



MATHS

BOOKS - OSWAAL PUBLICATION

SAMPLE PAPER 5

Exercise

1. If A has 4 elements. How many subsets does A have?

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2. Convert 520° into radian measure ?

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

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4. If $\frac{1}{6!} + \frac{1}{7!} = \frac{x}{8!}$, find x

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5. Find the 20th term of the G.P $\frac{5}{2}, \frac{5}{4}, \frac{5}{8}, \dots$?

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6. Find the slope of the lines making inclination of 60° with the positive direction of x-axis ?

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7. Find the derivative of $2x - \frac{3}{4}$ w.r.t. x .

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

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9. Define mutually exclusive events.

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10. If for some non-empty sets A and B containing 3 elements each, subset $A \times B = \{(3,4), (5,-3), (6,1)\}$. Find the set A .

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11. If $A=\{1,2,3,4\}$, $B=\{2,3,5\}$ and $C=\{3,5,6\}$. Find $A \cup (B \cap C)$.

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12. If X and Y are two sets such that $n(X) = 17$, $n(Y) = 23$, and $n(X \cup Y) = 38$ find $n(X \cap Y)$

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13. Find the range and domain of the real function $f(x) = \sqrt{9 - x^2}$.

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14. The minute hand of a clock is 2.1cm long. How far does its tip move in 20 minutes. $\left(\text{use } \pi = \frac{22}{7}\right)$



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15. Prove that $\tan(x + y) = \frac{\tan x + \tan y}{1 - \tan x \tan y}$



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16. Evaluate: $\lim_{x \rightarrow -1} [1 + x + x^2 + x^3 + \dots + x^{10}]$.



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17. A die is thrown. Write the sample space. Also find the probability of the event "A number greater than or equal to 3 will appear".



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18. Write the inverse , converse of 'If a parallelogram is a square , then it is a rhombus.

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19. Two series A and B with equal means standard deviation 9 and 10 respectively . Which series is more consistent ?

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20. Find the equation of the line perpendicular to the line $x + y + 2 = 0$ and passing through the point $(-1,0)$.

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21. Convert the complex number $-1+i$ in the polar form ?



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22. Solve $3x + 2y > 6$ graphically.



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23. Find the distance between the parallel lines $3x - 4y + 7 = 0$ and $3x - 4y + 5 = 0$?



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24. Show that the points A(1,2,3), B(-1,-2,-1), C(2,3,2) and D(4,7,6) are the vertices of a parallelogram.



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25. In a group of 65 people, 40 like cricket, 10 like both cricket and tennis. How many like tennis only and not cricket? How many like tennis?

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26. Determine the domain and range of the relation R defined by
 $R = \{(x, x+5) : x \text{ in } \{0, 1, 2, 3, 4, 5\}\}$

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27. Prove that

$$(\cos x + \cos y)^2 + (\sin x - \sin y)^2 = 4 \cos^2 \left(\frac{x + y}{2} \right)$$

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28. Solve the equation $x^2 + 3x + 9 = 0$.

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29. Find real θ such that $\frac{3 + 2i \sin \theta}{1 - 2i \sin \theta}$ is purely real.

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30. In a class of 60 students. 30 opted for NCC, 32 opted for NSS and 24 opted for both NCC and NSS. If one of these students is selected at random, find the probability that

- (i) The student opted for NCC or NSS.
- (ii) The student has opted neither NCC nor NSS.
- (iii) The students has opted NSS but not NCC.

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31. In a class of 60 students. 30 opted for NCC, 32 opted for NSS and 24 opted for both NCC and NSS. If one of these students is selected at random, find the probability that

- (i) The student opted for NCC or NSS.
- (ii) The student has opted neither NCC nor NSS.
- (iii) The students has opted NSS but not NCC.

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32. Find the coefficient of x^6y^3 in the expansion of $(x + 2y)^9$

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33. Find the sum of the sequence 7,77,777,7777,.....n terms

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34. If $\frac{a^n + b^n}{a^{n-1} + b^{n-1}}$ is the A.M. between a and b, then find the value of n.

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35. Find the derivative of the function 'x' with respect to 'x' using first principle.

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36. Find the centre and radius of the circle

$$x^2 + y^2 + 8x + 10y - 8 = 0$$

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37. How many words, with or without meaning can be made from the letters of the word MONDAY, assuming that no letter is repeated, if.

(i) 4 letters are used at a time,

(ii) all letters are used at a time

(iii) all letters are used but first letter is a vowel ?

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38. How many words, with or without meaning can be made from the letters of the word MONDAY, assuming that no letter is repeated, if.

(i) 4 letters are used at a time,

(ii) all letters are used at a time

(iii) all letters are used but first letter is a vowel ?

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39. How many words, with or without meaning can be made from the letters of the word MONDAY, assuming that no letter is repeated, if.

(i) 4 letters are used at a time,

(ii) all letters are used at a time

(iii) all letters are used but first letter is a vowel ?

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

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41. Find the probability that when a hand of 7 cards is drawn from a well shuffled deck of 52 cards, it contains (i) 3 kings.

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42. Find the probability that when a hand of 7 cards is drawn from a well shuffled deck of 52 cards, it contains (ii) Atleast 3 kings.

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43. Define greatest integer function .Draw its graph ,write its domain and range ?

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44. 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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45.

$$\frac{1}{1.4} + \frac{1}{4.7} + \frac{1}{7.10} + \dots + \frac{1}{(3n-2)(3n+1)} = \frac{n}{(3n+1)} \forall n \in \mathbb{N}.$$

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46. How many words with or without meaning each of 3 vowels and 2 consonants can be formed from the letters of the word INVOLUTE.

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47. Find a if the 17^{th} and 18^{th} terms of the expansion $(2+a)^{50}$ are equal.

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48. Derive the equation of the line with slope m and y -intercept c . Also find the equation of the line for which $\tan \theta = \frac{1}{2}$ and y -intercept c is $-\frac{3}{2}$

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49. Prove that $\cos^2 x + \cos^2\left(x + \frac{\pi}{3}\right) + \cos^2\left(x - \frac{\pi}{3}\right) = \frac{3}{2}$ and hence find the values of $\sin^2 x + \sin^2\left(x + \frac{\pi}{3}\right) + \sin^2\left(x - \frac{\pi}{3}\right)$

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50. A manufacturer has 600 litres of a 12% solution of acid. How many litres of a 30% acid solution must be added to it so that acid content in the resulting mixture will be more than 15% but less than 18%?

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51. Find the sum to 'n' terms of $1.2.3 + 2.3.4 + 3.4.5 + \dots$

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52. Suppose $f(x) = \begin{cases} a + bx, & x < 1 \\ 4, & x = 1 \\ b - ax, & x > 1 \end{cases}$

and if $\lim_{x \rightarrow 1} f(x) = f(1)$ what are possible values of a and b?

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