MATHS

BOOKS - VGS PUBLICATION-BRILLIANT

MODEL PAPER 11

Section A

1. Find the square root fo $(-5 + 12i)$

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2. If $z_1 = -1, z_2 = i,$ then find $Arg\left(\dfrac{z_1}{z_2}\right).$

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3. Find the value of $(1 + i)^{16}$.

4. If α, β are the roots of the equation $ax^2 + bx + c = 0,$ then find the value of $\dfrac{1}{\alpha^2} + \dfrac{1}{\beta^2}$.

5. Find the algebraic equation whose roots are 2 times the roots of

$$x^5 - 2x^4 + 3x^3 - 2x^2 + 4x + 3 = 0$$

6. Find the number of ways of arranging the letters of the word "INTERMEDIATE".

7. If $^{n}P_{r} = 5040$ and $^{n}C_{r} = 210$, find n and r.

8. If $(1 + x)^{n} = a_0 + a_1x + a_2x^2 + \ldots\ldots\ldots + a_nx^n$, then show that

(i) $a_0 - a_2 + a_4 - a_6 + \ldots\ldots\ldots = 2^{n/2} \cos. \dfrac{n\pi}{4}$

(ii) $a_1a_3 + a_5 - a_7 + \ldots\ldots\ldots = 2^{n/2} \sin. \dfrac{n\pi}{4}$

9. The variance of 20 observations is 5. If each observations is multiplied by 2, then the new variance of the resulting observations is

10. A poisson variable satisfies P(X= 1) = P (X = 2). Find P(X = 5).

Section B

1. If z = x + iy and if the point P in the argand plane represents z , then the locus of P satisfying the equation
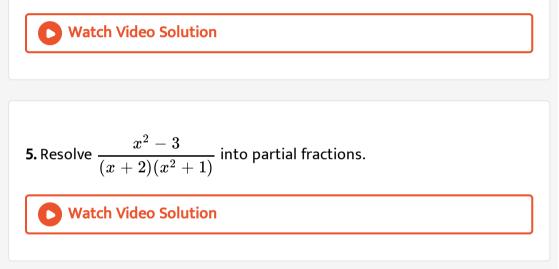
|z-2-3i|=5

2. Find the range of $\dfrac{x+2}{2x^2+3x+6}$

3. If the letters of the word MASTER are permuted in all possible ways and the words thus formed are arranged in the dictionary order, then find the rank of the word "REMAST" .
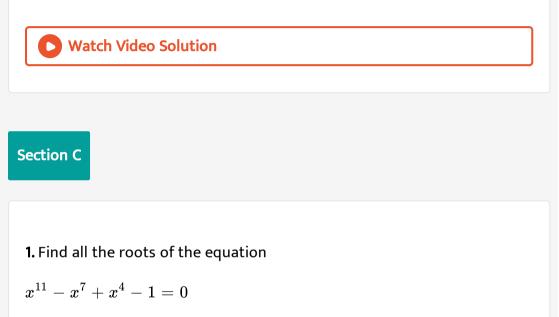
4. Find the number of ways of selecting a cricket team of 11 players from 7 batsmen and 6 bowlers such that there will be atleast 5 bowlers in the team.

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

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6. Two persons A and B are rolling die on the condition that the person who gets 3 will win the game. If A starts the game, then find the probabilities of A and B respectively to win the game.

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7. A problem in calculus is given to two students, A and B whose chances of solving it are 1/3, 1/4 respectively. Find the probability of the problem being solved if both of them try'independently.

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Section C

1. Find all the roots of the equation

$$x^{11} - x^7 + x^4 - 1 = 0$$

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2. Solve the following equations . $x^4 - 10x^3 + 26x^2 - 10x + 1 = 0$

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3. Prove that : If n is a positive integer and x is any nonzero real number, then prove that

$$C_0 + C_1\frac{x}{2} + C_2.\frac{x^2}{3} + C_3.\frac{x^3}{4} + \ldots + C_n.\frac{x^n}{n+1} = \frac{(1+x)^{n+1} - 1}{(n+1)x}$$

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4. If $x = \frac{1.3}{3.6} + \frac{1.3.5}{3.6.9} + \frac{1.3.5.7}{3.6.9.12} + \ldots$ then prove that $9x^2 + 24x = 11$.

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5. Calculate the mean, vartiance and standard deviation for the following distribution.

Class	30–40	40–50	50–60	60–70	70–80	80–90	90–100
Frequency	3	7	12	15	8	3	2

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6. If P(A) = 0.3, P(B) = 0.4, P(C) = 0.8,

$P(A \cap B) = 0.08, P(A \cap C) = 0.28, P(A \cap B \cap C) = 0.09, P(A \cup B \cup C$

then show $P(B \cap C)$ lies in [0.23, 0.48].

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7. Find the mean and variance of the random variable X which follows the

following distribution

X = x	1	2	3	4
P(X = x)	0.1	0.2	0.3	0.4

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