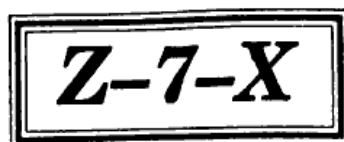


Roll No.



Total No. of Questions : 31]

[Total No. of Printed Pages : 8

11thARM(SZ)JKUT2024

1207-X

MATHEMATICS

Time : 3.00 Hours]

[Maximum Marks : 80

General Instructions :

- (i) This question paper contains 4 Sections A, B, C and D. Each Section is compulsory.
- (ii) **Section-A** : Q. No. 1 to 10 comprises of 10 questions of 1 mark each.
- (iii) **Section-B** : Q. No. 11 to 20 comprises of 10 Very Short Answer (V.S.A.) type questions of 2 marks each.
- (iv) **Section-C** : Q. No. 21 to 28 comprises of 8 Short Answer (S.A.) type questions of 4 marks each.
- (v) **Section-D** : Q. No. 29 to 31 comprises of 3 Long Answer (L.A.) type questions of 6 marks each.

Z-7-X

11thARM(SZ)JKUT2024-1207-X

Turn Over

(2)

Section-A

(Objective Type Questions)

1 each

1. Subsets of set $\{-1, 1\}$ are :

- (A) $\phi, \{-1\}$
- (B) ϕ only
- (C) $\phi, \{-1\}, \{1\}, \{-1, 1\}$
- (D) 0

2. Let :

$$f(x) = \frac{x^2}{2},$$

then $f(2)$ is equal to :

- (A) 2
- (B) 4
- (C) 6
- (D) 8

3. $\sin(x + y)$ is equal to :

- (A) $\sin x + \sin y$
- (B) $\sin x - \sin y$
- (C) $\sin x \cos y + \cos x \sin y$
- (D) None of these

4. The value of $(\sqrt{3}i)^2$ is equal to :

- (A) 3
- (B) -3
- (C) 9
- (D) 18

5. The value of

$$\frac{n!}{(n-r)!}$$

when $n = 6$, $r = 2$ is equal to :

- (A) 6
- (B) 8
- (C) 15
- (D) 30

6. e (eccentricity) of ellipse is :

- (A) $e < 1$
- (B) $e = 1$
- (C) $e > 1$
- (D) $e = 2$

7. Equation of circle with centre (0, 2) and radius 2 is equal to :
- (A) $x^2 + y^2 - 6y = 0$
- (B) $x^2 + y^2 - 4y = 0$
- (C) $x^2 + 2y^2 - 3 = 0$
- (D) $2x^2 + y^2 + 3y = 0$
8. The value of $-12x > 30$ when x is a natural number is :
- (A) 3
- (B) < 3
- (C) No solution
- (D) 0
9. Mean of first 4 natural numbers is :
- (A) 4
- (B) 2.5
- (C) 0
- (D) -4
10. Sample space of a coin when tossed twice is :
- (A) {H, H}
- (B) {HH, HT, TH, TT}
- (C) {HH, TT}
- (D) {TH, HT}

Section-B**(Very Short Answer Type Questions)****2 each**

11. Write down all the subsets of set $\{1, 2, 3\}$.
12. Find the union of sets $A = \{x/x \text{ is a natural number and } 1 < x \leq 6\}$,
 $B = \{x/x \text{ is natural number and } 6 < x < 10\}$.
13. Reduce the equation $3x + 2y - 12 = 0$ into intercept form and find its intercepts on the axes.
14. Find the centre and radius of the circle $(x + 5)^2 + (y - 3)^2 = 36$.
15. Find the coordinates of focus and the equation of the directrix of the parabola $y^2 = 12x$. <https://www.jkboseonline.com>
16. Find the degree measure of the angle subtended at the centre of circle of radius 100 cm by an arc of length 22 cm. $\left(\text{Use } \pi = \frac{22}{7} \right)$
17. Write down the sample space when a die is thrown twice.

