



MATHS

BOOKS - OSWAAL PUBLICATION

SOLVED PAPER 2016-1

Exercise

1. Define power set of a Set.

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2. If $G = \{7, 8\}$ and $H = \{5, 4, 2\}$, find $G \times H$ and $H \times G$.

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3. Convert 315° radians.

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4. Find the multiplicative inverse of $1+i$.

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5. If ${}^n C_8 = {}^n C_2$ find the value of 'n'.

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6. Write the first term of the sequence, whose n th term is

$$a_n = \frac{n}{n+1}.$$

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7. Reduce $3x - 2y - 12 = 0$ into intercept form.

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8. Evaluate $\lim_{x \rightarrow 0} (x \sec x)$?

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9. Write the negation of the statement " The number 2 is greater than 7"

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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 $U=\{1,2,3,4,5,6\}$, $A=\{2,3\}$ and $B=\{3,4,5\}$, verify that

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

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12. If X and Y are two sets such that $n(X) = 17$, $n(Y) = 23$, and n

$$(X \cup Y) = 38 \text{ find } n(X \cap Y)$$

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13. If $\left(\frac{x}{3} + 1, y - \frac{2}{3}\right) = \left(\frac{5}{3}, \frac{1}{3}\right)$, find the values of x and y .

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14. Find the angle in radians through which a pendulum swings if its length is 75 cm and the tip describes an arc of length 10 cm

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

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16. Express $\left(\frac{1}{3} + 3i\right)^3$ in the form $a+ib$.

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17. Solve $3(1 - x) < 2(x + 4)$ and show the graph of the solution on number line.

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18. The vertices of $\triangle PQR$ are $P(2,1), Q(-2,3)$ and $R(4,5)$. Find the equation of the median through the vertex R .

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19. Find the angle between the lines $\sqrt{3}x + y = 1$ and $x + \sqrt{3}y = 1$

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20. Given that $P(3,2,-4), Q(5,4,-6)$ and $R(9,8,-10)$ are collinear. Find the ratio in which Q divides PR .

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21. Evaluate $\lim_{x \rightarrow 0} \left[\frac{(x + 1)^5 - 1}{x} \right]$.

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

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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. A and B are events such that $P(A) = 0.42$, $P(B) = 0.48$ and $P(A \text{ and } B) = 0.16$, Determine (i) $P(\text{not } A)$, (ii) $P(\text{not } B)$ and (iii) $P(A \text{ or } B)$

B).



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25. In a survey of 400 students in a school, 100 were listed as taking apple juice, 150 as taking orange juice and 75 were listed as taking both apple as well as orange juice. Find how many students were taking neither apple juice nor orange juice.



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26. Let $f(x) = x^2$ and $g(x) = 2x + 1$ be two real valued functions, Find (i) $(f + g)(x)$



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27. Let $f(x) = x^2$ and $g(x) = 2x + 1$ be two real valued functions, Find (ii) $(f - g)(x)$

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28. Let $f(x) = x^2$ and $g(x) = 2x + 1$ be two real valued functions, Find (iii) $(fg)(x)$

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29. Find the general solution of $2 \cos^2 x + 3 \sin x = 0$

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30. Convert $\frac{-16}{1 + i\sqrt{3}}$ into polar form.

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31. Solve $\sqrt{2}x^2 + x + \sqrt{2} = 0$

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

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33. Find $(a + b)^4 - (a - b)^4$. Hence evaluate

$$(\sqrt{3} + \sqrt{2})^4 - (\sqrt{3} - \sqrt{2})^4.$$

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34. Insert five numbers between 8 and 26 such that the resulting sequence is in AP.

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35. 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.

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36. Find the eccentricity and length of latus rectum of the hyperbola $4x^2 - 9y^2 = 36$.

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37. Differentiate of $\cos x$ w.r.t. x from first principles



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38. Verify by the method of contradiction that $\sqrt{7}$ is irrational number



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39. A committee of two persons is selected from two men and two women. What is the probability that the committee will have (a) no man? (b) one man? (c) two men?



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40. A committee of two persons is selected from two men and two women. What is the probability that the committee will have (a) no man? (b) one man? (c) two men?

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41. A committee of two persons is selected from two men and two women. What is the probability that the committee will have (i) no men (ii) two men

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42. A fair die is thrown. Describe the following events.

A: a number less than 4

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43. A fair die is thrown. Describe the following events.

B: a number greater than 7

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44. A fair die is thrown. Describe the following events.

C: a multiple of 3.

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45. Define modulus function, draw the graph of it, write its domain and range.

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

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47.

$$\frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4} + \dots + \frac{1}{n(n+1)} = \frac{n}{n+1} \quad \forall n \in \mathbb{N}.$$

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48. Solve graphically the system of linear inequalities

$$4x + 3y \leq 60, y \geq 2x, x \geq 3, x, y \geq 0.$$

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

At least one boy and one girl?

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51. 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 : (iii) At least three girls.

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52. State and prove Binomial theorem for a positive integer index.

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53. Derive the expression for the length of the perpendicular drawn from the point (x_1, y_1) to the line $ax + by + c = 0$

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54. Find the coordinates of the mid-point of the line joining the points (x_1, y_1) and (x_2, y_2) .

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55. Prove that $\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$?

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56. Find the sum to n terms of the series , $5+11+19+29+41...$

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57. Derive the equation of the ellipse in the form $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$.

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58. If $y = \frac{\sin x + \cos x}{\sin x - \cos x}$ find $\frac{dy}{dx}$.

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