

## MATHS

# BOOKS - VIKRAM PUBLICATION ( ANDHRA PUBLICATION)

# RANDOM VARIABLES AND PROBABILITY DISTRIBUTIONS

**Solved Problems** 

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

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 
$$rac{x^2+13x+15}{\left(2x+3
ight)\left(x+3
ight)^2}$$
 into Partial fractions.

**6.** Resolve 
$$/1\Big((X-1)^2(X-2)\Big)$$
 into Partial fractions.

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

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

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 
$$rac{x^4+24x^2+28}{\left(x^2+1
ight)^3}$$
 into partial fractions.

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

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

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

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.



17. Find the coefficient of  $x^n$  in the power series expansion of

 $rac{x}{\left(x-1
ight)^2 (x-2)}$  specifying the region in which the

expansion is valid.



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 
$$rac{2x^2+3x+4}{(x-1)(x^2+2)}$$
 into partial fractions.

Dam Sure Laq 7 Marks

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

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Exercise 10 A I

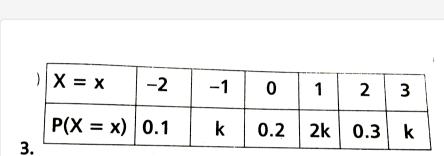
**1.** A.p.d.f of a discrete random variable is zero except at the points x = 0, 1, 2. At these points it has the value  $P(0) = 3c^3$ ,  $P(1) = 4c - 10c^2$ , P(2) = 5c - 1 for some c > 0. Find the value of c.

2. Find the constant C, so that

$$F(x)=Cigg(rac{2}{3}igg)^x, x=1,2,3.\ldots$$
is the p.d.f of

a discrete random variable X.

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is the probability distribution of a random variable X. Find

the value of K and the variance of X.



| X = x    | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
|----------|----|----|----|---|---|---|---|
|          | 1  | 1  | 1  | 1 | 1 | 1 | 1 |
| P(X = x) | 9  | 9  | 9  | 3 | 9 | 9 | 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 <sup>2</sup> | 2k <sup>2</sup> | 7k <sup>2</sup> + k |

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



- 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
- $\hbox{ ii) } P(X < 1), P(1 < X \leq 2) \ \ \text{and} \ \ P(0 < X \leq 3) \\$

2. 
$$rac{x^3}{\left(2x-1
ight)\left(x-1
ight)^2}$$

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

#### 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 is the coefficient of  $x^4$  in the power series expansion

of  $rac{3x^2+2x}{(x^2+2)(x-3)}$  specifying the interval in which the

expansion is valid.

**3.** Find the coefficient of  $x^n$  in the power series expansion of

 $rac{x-4}{x^2-5x+6}$  specifying the region in which the expansion is valid.



**4.** Find the coefficient of  $x^n$  in the power series expansion of

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

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