18. Find the mean deviation about the median for the data as under :

13, 17, 16, 14, 11, 13, 10, 16, 11, 18, 12, 17.
 6 11 8 7 2 5 1 9 3 12 4 10

19. If

$$\frac{1}{6!} + \frac{1}{7!} = \frac{x}{8!}$$

then find x .

20. Which term of the sequence $\sqrt{3}, 3, 3\sqrt{3}, \dots$ is 729?

Section-C

(Short Answer Type Questions)

21. Find the domain and range of the real function :

$$f(x) = \sqrt{9 - x^2}.$$

22. Prove that :

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

23. Find the multiplicative inverse of $\sqrt{5} + 3i$.

24. Solve the inequality :

$$\frac{x}{2} - \frac{5x}{3} \geq \frac{2}{3} - \frac{7x}{5}$$

b

and show the graph of the solution on number line.

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Z-7-X

25. If p is the length of perpendicular from the origin to the line whose intercepts on the axes are ' a ' and ' b ', then show that :

$$\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}.$$

26. Find the derivative of :

$$f(x) = \frac{2x + 3}{x - 2}$$

from the first principle.

27. Find the derivative of :

$$(5x^3 + 3x - 1)(x - 1).$$

28. Find n if

$${}^{n-1}P_3 : {}^nP_4 = 1 : 9.$$

Section-D

(Long Answer Type Questions)

6 each

29. Prove that :

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

Or

Prove that :

$$\cos 4x = 1 - 8 \sin^2 x \cos^2 x.$$

30. In how many ways can one select a cricket team of 11 from 17 players in which only 5 players can bowl if each cricket team of 11 must include exactly 4 bowlers.

Or

In how many ways can a student choose a programme of 5 courses if 9 courses are available and 2 specific courses are compulsory for every student.

31. Find the mean deviation about the mean for the following data :

Income Per Day (in ₹)	No. of Persons
0—100	4
100—200	8
200—300	9
300—400	10
400—500	7
500—600	5
600—700	4
700—800	3

Or

In Class XI of a school 40% of the students study Mathematics and 30% students study Biology. 10% of the class study both Mathematics and Biology. If a student is selected at random from the class, find the probability that he will be studying Mathematics or Biology or both.

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Total No. of Questions : 31]

[Total No. of Printed Pages : 8

11thARM(SZ)JKUT2024

1207-Y

MATHEMATICS

Time : 3.00 Hours]

[Maximum Marks : 80

General Instructions :

- (i) This question paper contains 4 Sections A, B, C and D. Each Section is compulsory.
- (ii) **Section-A** : Q. No. 1 to 10 comprises of 10 questions of 1 mark each.
- (iii) **Section-B** : Q. No. 11 to 20 comprises of 10 Very Short Answer (V.S.A.) type questions of 2 marks each.
- (iv) **Section-C** : Q. No. 21 to 28 comprises of 8 Short Answer (S.A.) type questions of 4 marks each.
- (v) **Section-D** : Q. No. 29 to 31 comprises of 3 Long Answer (L.A.) type questions of 6 marks each.

Z-7-Y

11thARM(SZ)JKUT2024-1207-Y

Turn Over

<https://www.jkboseonline.com>

Section-A

(Objective Type Questions)

1 each

Set builder form of $\{3, 6, 9, 12\}$ is :

- (A) $\{x \mid x = 3n, n \in \mathbb{N} \text{ and } 1 \leq n \leq 9\}$
 (B) $\{x \mid x = 4n, n \in \mathbb{N} \text{ and } 1 \leq n \leq 6\}$
 (C) $\{x \mid x = 3n, n \in \mathbb{N} \text{ and } 1 \leq n \leq 4\}$
 (D) $\{x \mid x = 2n, n \in \mathbb{N} \text{ and } 1 \leq n \leq 4\}$

2. Let $f(x) = 2x - 5$, then $f(7)$ is equal to :

- (A) 12
 (B) 11
 (C) 0
 (D) 9

3. $\sin 3x$ is equal to :

