MATHS

BOOKS - OSWAAL PUBLICATION

SAMPLE PAPER 3

Exercise

1. Define an empty set.

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2. If $\left(\frac{x+1}{2}, 7\right) = (6, 7)$.find x.

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3. Convert $\frac{7\pi}{6}$ radians in degree measure ?

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4. Find the real number x if $(x-2i)(1+i)$is purely imaginary.

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5. Given 4 flags of different colours, how many different signals can be generated, if a signal requires the use of 2 flags one below the other?

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6. For what values of x, the numbers $-\frac{2}{7}, x, -\frac{7}{2}$ are in G.P ?

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

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8. Find the derivative of $x^2 - 2$ at x=0.

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9. write the negation of 'For all $a, b \in I, a - b \in I'$.

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10. The probability of a sure event is:

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11. In a school there are 20 teachers who teach mathematics or physics. Of these, 12 teach mathematics and 4 teach both physics and mathematics. How many teach physics ?

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12. If P={1,2}, form the set $P \times P \times P$

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13. Taking the set of natural numbers as the universal set, write down the complements of the following sets:

$\{x : x \in N \text{ and } 2x + 1 > 10\}$

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14. Find the value of $\cos(-1710^\circ)$.

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15. Prove that $\sin 2x = \frac{2\tan x}{1+\tan^2 x}$

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16. Find the least positive integer m such that $\left(\frac{1+i}{1-i}\right)^{4m} = 1.$

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17. Solve $\{3(2x-5)-7\} \geq -9(x-5).$

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18. Find the distance of a point(3,-5) from the line$3x - 4y - 5 = 0$

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19. Find the angle between the lines $y - \sqrt{3}x - 5 = 0$ and $\sqrt{3}y - x + 6 = 0$

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20. Evaluate: $\lim_{x \to -2} \frac{\frac{1}{x} + \frac{1}{2}}{x + 2}$

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21. Show that the points P(- 2 , 3, 5) , Q (1, 2, 3) and R(7, 0, -1) are collinear.

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22. Write the contrapositive and converse of "If a paralleogram is a square,then it is a rhombus".

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23. Write the mean of the given data : 6,7,10,12,13,4,8,12 ?

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24. If A and B are mutually exclusive events, given that $P(A) = \frac{3}{5}, P(B) = \frac{1}{5}$, then P(A or B) is

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25. There are 200 individuals with a skin disorder, 120 had been exposed to the chemical $C_1, 50$ to chemical C_2, and 30 to both the chemicals C_1 and C_2. Find the number of individuals exposed to

(i) Chemical C_1 but not chemical C_2

(ii) Chemical C_2 but not chemical C_1

(iii) Chemical C_1 or chemical C_2

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27. Let A={1,2},B={1,2,3,4],C={5,6}.Verify that $A \times (B \cap C) = (A \times B) \cap (A \times C)$.

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28. In any triangle ABC, $\sin. \frac{A}{2}$ is

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

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30. Solve the equation $x^2 + \frac{x}{\sqrt{2}} + 2 = 0$

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31. In how many ways can 5 girls and 3 boys be selected in a row so that no two boys are together ?

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32. Find the middle term in the expansion of $\left(\frac{x}{3} + 9y\right)^{10}$

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33. The number of bacteria in a certain culture doubles every hour. If there were 30 bacteria present in the culture originally, how many bacteria will be present at the end of 2^{nd} hour, 4^{th} hour and n^{th} hour ?

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34. The difference between any two consecutive interior angles of a polygon is 5° .If the smallest angle is 120° , find the number of the sides of the polygon.

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35. Find the equation of the ellipse, with major axis along the x-axis and passing through the points $(4, 3)$ and $(-1, 4)$

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36. Find the derivative of (tanx) w.r.t x from first principal method ?

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

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38. One card is drawn from a well shuffled deck of 52 cards. If each outcomes is equally likely, calculate the probability that the card will be

(i) a diamond

(ii) not a ace

(iii) a black card (i.e., a club or, a spade) (iv) not a diamond

(v) not a black card.

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41. A fair coin with 1 marked on one face and 6 on the other and a fair die are both tossed Find the probability that the sum of numbers that turn up is (i) 3 (ii) 12

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43. Define a modulus function . Draw its graph. Also write down its domain and range.

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44. Prove that $\cos^2 2x - \cos^2 6x = \sin 4x . \sin 8x$?

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45.

$$\frac{1}{2 \cdot 5} + \frac{1}{5 \cdot 8} + \frac{1}{8 \cdot 11} + \ldots\ldots\ldots \frac{1}{(3n-1)(3n+2)} = \frac{n}{(6n+4)} \forall n \in N$$

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46. Solve the following system of inequalities graphically :

$5x + 4y \leq 20, x \geq 1, y \geq 2$

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47. What is the number of ways of choosing 4 cards from a pack of 52 playing cards? In how many of these

(i) four cards are of the same suit,

(ii) four cards belong to four different suits,

(iii) are face cards,

(iv) two are red cards and two are black cards,

(v) cards are of the same colour?

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

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52. Prove that $\lim_{x \to 0} \left(\frac{\sin x}{x} = 1 \right)$?

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53. The mean and standard deviation of 100 observations were calculated as 40 and 5.1, respectively by a student who took by mistake 50 instead of 40 for one observation. What are the correct mean and standard deviation?

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

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56. Find the derivative of $f(x) = 2x^2 + 3x - 5$,also prove that $f'(0) + 3f'(-1) = 0$.

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57. Find the sum to n terms of the series $1^2 + (1^2 + 2^2) + (1^2 + 2^2 + 3^2) + \ldots\ldots$.

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