

MRIDIKA KAPOOR

X-C
14.

ST. GEORGE'S SCHOOL, ALAKNANDA
MID TERM ASSESSMENT [2017 -18]
SUBJECT :- MATHEMATICS
CLASS :-X

DATE: 14.9.17
TIME:- 3HRS

MAX MARKS : 80
NO. OF PAGES : 02

General Instructions:-

- (i) All questions are compulsory.
- (ii) The question paper consists of 30 questions divided into four sections. Section -A comprises of 6 questions of 1 mark each. Section -B comprises of 6 questions of 2 marks each. Section - C comprises of 10 questions of 3 marks each and Section - D comprises of 8 questions of 4 marks each.

SECTION: A

- Q1. Explain why $3 \times 5 \times 7 + 7$ is a composite number.
- Q2. For what value of P of quadratic equation $Px^2 + Px + 3$ has equal roots.
- Q3. If α and β are zeros of $P(x) = x^2 + x - 1$ then find $\frac{1}{\alpha} + \frac{1}{\beta}$.
- Q4. In an A.P., if $d = -4$, $n = 7$, $a_n = 4$, find a.
- Q5. If the points A (1,2) B (0,0) and C(a,b) are collinear, then what is the relation between a and b?
- Q6. State converse of Basic Proportionality Theorem.

SECTION : B

- Q7. Find the ratio in which point $(-3, K)$ divides the line segment joining the points $(-5, -4)$ and $(-2, 3)$. Also find the value of K.
- Q8. Without using tables, evaluate :
 $3 \cos 68^\circ \cdot \cos 22^\circ - \frac{1}{2} \tan 43^\circ \cdot \tan 47^\circ \cdot \tan 12^\circ \cdot \tan 60^\circ \cdot \tan 78^\circ$
- Q9. Find the zeros of Quadratic Polynomial $6x^2 - 3 - 7x$ and verify the relationship between the zeros and the coefficients.
- Q10. The following data gives the information on the observed life times (in hours) of 225 electrical components. Determine the modal lifetimes of the components.

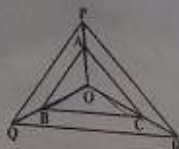
Life times (in hrs.)	0 - 20	20 - 40	40 - 60	60 - 80	80 - 100	100 - 120
Frequency	10	35	52	61	38	29

- Q11. Prove that the diagonals of the trapezium divide each other proportionally.
- Q12. The sum of first n terms of an A.P. is $3n^2 + 6n$. Find the n^{th} term of this A.P.

SECTION : C

- Q13. Prove that $\sqrt{7}$ is an irrational number.
- Q14. Solve for x: $\frac{1}{(x-1)(x-2)} + \frac{1}{(x-2)(x-3)} = \frac{2}{3}$, $x \neq 1, 2, 3$.
- Q15. The sum of the 5th and the 9th term of an A.P. is 30. If its 25th term is three times its 8th term, find the A.P.
- Q16. From a point on the ground 40m away from the foot of a tower, the angle of elevation of the top of the tower is 30° . The angle of elevation of the top of the water tank (on the top of the tower) is 45° . Find the (i) height of tower (ii) the depth of the tank.

- Q17. Determine the ratio in which the line $2x + y - 4 = 0$ divides the line segment joining the points $A(2, -2)$ and $B(3, 7)$.
- Q18. On a morning walk, three persons step off together and the steps measure 40cm, 42cm and 45cm respectively. What is the minimum distance each should walk so that each can cover the same distance in complete steps.
- Q19. In the given fig., A, B and C are points on OP, OQ and OR respectively such that $AB \parallel PQ$ and $AC \parallel PR$. Show that $BC \parallel QR$.



- Q20. At present Asha's is two more than the square of her daughter Nisha's age. When Nisha grows to her mother's present age, Asha's age would be one year less than ten times the present age of Nisha. Find the present ages of both Asha and Nisha.

Q21. Prove that :- $\frac{1}{(\operatorname{Cosec} x + \cot x)} - \frac{1}{\sin x} = \frac{1}{\sin x} - \frac{1}{(\operatorname{Cosec} x - \cot x)}$

- Q22. If the median of the distribution given below is 28.5. Find the value of x and y.

Class - Interval	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	Total
Frequency	5	x	20	15	y	5	60

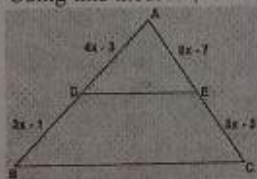
SECTION : D

- Q23. The distribution below gives the marks of 100 Students of a class. Draw a less than type and a more than type ogive from the given data. Hence obtain the median marks from the graph.

Marks	0 - 5	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35 - 40
No of Students	4	6	10	10	25	22	18	5

Q24. Solve the given quadratic equation: - $9x^2 - 9(a + b)x + [2a^2 + 5ab + 2b^2] = 0$

- Q25. If a line is drawn parallel to one side of a Δ to intersect the other sides in distinct points, the other two sides are divided in the same ratio. Using this theorem, find x in the given figure, if $DE \parallel BC$.



- Q26. The angle of elevation of a cloud from a point 60 m above a lake is 30° . The angle of depression of the reflection of cloud in the lake is 60° . Find the height of the cloud.

Q27. If two zeros of polynomial $x^4 - 6x^3 - 26x^2 + 138x - 35$ are $2 \pm \sqrt{3}$, find other zeros.

- Q28. Find the values of k, if the points $A(k+1, 2k)$, $B(3k, 2k+3)$ and $C(5k-1, 5k)$ are collinear.

- Q29. Kanika was given her pocket money on 1st Jan 2008. She puts Rs 1 on day one, Rs 2 on day two, Rs 3 on day three and continued doing so till the end of the month, from this money into her piggy bank. She also spent Rs 204 of her pocket money in some charity and found that at the end of the month she still had Rs 100 with her. How much was her pocket money for the month? which value is depicted in this question?

Q30. Prove that : $(\sin \theta + \operatorname{Cosec} \theta)^2 + (\cos \theta + \operatorname{Sec} \theta)^2 = 7 + \cot^2 \theta + \tan^2 \theta$