- (A) $4 \sin x - 3 \cos^3 x$
 (B) $3 \sin x - 4 \sin^3 x$
 (C) $4 \cos x - 3 \sin^3 x$
 (D) $4 \sin x - 3 \cos x$

4. The value of $(5i)(-3 - 5i)$:

(A) $-15i + 25$

(B) $-25 + 15i$

(C) $3i - 15$

(D) $25 - 5i$

5. The value of :

$$\frac{n!}{(n-r)!}$$

when $n = 9$, $r = 5$ is :

(A) 1,300

(B) 2,400

(C) 15,120

(D) 12,560

6. The e (eccentricity) of ellipse is equal to :

(A) $e = 1$

(B) $e < 1$

(C) $e > 1$

(D) $e = 2$

7. Equation of circle with centre $(-a, -b)$ is radius $\sqrt{a^2 + b^2}$ is equal to :

(A) $x^2 + y^2 + 2ax + 2by + 2b^2 = 0$

(B) $x^2 + y^2 - ax - by = 0$

(C) $x^2 + 2y^2 - 2ax + 4ay = 0$

(D) $x^2 + y^2 - 2ax + 4ay = 0$

8. The value of $5x - 3 < 7$ when x is an integer is :

(A) $\{\dots\dots -2, -1, 0, 1\}$

(B) $\{-2, -1, \dots\dots\}$

(C) $\{-\infty, \infty\}$

(D) $\{1, 2, 3, \dots\dots\}$

9. The mean of first n natural number is :

(A) $\frac{n(n^2 + 1)}{2}$

(B) $\frac{n(n + 1)}{4}$

(C) $\frac{n(n + 1)}{2}$

(D) $\frac{(n + 1)}{2}$

10. The probability of doublet in 2 throws of a dice is :

(A) $\frac{1}{8}$

(B) $\frac{1}{6}$

(C) $\frac{1}{9}$

(D) $\frac{10}{21}$

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Z-7-Y

Section-B**(Very Short Answer Type Questions)**

2 each

11. ✓ Write down the subsets of $\{a, b\}$.
12. Find the union of set $A = \{x/x \text{ is natural number and multiple of } 3\}$ and $B = \{x/x \text{ is natural number less than } 6\}$.
13. Reduce the equation $4x - 3y = 6$ into intercept form and find its intercepts on the axes. <https://www.jkboseonline.com>
14. Find the centre and radius of the circle $x^2 + y^2 - 4x - 8y - 45 = 0$.
15. Find the equation of the parabola with vertex $(0, 0)$ and focus $(3, 0)$.
16. A wheel makes 360 revolution in 1 minute. Through how many radians does it turn in 1 second.
17. Write the sample space when a coin is tossed thrice.

18. Find the mean deviation about the median for the data as under :
13, 17, 16, 14, 11, 13, 10, 16, 11, 18, 12, 17.

19. ✓ If

$$\frac{1}{6!} + \frac{1}{7!} = \frac{x}{8!}$$

then find x .

20. Which term of the sequence $\sqrt{3}, 3, 3\sqrt{3}, \dots$ is 729.

Section-C

(Short Answer Type Questions)

21. ✓ Find the domain and range of the real function :

$$f(x) = \sqrt{9 - x^2}.$$

22. ✓ Prove that :

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

23. Find the multiplicative inverse of $\sqrt{5} + 3i$.

24. ✓ Solve the inequality :

$$\frac{x}{2} \geq \frac{5x - 2}{3} - \frac{7x - 3}{5}$$

and show the graph of the solution on number line.

25. If p is the length of perpendicular from the origin to the line whose intercepts on the axes are 'a' and 'b', then show that :

$$\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}.$$

26. Find the derivative of :

$$f(x) = \frac{2x + 3}{x - 2}$$

from the first principle.

27. Find the derivative of :

$$(5x^3 + 3x - 1)(x - 1).$$

28. Find n if

$${}^{n-1}p_3 : {}^np_4 = 1 : 9.$$

Section-D

(Long Answer Type Questions)

6 each

29. Prove that :

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

Or

Prove that :

$$\cos 4x = 1 - 8 \sin^2 x \cos^2 x.$$

30. In how many ways can one select a cricket team of 11 from 17 players in which only 5 players can bowl if each cricket team of 11 must include exactly 4 bowlers.

