(c) $A=-1, B=0, C=-2$ 　　　　　(d) None of these

16. If $\dfrac{2x}{x^3 - 1} = \dfrac{A}{x - 1} + \dfrac{Bx + C}{x^2 + x + 1}$, then

    (a) $A = B = C$ (b) $A = B \neq C$ (c) $A \neq B = C$ (d) $A \neq B \neq C$

17. $\dfrac{x^2 + 1}{(2x - 1)(x^2 - 1)} =$ **[MNR 1994]**

    (a) $\dfrac{-5}{3(2x - 1)} + \dfrac{3}{(x + 1)} + \dfrac{1}{(x - 1)}$ (b) $\dfrac{-5}{3(2x - 1)} + \dfrac{1}{3(x + 1)} + \dfrac{1}{(x - 1)}$

    (c) $\dfrac{1}{2x - 1} + \dfrac{5}{(x + 1)} - \dfrac{3}{(x - 1)}$ (d) None of these

18. If $\dfrac{ax - 1}{(1 - x + x^2)(2 + x)} = \dfrac{x}{1 - x + x^2} - \dfrac{1}{2 + x}$, then $a =$

    (a) 2   (b) 3   (c) 4   (d) 5

19. $\dfrac{1}{x(x^2 + 1)} = \dfrac{A}{x} + \dfrac{Bx + C}{(x^2 + 1)}$, then $(A, B, C) =$ **[IIT 1995]**

    (a) $(1, -1, 0)$ (b) $(-1, 0, -1)$ (c) $(0, 1, 1)$ (d) None of these

Advance Level

20. $\dfrac{2x}{x^4 + x^2 + 1} =$

    (a) $\dfrac{x + 1}{x^2 - x + 1} + \dfrac{x - 1}{x^2 + x - 1}$ (b) $\dfrac{x - 1}{x^2 - x + 1} - \dfrac{x + 1}{x^2 + x - 1}$ (c) $\dfrac{x}{x^2 - x + 1} + \dfrac{x + 1}{x^2 + x - 1}$ (d) $\dfrac{1}{x^2 - x + 1} - \dfrac{1}{x^2 + x + 1}$

Repeated quadratic factors in Denominator

Basic Level

21. $\dfrac{3x^2 + 5}{(x^2 + 1)^2} = \dfrac{a}{x^2 + 1} + \dfrac{b}{(x^2 + 1)^2}$, then $(a, b) =$

    (a) $(2, 3)$ (b) $(3, 2)$ (c) $(-2, 3)$ (d) $(-3, 2)$

Improper fractions

Basic Level

22. $\dfrac{(x - a)(x - b)}{(x - c)(x - d)} = \dfrac{A}{x - c} - \dfrac{B}{(x - d)} + C$, then $C =$

    (a) 5   (b) 4   (c) 3   (d) 1

23. The partial fractions of $\dfrac{x^2 - 5}{x^2 - 3x + 2}$ are

    (a) $1 + \dfrac{1}{(x - 1)} - \dfrac{1}{(x - 2)^2}$ (b) $\dfrac{1}{(x - 1)} + \dfrac{1}{(x - 2)^2}$

(c) $\dfrac{1}{x-1}+\dfrac{1}{(x-2)^2}$ (d) $1+\dfrac{4}{(x-1)}-\dfrac{1}{(x-2)}$

Advance Level

24. If $\dfrac{x^3}{(2x-1)(x+2)(x-3)}=p+\dfrac{q}{2x-1}+\dfrac{r}{x+2}+\dfrac{s}{x-3}$, then

     (a) $p=1$ (b) $p=2$ (c) $p=\dfrac{1}{2}$ (d) $6q-3r+2s=3$

25. The partial fraction of $\dfrac{6x^4+5x^3+x^2+5x+2}{1+5x+6x^2}=$

     (a) $x^2+\dfrac{1}{1+2x}+\dfrac{1}{1+3x}$ (b) $x^2-\dfrac{1}{1+2x}+\dfrac{1}{1+3x}$

     (c) $x^2+\dfrac{1}{1+2x}-\dfrac{1}{1-3x}$ (d) None of these

26. If $\dfrac{\sin^2 x+1}{2\sin^2 x-5\sin x+3}=\dfrac{A}{(2\sin x-3)}+\dfrac{B}{(\sin x-1)}+C$, then

     (a) $A=\dfrac{13}{2}$ (b) $B=2$ (c) $C=1$ (d) $A+B+C=5$

Miscellaneous problems

Basic Level

27. The coefficient of x^4 in the expansion of the expression $\dfrac{3x}{(x-2)(x+1)}$ is

     (a) $-\dfrac{15}{16}$ (b) $\dfrac{15}{16}$ (c) $-\dfrac{16}{15}$ (d) $\dfrac{16}{15}$

28. The coefficient of x^5 in the expansion of $\dfrac{x^2+1}{(x^2+4)(x-2)}$ is

     (a) $\dfrac{1}{256}$ (b) $\dfrac{1}{562}$ (c) $\dfrac{1}{265}$ (d) $-\dfrac{1}{256}$

29. The coefficient of x^n in the expression $\dfrac{x-4}{x^2-5x+6}$ when expanded in ascending powers of x is

     (a) $\dfrac{-1}{2^n}-\dfrac{1}{3^{n+1}}$ (b) $\dfrac{1}{2^n}-\dfrac{1}{3^{n-1}}$

     (c) $\dfrac{-1}{2^n}+\dfrac{1}{3^{n+1}}$ (d) $\dfrac{-1}{2^n}+\dfrac{1}{3^{n-1}}$

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Logarithms — Assignment (Basic and Advance Level)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
b	c	b	c	d	c	d	b,c	c	c	c	d	b	c	b	b	d	c	d	a

21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
d	c	b	a	a	c	c	a,b,c,d	b	d	b	a,b,c	a	b	a	a	b	b	c	a,b,d

41	42
c	a

Indices and Surds — Assignment (Basic and Advance Level)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
c	c	d	b	d	a	a	d	b	a,d	b	c	b	a,b	b,c	a	a,c,d	c	b	b

21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
b	b	c	a	a	b	a	d	c	b	b	b	d	b	c	d	b	b	a	d

41	42	43	44	45
d	b	a,b,c	a	a,d

Partial Fractions — Assignment (Basic and Advance Level)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
c	b	c	a,c	d	b	a	c	d	c	b,c	a	c	a	b	d	b	b	a	d

21	22	23	24	25	26	27	28	29
b	d	d	c,d	a	a,d	b	d	c