

G M VIDYANIKETAN PUBLIC SCHOOL, BRAHMAVAR
MID TERM EXAMINATION, NOVEMBER 2020
CLASS: X, MATHEMATICS

Duration: 3 Hrs.

Max. Marks:80

General Instructions:

1. This question paper contains two parts A and B.
2. Both Part A and Part B have internal choices.

Part – A:

1. It consists two sections- I and II.
2. Section I has 16 questions of 1 mark each. Internal choice is provided in 5 questions.
3. Section II has 4 questions on case study. Each case study has 5 case-based sub-parts. An examinee is to attempt any 4 out of 5 sub-parts.

Part – B:

1. Question No 21 to 26 are Very short answer Type questions of 2 mark each,
2. Question No 27 to 33 are Short Answer Type questions of 3 marks each
3. Question No 34 to 36 are Long Answer Type questions of 5 marks each.
4. Internal choice is provided in 2 questions of 2 marks, 2 questions of 3 marks and 1 question of 5 marks.

Part A

Section I

Section I has 16 questions of 1 mark each. Internal choice is provided in 5 questions.

1. Find a quadratic polynomial, sum of whose zeroes is 2 and product is -8. 1M

OR

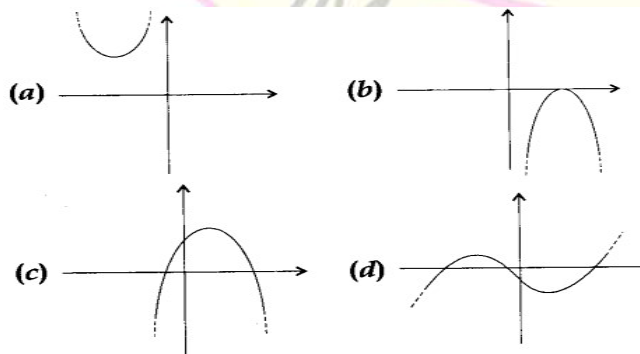
Find a quadratic polynomial whose zeroes are 3 and -4

2. Write the empirical relationship among mean, median and mode. 1M
3. If one zero of the quadratic polynomial $x^2 + 3x + k$ is 2, then find the value of k 1M

OR

If one root of $5x^2+13x+k=0$ is the reciprocal of the other root, then find the value of k

4. Which of the following graph is not a graph of quadratic polynomial? 1M



5. Find zeroes of the quadratic polynomial $3x^2 - 48$ 1M

OR

Find zeroes of x^2-25

6. Which of the following is not a polynomial? 1M

(a) $x^2-4x-\sqrt{6}$ (b) $4x^3- \sqrt{7} x$ (c) $\frac{2}{x} + 3$ (d) $7x^5-3x+1$

7. The class interval of a given observation is 10 to 15, then find the class mark for this Interval. 1M

8. Write the formula to find mean using assumed mean method. 1M

9. Find the mean of first five prime numbers 1M

OR

Find mean of first five multiples of 3

10. To divide the line segment AB in the ratio 2:3, a ray AX is drawn such that BAX is acute, AX is then marked at equal intervals. The minimum number of these marks is _____ 1M

11. The decimal expansion of $\frac{1}{7}$ is terminating or not? 1M

12. Find the distance of point P(-6,8) from origin. 1M

13. OABC is a rectangle whose three vertices are A(0,3), O(0,0) , B(5,0). Find the length of its diagonal. 1M

14. What is the probability of an event which cannot happen?. 1M

OR

Write the sample space when three coins are tossed simultaneously.

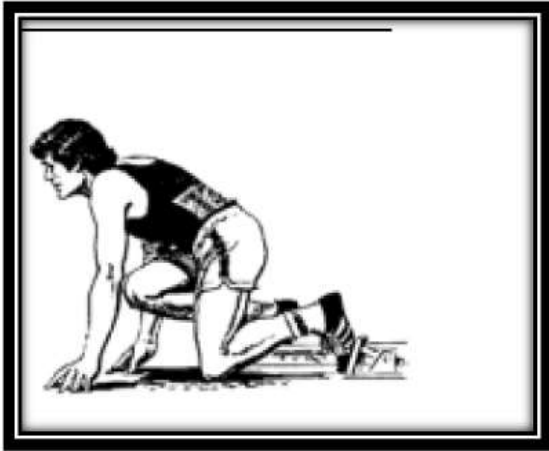
15. Can probability of an event be negative?. 1M

16. Probability of an 'event E' + Probability of an event 'notE' = _____ 1M

Section-II

Case study based questions are compulsory. Attempt any four sub parts of each question. Each sub part carries 1 mark.

17. Case Study Based -1



100m RACE

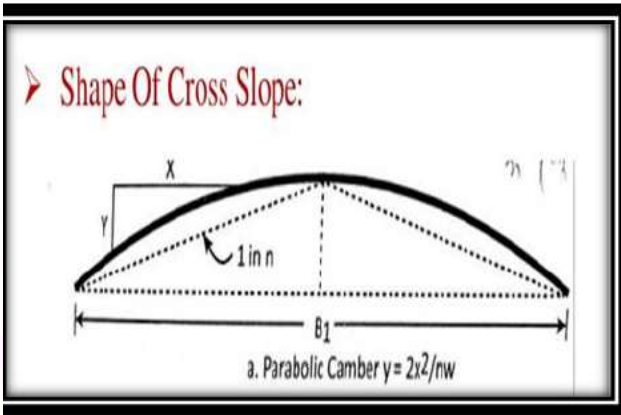
A stopwatch was used to find the time that it took a group of students to run 100 m.