11th ARM(SZ)JKUT2024-1207-Y

Turn Over

Z-7-Y

Or

In how many ways can a student choose a programme of 5 courses if 9 courses are available and 2 specific courses are compulsory for every student.

31. ✓ Find the mean deviation about the mean for the following data :

Income Per Day (in ₹)	No. of Persons
0—100	4
100—200	8
200—300	9
300—400	10
400—500	7
500—600	5
600—700	4
700—800	3

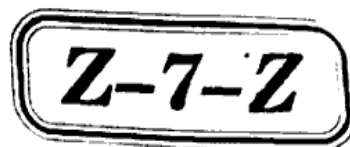
Or

In Class XI of a school 40% of the students study Mathematics and 30% students study Biology. 10% of the class study both Mathematics and Biology. If a student is selected at random from the class, find the probability that he will be studying Mathematics or Biology or both.

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Z-7-Y

Roll No.



Total No. of Questions : 31]

[Total No. of Printed Pages : 8

11thARM(SZ)JKUT2024

1207-Z

MATHEMATICS

Time : 3.00 Hours]

[Maximum Marks : 80

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Z-7-Z

11thARM(SZ)JKUT2024-1207-Z

Turn Over

Section-A

(Objective Type Questions)

1 each

1. Set builder form of $\{5, 25, 125, 625\}$ is :

(A) $\{x/x \in \mathbb{N} \text{ and } x = n^2\}$

(B) $\{x/x = 5^n, n \in \mathbb{N} \text{ and } 1 \leq n \leq 4\}$

(C) $\{x/x = n^5, n \in \mathbb{N} \text{ and } 1 \leq n \leq 6\}$

(D) $\{x/x = n^2, n \in \mathbb{N} \text{ and } 0 \leq n \leq 6\}$

2. Let $f(x) = 2x - 5$, then $f(-3)$ is equal to :

(A) -11

(B) 11

(C) 0

(D) 18

3. $\tan 3x$ is equal to :

(A) $\frac{1 - 3 \tan x}{\tan^2 x}$

(B) $\frac{3 \tan x - \tan^3 x}{1 - 3 \tan^2 x}$

(C) $\frac{1 - 4 \tan^2 x}{4 \sin x}$

(D) $\frac{3 \tan x + \tan^3 x}{1 + 3 \tan^2 x}$

4. The value of $i^9 + i^{19}$ is equal to :

(A) $0 + i.0$

(B) $9i$

(C) i

(D) $-i$

5. Value of

$$\frac{8!}{6! \times 2!}$$

is equal to :

(A) 82

(B) 28

(C) 20

(D) 21

6. The e (eccentricity) of hyperbola is :

(A) $e = 1$

(B) $e > 1$

(C) $e < 1$

(D) $e = 2$

7. Equation of circle with centre

$$\left(\frac{1}{2}, \frac{1}{4} \right)$$

and radius

$$\frac{1}{12}$$

is :

(A) $x^2 + y^2 + 20x + 20y = 0$

(B) $x^2 + y^2 - 9x = 0$

~~(C)~~ $36x^2 + 36y^2 - 36x - 18y + 11 = 0$

(D) $36x^2 + 18y^2 - 18x + 36y + 11 = 0$

8. The value of $24x < 100$ when x is an integer is :

(A) $\{1, 2, 3, 4\}$

~~(B)~~ $\{\dots\dots -3, -2, -1, 0, 1, 2, 3, 4\}$

(C) $\{\dots\dots -4, -3, 1 \dots\dots\}$

(D) $\{1, 2, 3, 4 \dots\dots\}$

9. The mean of first 10 natural numbers is :

(A) 5

(B) 6

~~(C)~~ 5.5

(D) 8

10. The probability of 3 heads in a toss of coin thrice is :

(A) $\frac{1}{8}$

(B) $\frac{1}{16}$

(C) $\frac{1}{4}$

(D) $\frac{1}{2}$

Section-B

(Very Short Answer Type Questions)

2 each

11. Find the subsets of the set $\{-1, 1, 2\}$.

12. If

$$B = \{3, 4, 5, 6\}, C = \{5, 6, 7, 8\}, D = \{7, 8, 9, 10\},$$

then find $B \cup C \cup D$.

