MATHS

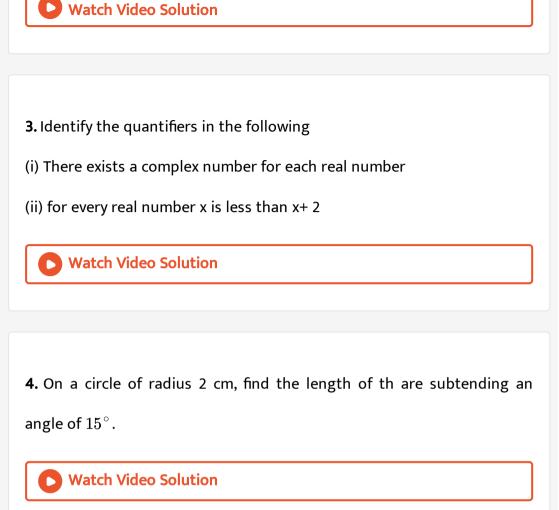## BOOKS - OSWAAL PUBLICATION

SAMPLE PAPER 6

Exercise

1. Describe the sample space for the indicated experiments.

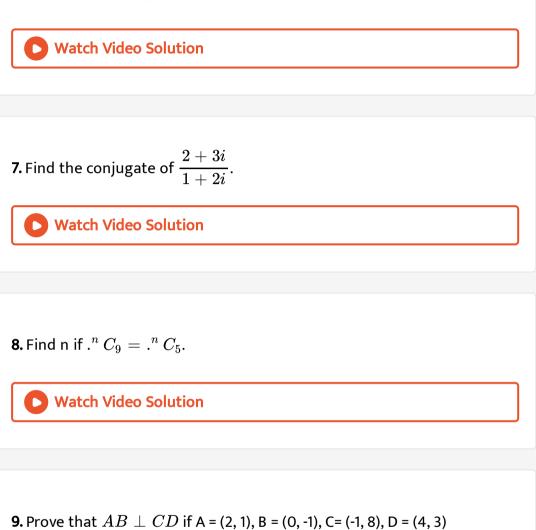A box contins 1 red 3 identical white balls. Two balls re drawn in succession without replacement.

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2. Are the following pair of sets equal? Give reason. ltrbgt

$A = (3, 4), B = \left\{ x : x^2 + 5x + 6 = 0 \right\}$

3. Identify the quantifiers in the following

(i) There exists a complex number for each real number

(ii) for every real number x is less than x+ 2

4. On a circle of radius 2 cm, find the length of th are subtending an angle of $15°$.

5. Evaluate: $\lim\limits_{x \to 2} \dfrac{x^2 - 5x + 6}{x^2 - 4}$.

6. How many two digit numbers are divisible by 3?

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7. Find the conjugate of $\dfrac{2+3i}{1+2i}$.

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8. Find n if $.^{n}C_9 = .^{n}C_5$.

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9. Prove that $AB \perp CD$ if A = (2, 1), B = (0, -1), C= (-1, 8), D = (4, 3)

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10. If A={a,b,c}, B={m,n} find the number of relations from A to B.

11. Find the equation of the passing through (2, 3) and cutting off equal intercepts on co-ordinate axis.

12. If $f(x) = x^2 + 1$, $g(x) = x^2 - 5x + 6$, find $f + g$, $f - g$, $\dfrac{f}{g}$.

13. Show that $\sqrt{\dfrac{1 + \sin A}{1 - \sin A}} = \sec A + \tan A$

14. Let $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$, $A = \{1, 2, 3, 4\}$, $B = \{2, 4, 6, 8\}$ and $C = \{3, 4, 5, 6\}$: Find:$(A \cup C)'$

15. Name the octants in which the following points lie:(i)(3,4,5)

16. Name the octants in which the following points lie:(ii)(5,2,-1)

17. Name the octants in which the following points lie:(iii)(-2,3,7)

18. Name the octants in which the following points lie:(iv)(-5,-7,-9)

19. The coefficient of variation for a distribution is 60 and standard deviation is 21. Find the arithmetic mean.

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20. Solve $\dfrac{3(x - 2)}{5} \leq \dfrac{5(2 - x)}{3}$

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21. If X and Y are two sets such that X has 40 elements, $X \cup Y$ has 60 elements and $X \cap Y$ has 10 elements, how many elements does Y have?

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22. Evaluate : $\lim\limits_{x \to 0} \dfrac{3x - \tan 4x}{x + \sin x}$.

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23. Find the acute angle between :-

$$5x + 6y - 1 = 0, \qquad x - 11y + 8 = 0$$

24. Write the converse and contrapositive of the statement " If x is a prime number then x is odd "

25. If $\sin A = \dfrac{4}{5}$, $\cos B = \dfrac{-12}{13}$ and $\dfrac{\pi}{2} < A, B < \pi$, Find $\sin(A - B)$

26. In a survey it was found that 21 people liked product A, 26 liked product B and 29 liked product C. If 14 people liked products A and B, 12

people liked products C and A, 14 people liked products B and C and 8 liked all the three products. Find how many liked product C only.

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27. Out of 100 students,two sections of 40 and 60 are formed.If you and your friend are among the 100 students,what is the probability that

(a) you both enter the same section ?(b) you both enter the different section?

