MATHS

BOOKS - MAXIMUM PUBLICATION

QUESTION PAPER MARCH 18

Example

1. Find the sum to n terms of the sequence

$$4 + 44 + 444 + \ldots\ldots$$

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2. Solve: $\sin 2x - \sin 4x + \sin 6x = 0$

3. If A and B are events such that $P(A) = \dfrac{1}{4}$, $P(B) = \dfrac{1}{2}, P\left(A \bigcap B\right) = \dfrac{1}{6}$

Then find P(A or B)

4. If A and B are events such that $P(A) = \dfrac{1}{4}$, $P(B) = \dfrac{1}{2}, P\left(A \cap B\right) = \dfrac{1}{6}$

Then find P(not A and not B)

5. In a $\triangle ABC$, prove that

$$\tan\left(\frac{B-C}{2}\right) = \frac{b-c}{b+c}\cot\frac{A}{2}$$

6. The maximum value of the function

$$f(x) = \sin x \text{ is......}$$

A. 1

B. $\dfrac{\sqrt{3}}{2}$

C. $\dfrac{1}{2}$

D. 2

Answer: A

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7. Prove that, $(\sin x + \cos x)^2 = 1 + \sin 2x$

8. Find the maximum value of $\sin x + \cos x$

9. $\lim_{x \to 2} [x] = ...$

A. 2

B. 3

C. 0

D. does not exist

Answer: D

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10. Evaluate : $\lim_{x \to 2} \dfrac{x^3 - 4x^2 + 4x}{x^2 - 4}$

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11. One card is drawn at random from a pack of 52 playing cards. Find the probability that, the card drawn is black.

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12. One card is drawn at random from a pack of 52 playing cards. Find the probability that, the card is face card.

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13. One card is drawn at random from a pack of 52 playing cards. Find the probability that, the card is a black face card.

14. If $A = \{a, b, c\}$, then write power set of $P(A)$.

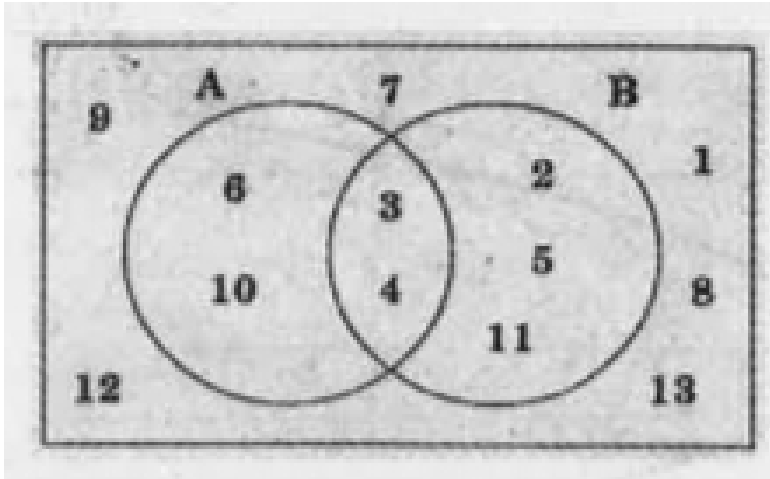**15.** If the number of subsets with two elements of a set P is 10,then find the total number of elements in set P.

16. Consider the Venn diagram of the Universal set $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13\}$

Verify $\left(A \cup B\right)' = A' \cap B'$

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17. Consider the Venn diagram of the Universal set $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13\}$
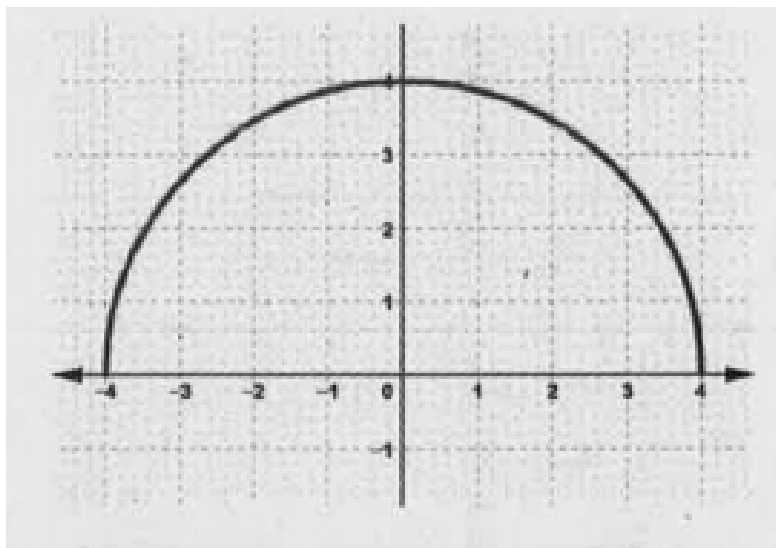
Find $n\left(A \cap B\right)'$

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18. The figure shows the graph of a function

$f(x)$

which is a semi circle centered ar origin.

