



MATHS

BOOKS - VIKRAM PUBLICATION (ANDHRA PUBLICATION)

RANDOM VARIABLES AND PROBABILITY DISTRIBUTIONS

Solved Problems

1. Resolve $\frac{5x + 1}{(x + 2)(x - 1)}$ into Partial fractions.



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2. Resolve $\frac{2x + 3}{5(x + 2)(2x + 1)}$ into Partial fractions.

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3. Resolve $\frac{13x + 43}{2x^2 + 17x + 30}$ into partial fractions.

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4. Resolve $\frac{x^2 + 5x + 7}{(x - 3)^3}$ into partial fractions.

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5. Resolve $\frac{x^2 + 13x + 15}{(2x + 3)(x + 3)^2}$ into Partial fractions.

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6. Resolve $\frac{1}{(X - 1)^2(X - 2)}$ into Partial fractions.

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7. Resolve $\frac{3x - 18}{x^3(x + 3)}$ into Partial fractions.

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

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9. Resolve $\frac{2x^2 + 1}{x^3 - 1}$ into partial fractions.

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10. Resolve $\frac{x^3 + x^2 + 1}{(x^2 + 2)(x^2 + 3)}$ into partial fractions.

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11. Resolve $\frac{3x^3 - 2x^2 - 1}{x^4 + x^2 + 1}$ into partial fractions.

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

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

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

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

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16. Find the coefficient of x^4 in the expansion of $\frac{3x}{(x-2)(x+1)}$ in powers of x specifying the interval in which the expansion is valid.

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17. Find the coefficient of x^n in the power series expansion of $\frac{x}{(x-1)^2(x-2)}$ specifying the region in which the expansion is valid.

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Dam Sure Saq 4 Marks

1. Resolve the following into partial fractions.

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

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2. Resolve the following into partial fractions.

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

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3. Resolve the $\frac{2x^2 + 3x + 4}{(x - 1)(x^2 + 2)}$ into partial fractions.

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Dam Sure Laq 7 Marks

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



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Exercise 10 A I

1. A.p.d.f of a discrete random variable is zero except at the points $x = 0, 1, 2$. At these points it has the value $P(0) = 3c^3, P(1) = 4c - 10c^2, P(2) = 5c - 1$ for some $c > 0$. Find the value of c .



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2. Find the constant C, so that

$$F(x) = C \left(\frac{2}{3} \right)^x, \quad x = 1, 2, 3, \dots$$

is the p.d.f of a discrete random variable X.

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3.

$X = x$	-2	-1	0	1	2	3
$P(X = x)$	0.1	k	0.2	2k	0.3	k

is the probability distribution of a random variable X. Find the value of K and the variance of X.

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4.

$X = x$	-3	-2	-1	0	1	2	3
$P(X = x)$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{3}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$

is the probability distribution of a random variable X . Find the variance of X .

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5. A random variable X has the following probability distribution.

$X = x$	0	1	2	3	4	5	6	7
$P(X = x)$	0	k	$2k$	$2k$	$3k$	k^2	$2k^2$	$7k^2 + k$

Find i) k ii) the mean and iii) $P(0 < X < 5)$.

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Exercise 10 A li

1. The range of a random variable X is $\{0, 1, 2\}$. Given that $P(X = 0) = 3c^3$, $P(X = 1) = 4c - 10c^2$, $P(X = 2) = 5c - 1$
- i) Find the value of c
- ii) $P(X < 1)$, $P(1 < X \leq 2)$ and $P(0 < X \leq 3)$

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

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3.
$$\frac{x^3}{(x - a)(x - b)(x - c)}$$

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Exercise 7 D

1. Find the coefficient of x^3 in the power series expansion of $\frac{5x + 6}{(x + 2)(1 - x)}$ specifying the region in which the expansion is valid.

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2. Find the coefficient of x^4 in the power series expansion of $\frac{3x^2 + 2x}{(x^2 + 2)(x - 3)}$ specifying the interval in which the expansion is valid.

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3. Find the coefficient of x^n in the power series expansion of $\frac{x - 4}{x^2 - 5x + 6}$ specifying the region in which the expansion is valid.

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4. Find the coefficient of x^n in the power series expansion of $\frac{3x}{(x - 1)(x - 2)^2}$.

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