13. Reduce the equation $3y + 2 = 0$ into intercept form and find intercepts on the axes. <https://www.jkboseonline.com>

14. Find the centre and radius of the circle $x^2 + y^2 - 8x + 10y - 12 = 0$.

15. Find the equation of parabola with vertex $(0, 0)$ and focus $(-2, 0)$.

16. Find the degree measure corresponding to $\frac{5\pi}{3}$ radians. (Use $\pi = \frac{22}{7}$)

17. Find the sample space when a coin is tossed once and dice is thrown once.

18. Find the mean deviation about the median for the data as under :

13, 17, 16, 14, 11, 13, 10, 16, 11, 18, 12, 17.

19. If

$$\frac{1}{6!} + \frac{1}{7!} = \frac{x}{8!}$$

then find x .

20. Which term of the sequence $\sqrt{3}, 3, 3\sqrt{3}, \dots$ is 729.

Section-C

(Short Answer Type Questions)

4 each

21. Find the domain and range of the real function :

$$f(x) = \sqrt{9 - x^2}.$$

22. Prove that :

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

23. Find the multiplicative inverse of $\sqrt{5} + 3i$.

24. Solve the inequality :

$$\frac{x}{2} \geq \frac{5x - 2}{3} - \frac{7x - 3}{5}$$

and show the graph of the solution on number line.

27. If p is the length of perpendicular from the origin to the line whose intercepts on the axes are 'a' and 'b', then show that :

$$\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$$

28. Find the derivative of :

$$f(x) = \frac{2x+3}{x-2}$$

from the first principle.

29. Find the derivative of :

$$(5x^3 + 3x - 1)(x - 1).$$

30. Find n if

$${}^{n-1}p_3 : {}^np_4 = 1 : 9.$$

Section-D

(Long Answer Type Questions)

6 each

29. Prove that :

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

Or

Prove that :

$$\cos 4x = 1 - 8 \sin^2 x \cos^2 x.$$

30. In how many ways can one select a cricket team of 11 from 17 players in which only 5 players can bowl if each cricket team of 11 must include exactly 4 bowlers.

Or

In how many ways can a student choose a programme of 5 courses if 9 courses are available and 2 specific courses are compulsory for every student.

31. Find the mean deviation about the mean for the following data :

Income Per Day (in ₹)	No. of Persons
0—100	4
100—200	8
200—300	9
300—400	10
400—500	7
500—600	5
600—700	4
700—800	3

Or

In Class XI of a school 40% of the students study Mathematics and 30% students study Biology. 10% of the class study both Mathematics and Biology. If a student is selected at random from the class, find the probability that he will be studying Mathematics or Biology or both.

1st ARM(SZ)JKUT2024-1207-Z

Z-7-Z

Roll No.

Y-7-C

Total No. of Questions : 31]

[Total No. of Printed Pages : 7

11th ARA(HZ)JKLEHUT2024

1407-C

MATHEMATICS

Time : 3 Hours]

[Maximum Marks : 80

Section-A

(Objective Type/Multiple Choice Questions)

1 each

1. Cardinal number of an empty set is :
(A) 0
(B) 1
(C) 2
(D) Infinite
2. Range of the function $f : \mathbb{R} \rightarrow \mathbb{R}$ given by $f(x) = |x - 1|$ is :
(A) $(-\infty, \infty)$
(B) $(-\infty, 0]$
(C) $[0, \infty)$
(D) None of these