Write the domain and range of $f(x)$

19. If $3^{2n+2} - 8n - 9$ is divisible by 'k' for all $n \in N$ is true, then which one of the following is a value of 'k'?a)8 b)6 c)3 d)12

A. 8

B. 6

C. 3

D. 12

Answer: A

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20. Prove by using the principal of Mathematical Induction

$$P(n) = 1 + 3 + 3^2 + \ldots\ldots + 3^{n-1} = \frac{3^n - 1}{2}$$

is true for all $n \in N$

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21. Solve the inequality

$$\frac{2x - 1}{3} \geq \frac{3x - 2}{4} - \frac{2 - x}{5}$$

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22. Solve the inequality

$$\frac{2x - 1}{3} \geq \frac{3x - 2}{4} - \frac{2 - x}{5}$$

Represent the solution on a number line.

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23. Find the nth term of the sequence

3,5,7,.........

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24. Find the sum to n terms of the series

$$3 \times 1^2 + 5 \times 2^2 + 7 \times 3^2 + \text{........}$$

25. Find the equation of the circle passing through the points (4,1) and (6,5) and whose centre is on the line $4x + y = 16$

26. Consider a point $A(4, 8, 10)$ in space

Find the distance of the point A from XY-Plane.

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27. Consider a point $A(4, 8, 10)$ in space

Find the distance of the point A from X-axis.

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28. Consider a point $A(4, 8, 10)$ in space. Find the ratio in which the line segment joining the point A and B $(6, 10, -8)$ is divided by YZ-plane.

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29. Which one of the following sentences is a statement? A) 275 is a perfect square. B)Mathematics is a difficult subject C)Answer this question D)Today is a rainy day

A. 275 is perfect square.

B. Mathematics is a difficult subject

C. Answer this question

D. Today is a rainy day.

Answer: A

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30. Verify by method of contradiction $p: \sqrt{2}$ is irrational.

31. Consider the quadratic equation

$$x^2 + x + 1 = 0$$

Solve the quadratic equation.

32. Consider the quadratic equation $x^2 + x + 1 = 0$.Write the polar form of one of the roots.

33. Consider the quadratic equation $x^2 + x + 1 = 0$.If the two roots of the given quadratic are α and β.Show that $\alpha^2 = \beta$

34. Which of the following has its middle term independent of x?

A. $\left(x + \dfrac{1}{x}\right)^{10}$

B. $\left(x + \dfrac{1}{x} \right)^9$

C. $\left(x^2 + \dfrac{1}{x} \right)^9$

D. $\left(x^2 + \dfrac{1}{x} \right)^{10}$

Answer: A

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35. Write the expansion of $\left(x^2 + \dfrac{3}{x} \right)^4$

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36. Determine whether the expansion of $\left(x^2 + \dfrac{2}{x}\right)^{18}$ will contain a term containing x^{10}
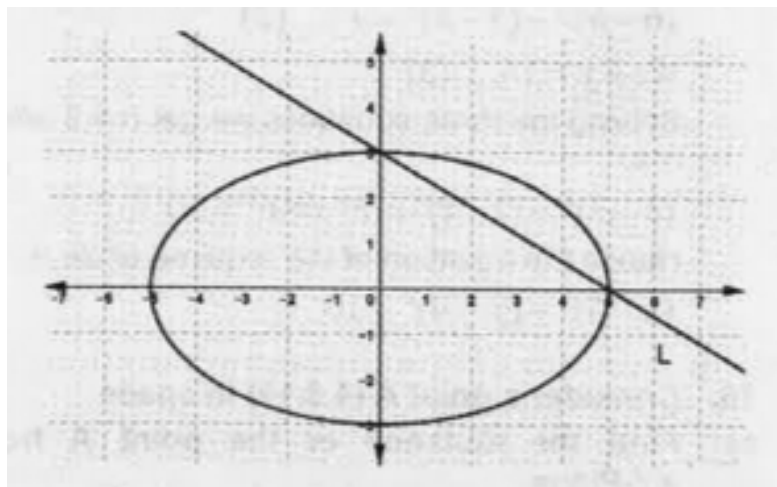
37. The figure shows an ellipse $\dfrac{x^2}{25} + \dfrac{y^2}{9} = 1$ and a line L.

Find the equation of the line parallel to the

line L and passing through any one of the foci.

38. Find the derivative of $y = \sin x$ from the first principle.

39. Find $\dfrac{dy}{dx}$, if $y = \dfrac{x^5 - \cos x}{\sin x}$

40. Find n,if $12 \times^{(n-1)} P_3 = 5 \times^{(n+1)} P_3$

41. If 'nPr'=840,nCr=35 , find r.

42. English alphabet has 5 vowels and 21 consonants. How many 4 letter words with two different vowels and two different consonants can be formed without repetition of letters?

43. Consider the following distribution:

Calculate the mean of the distribution

Class	10-20	20-30	30-40	40-50	50-60
Freq-uency	6	15	13	7	9

44. Consider the following distribution,

Find the standard deviation of the distribution.

Class	10-20	20-30	30-40	40-50	50-60
Freq-uency	6	15	13	7	9

45. Consider the following distribution,

Find the coefficient of variation of the distribution.

Class	10-20	20-30	30-40	40-50	50-60
Freq-uency	6	15	13	7	9

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