



# MATHS

## BOOKS - OSWAAL PUBLICATION

### SAMPLE PAPER 1

#### Exercise

1. If  $A = \{1, 2\}, B = \{x : x \in N \text{ and } x^2 - 9 = 0\}$ . Find  $A \times B$



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2. Define subset of a set.



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3. Convert  $\frac{2\pi}{3}$  radians into degree measure ?



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4. Express  $\frac{5 + i\sqrt{2}}{2}$  in the form  $x + iy$ .



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5. Find n if  ${}^{n-1}P_3 : {}^n P_4 = 1 : 9$ .



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6. Find the tenth term of G .P . 5, 25, 125 \_\_\_ ?



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7. Find the slope of the line passing through the points (3,-2) and (-1,4)



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8. Evaluate  $\lim_{x \rightarrow 0} \left[ \frac{\cos x}{\pi - x} \right] ?$



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9. Write the converse and contrapositive of "if a number is divisible by 9 then its is divisible by 3"



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10. Write the sample space for the experiment "a coin is tossed repeatedly three times".



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11. If the universal set

$$U = \{1, 2, 3, 4, 5, 6, 7\}, A = \{1, 2, 5, 7\}, B = \{3, 4, 5, 6\}$$

.Verify  $(A \cup B)' = A' \cap B'$



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12. In a class of 35 students, 24 like to play cricket, 5 like to play both cricket and football. Find how many students like to play football?



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13. If  $A = \{1, 2, 3\}$ ,  $B = \{3, 4\}$ ,  $C = \{4, 5, 6\}$ , find  $A \times (B \cup C)$ ?



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14. A wheel makes 360 revolutions in one minute. Through how many radians does it turn in one second?

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15. Find the value of  $\sin 15^\circ$

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16. Find the value of  $x$  and  $y$ , if  $(x + 2y) + i(2x - 3y)$  is the conjugate of  $5 + 4i$ .

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17. Solve  $7x + 1 \leq 3x + 5$  and represent the solution graphically on the number line.



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18. Find the equation of the line passing through the points  $(-1,1)$  and  $(2,-4)$  ?



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19. Write the equation of the line passing through  $(-4,3)$  with slope  $\frac{1}{2}$ .



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20. Find the Ratio in which  $yz$  plane divides the line segment joining the points  $(4,8,10)$  and  $(6, 10,-8)$  ?



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21. Evaluate  $\lim_{x \rightarrow 0} \left( \frac{1 - \cos x}{x} \right)$  ?



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22. Write the component statement of the following compound statement and check whether the given



compound statement is true or false "0 is less than every positive integer and every negative integer.



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**23.** If the coefficient of variation and standard deviation are 60 and 21 respectively, the arithmetic mean of distribution is



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**24.** One card is drawn from a well-shuffled deck of 52 cards. Calculate the probability that the card will be "not an ace".



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25. Let  $A = \{1, 2, 3, \dots, 14\}$ . Define a relation  $R$  from  $A$  to  $A$  by  $R = \{(x, y) : 3x - y = 0, \text{ where } x, y \in A\}$ . Write down its domain, codomain and range.



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26. Solve  $2 \cos^2 x + 3 \sin x = 0$



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27. Express  $\sqrt{3} + i$  in polar form ?



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28. Solve:

$$3x^2 - 4x + \frac{20}{3} = 0$$



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29. How many numbers greater than 10,00,000 can be formed by using the digits 1,2,0,2,4,2,4.



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30. Using Binomial Theorem, indicate which number is larger  $(1.1)^{10000}$  or 1000.

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31. In an A.P if  $m^{\text{th}}$  term is  $n$  and  $n^{\text{th}}$  term is  $m$ , where  $m \neq n$ , find the  $p^{\text{th}}$  term .

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32. Find the sum to  $n$  terms of the A.P., whose  $k^{\text{th}}$  term is  $5k + 1$ .

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**33.** Find the co-ordinates of the foci and latus rectum of the hyperbola  $3x^2 - y^2 = 3$ .



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**34.** Differentiate of  $\sin x$  w.r.t.  $x$  from first principles



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**35.** Given  $p$  : 25 is multiple of 5

$q$  : 25 is a multiple of 8

Write the compound statements connecting these

two statements with 'and' and 'or'. In both the cases check validity of the compound statement.



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**36.** Two students Anil and Ashima appeared in an examination . The probability that Anil will qualify the examination is 0.05 and that Ashima will qualify the examination is 0.10 . The probability hat both will qualify the examination is 0.02 . Find the Probability that both Anil and Ashima will not qualify the examination ?



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**37.** A letter is chosen at random from the word "ASSASSINATION" . Find the probability that letter is vowel.

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**38.** A letter is chosen at random from the word 'ASSASSINATION' Find the probability that latter is a vowel (ii) a consonant

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**39.** In a survey of 600 students in a school, 150 students were found to be taking tea and 225 taking coffee, 100 were taking both tea and coffee. Find how many students were taking neither tea nor coffee?



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**40.** If the function from  $f: R \rightarrow R$  is defined as  $f(x) = x^2$ , then draw the graph of  $f$  and find the domain and range.



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41. Prove that :  $\frac{\sin 5x - 2 \sin 3x + \sin x}{\cos 5x - \cos x} = \tan x$

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42. Prove by mathematical induction

$$1 + 2 + 3 + \dots + n = \frac{n(n+1)}{2}.$$

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43. Solve graphically

$$2x + y \geq 4, x + y \leq 3, 2x - 3y \leq 6, x \geq 0, y \geq 0$$

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**44.** A group consists of 4 girls and 7 boys .In how many ways can a team of 5 members be selected , if the term has (i) no girls (ii) atleast one boy and one girl ?



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**45.** A group consists of 4 girls and 7 boys. In how ways can a team of 5 members be selected, if he team has. At least one boy and one girl?



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**46.** A group consists of 4 girls and 7 boys. In how many ways can a team of 5 members be selected, if the team has.

At least three girls?



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**47.** State and prove Binomial theorem for a positive integer index.



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**48.** Derive a formula for the angle between two lines with slopes  $m_1$  and  $m_2$ . Hence the slopes of the lines which make an angle  $\frac{\pi}{4}$  with the line  $x - 2y + 5 = 0$

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**49.** Derive the formula for the distance between two points  $(x_1, y_1, z_1)$  and  $(x_2, y_2, z_2)$ . And hence find the distance between  $(2, -1, 3)$  and  $(-2, 1, 3)$ .

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50. Prove that  $\lim_{\theta \rightarrow 0} \frac{\sin \theta}{\theta} = 1$ , ( $\theta$  being in radians) and hence show that  $\lim_{\theta \rightarrow 0} \frac{\tan \theta}{\theta} = 1$ ?



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51. Find the mean deviation about the mean for the following data.

Find the mean deviation about the mean for the following data

Marks Obtained	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Number of Students	2	3	8	14	8	3	2



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52.

Prove

Geometrically

$\cos(x + y) = \cos x \cos y - \sin x \sin y$  and hence prove that  $\cos(x - y) = \cos x \cos y + \sin x \sin y$  using unit circle concept ?



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53. (b) Find the sum of first  $n$  terms of the series

$$1^2 + 2^2 + \dots + n^2.$$



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54. Derive the equation of the ellipse in the form

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1.$$



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55. Find the derivative of  $\frac{x^2 - \cos x}{\sin x}$  with respect to  $x$

?



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