MATHS

BOOKS - OSWAAL PUBLICATION

SAMPLE PAPER 7

Exercise

1. Find the 20^{th} term from end of the sequence

3,8,13 ..... 253.

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2. Write the following sets in the set-builder form: $\{1, 4, 9, \ldots\ldots\ldots\ldots 100\}$

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3. Describe the sample space for the indicated experiments.

A coin is tossed three times and exactly one head appears.

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4. Prove that the following points are collinear

(using the slope concept)

$A = (3, -4), B = (-7, 6), C = (-2, 1)$

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5. If R is the relation "is greater than" from A= {2,3,4,5,6} to B={2,5,6}, write the elements of R.

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6. Write the negation of statement "every natural number is an integer"?

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7. $(1-\sin(2)A)\left(1+\tan^2 A\right)=1$

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8. Evaluate $\lim_{x \to 4} \frac{4x+2}{x-2}$.

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9. Find the least positive integer 'n' such that $\left(\frac{1+i}{1-i}\right)^n = 1.$

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10. How many 3 - digit numbers can be formed by using the digits 1 to 9 if no digit is repeated ?

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11. Find the equation of line passing through (4, 2) and parallel to the line $5x - 7y + 11 = 0$

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12. set U={0,1,2,3,4,5,6,7,8,9},A={0,1,3,5,7},B={0,2,4,6,8},C={1,4,9}.Find $(A \cap B)'$ and $(A \cap C)'$.

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13. Three are 4 men and 6 women in a city council.If one council member is selected for a committee at random how likely is it that it is women ?

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14. Solve $7x + 3 < 5x + 9$. Show the graph of the solution on number line.

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15. Find the degree measure of the angle subtended at the centre of a circle of radius 100 cm by an arc of length 22 cm (Use $\pi = \frac{22}{7}$)

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16. Let $f(x) = \sqrt{x}$ and $g(x) = x$ be two functions defined over the set of non-negative real numbers. Find $(f+g)(x), (f-g), (fg)(x)$ and $\left(\frac{f}{g}\right)(x)$.

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17. Check the validity of the statements

(i) 200 is multiple of 4 and 5

(ii) 240 is a multiple of 3 or 5

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19. Prove that the points (2, -5) & (-1, 4) are equidistant from the line $3x + y - 5 = 0$.

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20. Find real value of θ for which $\dfrac{3 + 2i\sin\theta}{1 - 2i\sin\theta}$ is purely real.

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21. Define finite and infinite set with suitable examples.

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22. Evaluate $\lim_{x \to 1} \frac{x^{15} - 1}{x^{10} - 1}$.

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23. Prove that : $\sin 3x = 3 \sin x - 4 \sin^3 x$

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24. Show that the points $A(0, 7, 10), B(-1, 6, 6)$ and $C(-4, 9, 6)$ from a right angled triangle.

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25. A box contains 10 red marbles,20 blue marbles and 30 green marbles.5 marbles are drawn from the box.What is the probability that(i)all will be blue

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26. A box contains 10 red marbles, 20 blue marbles and 30 green marbles. 5 marbles are drawn from the box.What is the probability that (I) all will be blue ? (ii) atleast one will be green?

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27. Find four numbers forming a geometric progression in which the third term is greater

than the first term by 9, and the second term is greater than the 4^{th} by 18.

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28. Convert $\frac{1+7i}{(2-i)^2}$ in the polar form.

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29. In a survey of 60 people, it was found that 25 people read newspaper H, 26 read newspaper T, 26 read newspaper I, 9 read both

H and I, 11 read both H and T, 8 read both T and I, 3 read all three newspapers. Find:

the number of people who read at least one of the newspapers.

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30. In a survey of 60 people, it was found that 25 people read newspaper H, 26 read newspaper T, 26 read newspaper I, 9 read both H and I, 11 read both H and T, 8 read both T and I, 3 read all three newspapers. Find:

the number of people who read exactly one newspaper.

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31. Verify by the method of contradiction that $\sqrt{5}$ is irrational.

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32. Let R be a relation on the set Z of all integers defined by:(x,y) in $R \Rightarrow (x - y)$ is

divisible by n is eqivalence

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33. Let R be a relation on the set Z of all integers defined by:(x,y) in $R \Rightarrow (x-y)$ is divisible by n.Prove that (b) $(x, y) \in R \Rightarrow (y, x) \in Rf$ or $allx, y, z \in Z.$

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34. Find the derivative of $f(x) = \dfrac{2x+3}{x-2}$ from the first principle.

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35. Let $z_1 = 2 - I$, $z_2 = -2 + i$, Find

(i) $\left(Re\dfrac{z_1 z_2}{\bar{z}_1}\right)$, (ii) $Im\left(\dfrac{1}{z_1 \bar{z}_1}\right)$

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36. Let $z_1 = 2 - I, z_2 = -2 + i$, Find

(i) $\left(Re\frac{z_1 z_2}{\bar{z}_1}\right)$, (ii) $Im\left(\frac{1}{z_1 \bar{z}_1}\right)$

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37. Find the value of n such that

${}^{n}P_5 = 42^{n}P_3, n > 4$

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38. If the sum of n terms of an A . P is $3n^2 + 5n$ and its m^{th} term is 164 , find the value of m.

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39. For any real number of x and y, $\cos x = \cos y$,prove that $x = 2n\pi \pm y$ where $n \in Z$

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40. Find the equation of the hyperbola where foci are $(0, \pm 12)$ and the length of the latus rectum is 36.

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41. Find the Middle terms in

$$\left(2x^2 - \frac{1}{\sqrt{x}}\right)^{11}$$

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42. In a lottery 10,000 tickets are sold and ten equal prizes are awarded.What is the probability of not getting a prize if you buy(i) 1ticket.

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43. In a lottery 10,000 tickets are sold and ten equal prizes are awarded.What is the probability of not getting a prize if you buy(ii) 2 tickets.

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44. In a lottery 10,000 tickets are sold and ten equal prizes are awarded.What is the probability of not getting a prize if you buy 10 tickets.

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45. Define constant function.Draw the graph of constant function.Write the domain and range of the function.

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46. Prove that $\cos 20^\circ \cos 40^\circ \cos 60^\circ \cos 80^\circ = \frac{1}{16}$.

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47. Solve graphically

$x + 2y \leq 10, x + y \geq 1, x - y \leq 0, y \leq 0$

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

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49. Derive an expression for the co-ordinates of points that divides the linejoining points $A(x_1, y_1, z_1)$ and $B(x_2, y_2, z_2)$ internally in the ratio m:n.Hence find the co-ordinates of midpoint of AB where A=(3,2,1) and B=(7,6,5).

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50. Derive the equation for straight line in normal form.Hence find the equation of line p=2 and $\omega = 60^\circ$.

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51. State and prove Bionomial theorem for any positive integer n.

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52. Find the number of arrangements of the letters of the work "EXAMINATION". In how many of these arrangements.

(i) do the word, start with M.

(ii) do all the vowels always occur together.

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53. Find the number of arrangements of the letters of the word INDEPENDENCE. In how

many of these arrangements,

do all the vowels always occur together

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54. prove that

$\cos(A+B) = \cos A \cos B - \sin A \sin B$

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55. Find the sum to 'n' terms if n^{th} term is given by $n^2 + 2^n$

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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 derivative of $\frac{4x + 5\sin x}{3x + 7\cos x}$ using rule of differentiation.

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