



MATHS

BOOKS - OSWAAL PUBLICATION

SOLVED PAPER 2019-2

Exercise

1. Write the set $(x : x \in R \& -4 < x \leq 6)$ as an interval.

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2. Let $A=\{1,2\}$ and $B=\{3,4\}$. Find the number of relations from A to B.

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3. Convert $7\frac{\pi}{6}$ into degree measure.



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4. Find the conjugate of $\sqrt{3}i - 1$



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5. Find 'n' if $n_{c7} = n_{c6}$



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6. Write the first three terms of the sequence $a_n = (-1)^{n-1}5^{n+1}$



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7. Find the slope of the line $\frac{x}{3} + \frac{y}{2} = 1$



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



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9. Write the negation of "For every real number x , x is less than $x + 1$. "



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10. If $\frac{2}{11}$ is the probability of an event 'A'. What is the probability of the event 'not A'?



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11.

If

$U = \{x : x \leq 10, x \in N\}$ $A = \{x : x \in N, x \text{ is prime}\}$ $B = \{x : x \in N, x \text{ is prime}\}$

write $A \cap B$ in roster form.

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12. If X and Y are two sets such that $n(X)=17, n(Y)=23$ and $n(X \cup Y) = 35$, Find $n(X \cap Y)$.

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13. The Cartesian product $A \times A$ has 9 elements among which are found $(-1,0)$ and $(0,1)$. Find the set A and the remaining elements of $A \times A$.

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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. If $\sin A = \frac{3}{5}$ and A is in I quadrant then find $\sin 2A$.

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16. Express $i^{18} + \left(\frac{1}{i}\right)^{25}$ in a+ib form.

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17. Solve $3x - 2 < 2x + 1$ & represent the solution graphically on the number line.

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18. Find the equation of the straight line intersecting y - axis at a distance of 2 units above the origin & making an angle 30° with the positive direction of x-axis .

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19. Find the angle between the lines

$$y - \sqrt{3}x - 5 = 0 \text{ and } \sqrt{3}y - x + 6 = 0$$



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20. Show that $(-2, 3, 5), (1, 2, 3), (7, 0, -1)$ are collinear



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21. Evaluate: $\lim_{x \rightarrow 3} \frac{x - 3}{(x - 3)(x - 2)}$



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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. Given $P(A) = \frac{3}{5}$ and $P(B) = \frac{1}{5}$. Find $P(A \text{ or } B)$, if A & B are mutually exclusive events.

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25. 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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26. 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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27. Find the general solution of $2 \cos^2 x + 3 \sin x = 0$



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28. Express $\frac{-1 + i}{\sqrt{2}}$ in the polar form.



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29. Solve the equation $x^2 + \frac{x}{\sqrt{2}} + 1 = 0$ as per solution.



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30. How many words with or without meaning can be made from the letters of the word 'MONDAY' assuming that no letters is repeated, if (i) 4 letters are used at a time.

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31. How many words with or without meaning can be made from the letters of the word 'MONDAY' assuming that no letters is repeated, if (i) 4 letters are used at a time.

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32. How many words with or without meaning can be made from the letters of the word 'MONDAY' assuming that no letters is repeated, if (iii) All letters are used but first letter is a vowel.

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33. Find the term independent of x in the expansion of $\left(\frac{3}{2}x^2 - \frac{1}{3x}\right)$.

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34. The sum of first three terms of a G.P. is $\frac{13}{12}$ and their product is -1 .

Find the common ratio and the terms.

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35. Insert 3 arithmetic means between 8 & 24 .

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36. Find the equation of parabola with vertex at the origin ,axis along x -axis & passing through the point (2,3)also find its focus.

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37. Find the derivative of the function $\cos x$, w.r.t. x from first principle.

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38. Verify by the method of contradiction that $\sqrt{2}$ is irrational .

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39. One card is drawn from a well shuffled deck of 52 cards.If each outcome is equally likely,calculate the probability that the card will be (a) a diamond.

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40. One card is drawn from a well shuffled deck of 52 cards.If each outcome is equally likely, calculate the probability that card will be Not an ace.

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41. One card is drawn from a well shuffled deck of 52 cards.If each outcome is equally likely,calculate the probability that the card will be (c) a black card.

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42. A fair coin 1 marked on one face & 6 on the other face & a fair die are both tossed.Find the probability that the sum of numbers that turn up (i) 3

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43. A fair coin 1 marked on one face & 6 on the other face & a fair die are both tossed.Find the probability that the sum of numbers that turn up (ii)12.

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44. Define a signum function. Write range, also draw the graph of the function.

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45.
$$\frac{\cos 4x + \cos 3x + \cos 2x}{\sin 4x + \sin 3x + \sin 2x} = \cot 3x$$

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46. For all $n \geq 1$ prove that

$$1^2 + 2^2 + 3^2 + 4^2 + \dots + n^2 = \frac{n(n+1)(2n+1)}{6}$$

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47. Solve the following system of inequations in 2 variables graphically:

$$x + 2y \geq 20, 3x + y \leq 15$$

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48. 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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49. State and prove Binomial theorem for a positive integer index.

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50. Find the coordinates of the foot of the perpendicular from the point $(-1,3)$ to the line $3x-4y-16=0$.

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51. Derive the formula to find the co-ordinates of a point which divide the line joining the points $A(x_1, y_1, z_1)$ and $B(x_2, y_2, z_2)$ internally in the ratio $m : n$.

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

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53. 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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54. (a) Derive geometrically that $\cos(x + y) = \cos x \cos y - \sin x \sin y$

. Hence deduce the value of $\cos 75^\circ$

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55. (b) Find the derivative of $\frac{x^5 - \cos x}{\sin x}$ with respect to x .

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

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57. Find the sum to n terms of the series $3 \times 8 + 6 \times 11 + 9 \times 14 + \dots$

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