Y-7-C

11th ARA(HZ)JKLEHUT2024—1407-C

Turn Over

3. Maximum value of $\cos \theta$ is :
- (A) -1
(B) 0
(C) 1
(D) None of these
4. $i^{10} + i^{11}$ is equal to :
- (A) $-1 + i$
(B) $1 + i$
(C) $-1 - i$
(D) $1 - i$
5. If $n = 10$, $r = 3$, then value of nC_r is :
- (A) 100
(B) 120
(C) 110
(D) 520
6. Directrix of parabola $y^2 = -4x$ is
7. Eccentricity of the ellipse $\frac{x^2}{36} + \frac{y^2}{16} = 1$ is

(3)

8. If x is a natural number, then solution of $-12x > 30$ is $\{1, 2, 3, 4\}$.

(True/False)

9. Define a primary data.

10. If A and B are mutually exclusive events, then $P(A \text{ or } B) = P(A) + P(B)$

(True/False)

Section-B

(Very Short Answer Type Questions)

2 each

11. If $A = \{x \mid x \text{ is a two digit number such that sum of its digits is } 8\}$, find roster form of A .

12. If $A = \{-1, 1\}$, find $A \times A \times A$.

13. Find the equation of line passing through the points $(-1, 1)$ and $(2, -4)$.

14. Find the equation of circle having centre $(0, 2)$ and radius 2.

15. Find the coordinates of the foci and vertices of the hyperbola

$$5y^2 - 9x^2 = 36.$$

(4)

16. Prove that :

$$\cos 2x = \frac{1 - \tan^2 x}{1 + \tan^2 x}$$

17. A die is thrown once, find the probability of "getting a number less than 6".
18. Find the variance of the data :

6, 7, 10, 12, 13, 4, 8, 12

19. If :

$$\frac{1}{6!} + \frac{1}{7!} = \frac{x}{8!},$$

find x .

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

Section-C

(Short Answer Type Questions)

4 each

21. If $A = \{1, 2, 3, 5\}$ and $B = \{4, 6, 9\}$. Define a relation R from A to B by
- $$R = \{(x, y) \mid \text{the difference between } x \text{ and } y \text{ is odd; } x \in A, y \in B\}.$$
- Write R in roaster form and find domain and range of R .

11th ARA(HZ)JKLEHUT2024—1407-C

Y-7-C

(5)

22. Prove that :

$$\cot x \cot 2x - \cot 2x \cot 3x - \cot 3x \cot x = 1$$

23. For any two complex numbers z_1 and z_2 , prove that :

$$\operatorname{Re}(z_1 z_2) = \operatorname{Re}(z_1) \operatorname{Re}(z_2) - \operatorname{Im}(z_1) \operatorname{Im}(z_2)$$

24. Solve the inequality :

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

25. Find the equation of the line perpendicular to the line $x - 7y + 5 = 0$ and having x-intercept 3. <https://www.jkbosenonline.com>

26. Evaluate :

$$\lim_{x \rightarrow 3} \frac{x^4 - 81}{2x^2 - 5x - 3}$$

27. If :

$$y = \frac{4x + 5 \sin x}{3x + 7 \cos x},$$

find $\frac{dy}{dx}$

28. In how many ways can one select a cricket team of 11 from 17 players in which only 5 players can bowl if each cricket team of 11 must include exactly 4 bowlers ?

Section-D

(Long Answer Type Questions)

6 each

29. Find ;

$$\sin \frac{x}{2}, \cos \frac{x}{2} \text{ and } \tan \frac{x}{2}$$

if $\tan x = -\frac{4}{3}$, x is in quadrant 2nd.

Or

Prove that :

$$\sin x + \sin 3x + \sin 5x + \sin 7x = 4 \cos x \cos 2x \sin 4x$$

30. 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 .

Or

Find the sum to n terms of the sequence 8, 88, 888, 8888,

31. Find the mean deviation about the median for the following data :

Marks	No. of Girls
0—10	6
10—20	8
20—30	14
30—40	16
40—50	4
50—60	2

(7)

Or

A committee of two persons is selected from two men and two women.

What is the probability that the committee will have :

- (a) No man
- (b) One man
- (c) Two men

Y-7-C

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