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29. (i) If $x - iy = \sqrt{\dfrac{a - ib}{c - id}}$ prove that $(x^2 + y^2) = \dfrac{a^2 + b^2}{c^2 + d^2}$

30. If the sum of first p terms of an A.P is equal to the sum of the first q terms , then find the first (p+q) terms .

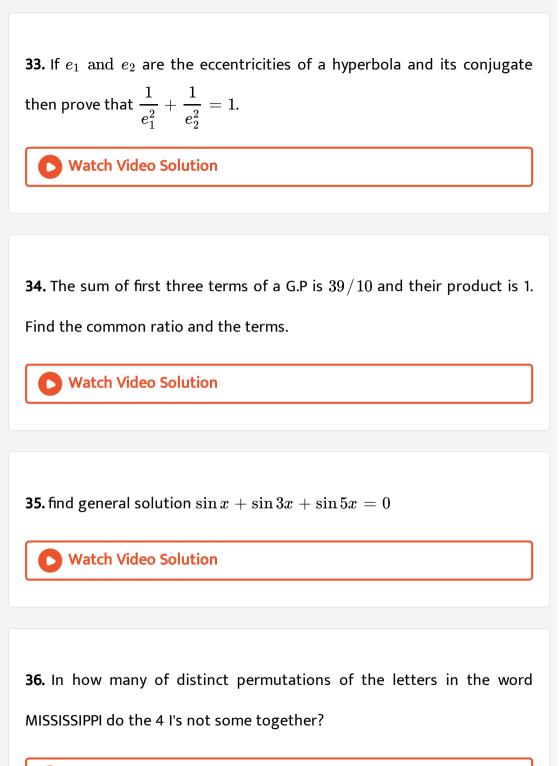**31.** Let f={(1,1), (2,3), (3,5), (4,7)} be a function from Z into Z defined by f(x) = ax + b, for some integers a & b. Determine a & b.

32. By giving a conter example , show that the statement " For any real number a and b $a^2 = b^2 \Rightarrow a = b$ is false

33. If e_1 and e_2 are the eccentricities of a hyperbola and its conjugate then prove that $\dfrac{1}{e_1^2} + \dfrac{1}{e_2^2} = 1.$

34. The sum of first three terms of a G.P is $39/10$ and their product is 1. Find the common ratio and the terms.

35. find general solution $\sin x + \sin 3x + \sin 5x = 0$

36. In how many of distinct permutations of the letters in the word MISSISSIPPI do the 4 I's not some together?

37. (iii) Find the modulus and argument of the complex numbers.

(a) $\dfrac{1+i}{1-i}$, (b) $\dfrac{1}{1+i}$

38. A and B are two events such that P(A) =0.54,P(B) =0.69 and

$P(A \cap B) = 0.35$. Find

$(a)P(A \cup B)(ii)P(A' \cap B')(iii)P(A \cap B')(iv)P(B \cap A')$

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41. Find the derivative of function $\cot x$ with respect to x from first principle.

42. If a,b,c are in G.P and $a^{\frac{1}{x}} = b^{\frac{1}{y}} = c^{\frac{1}{z}}$, prove that x,y,z are in A.P.

43. Define rational function.If function from $f: R - \{0\} \rightarrow R$is defined as $f(x) = \frac{1}{x}$,then draw the graph of function.Also domain and range.

44. Calculate the mean deviation about median for the following distribution:

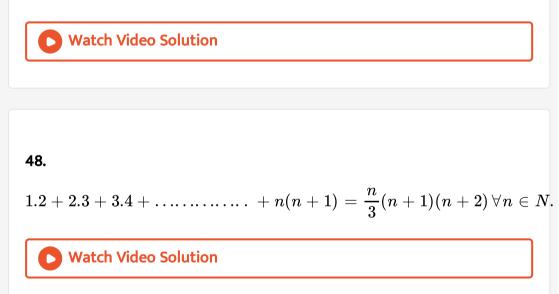| Class	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
Frequency	5	10	20	5	10

45. $\cos^2 A + \cos^2 B - \cos^2 C = 1 - 2\sin A \sin B \cos C$

46. An examination paper consists of 12 questions diyided in to part A and B. Part A contains 7 questions and part B contains 5 questions. A candidate is required to attempt 8 questions, selecting atleat 3 questions from each part. In how many ways can the candidate select the questions ?

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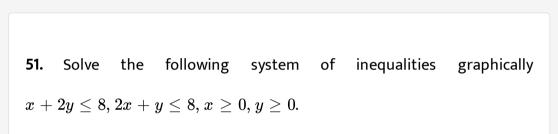
48.
$$1.2 + 2.3 + 3.4 + \ldots\ldots\ldots\ldots + n(n+1) = \frac{n}{3}(n+1)(n+2) \, \forall n \in N.$$

49. The second ,third and fourth terms in the binomial expansion $(x + a)^n$ are 240,720 and 1080 respectively.Find x,a,n.

50. Derive an expression for the distance between two parallel lines $y = mx + c_1$ and $y = mx + c_2$. Hence find the distance between parallel lines $3x - 4y + 7 = 0$ and $3x - 4y + 5 = 0$.

51. Solve the following system of inequalities graphically $x + 2y \leq 8, 2x + y \leq 8, x \geq 0, y \geq 0$.

52. prove that $\cos(A + B) = \cos A \cos B - \sin A \sin B$

53. Find the sum to 'n' terms of $3.1^2 + 5.2^2 + 7.3^2 + \dots\dots$

54. (a)Define a parabola and derive its equation in the standard form

$$y^2 = 4ax$$

55. Find derivative:$x^2 \dfrac{\cos\left(\frac{\pi}{4}\right)}{\sin x}$ w.r.t.'x'.