Time (in sec)	0-20	20-40	40-60	60-80	80-100
No. of students	8	10	13	6	3

- (i) What will be the upper limit of the modal class
(a) 20 (b) 40 (c) 60 (d) 80 1M
- (ii) Estimate the mean time taken by a student to finish the race
(a) 54 (b) 63 (c) 43 (d) 50 1M
- (iii) The construction of cumulative frequency table is useful in determining the
(a) Mean (b) Median (c) Mode (d) All of the above 1M
- (iv) The sum of lower limits of median class and modal class is
(a) 60 (b) 100 (c) 80 (d) 140 1M
- (v) How many students finished the race within 1 minute?
(a) 18 (b) 37 (c) 31 (d) 8 1M

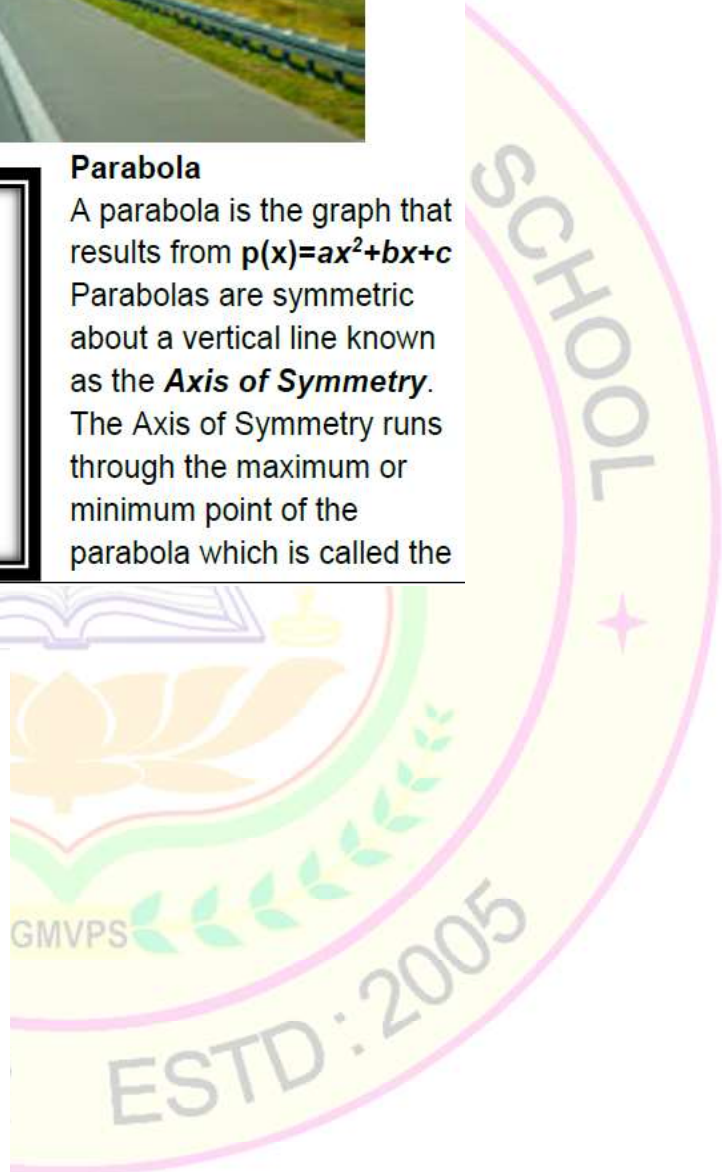
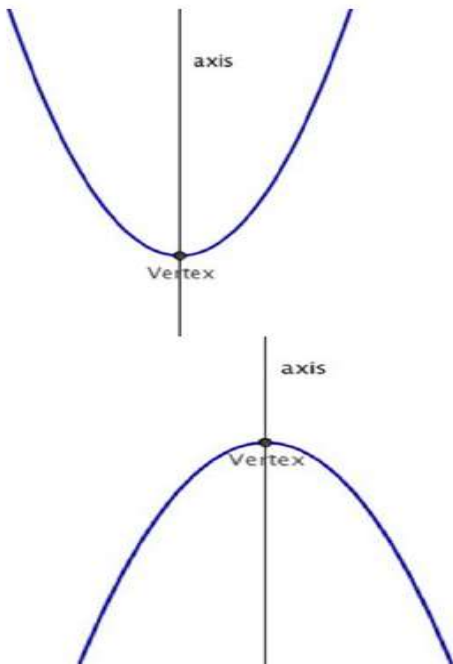
18. Case Study Based- 2

Applications of Parabolas-Highway Overpasses/Underpasses
A highway underpass is parabolic in shape.



Parabola

A parabola is the graph that results from $p(x)=ax^2+bx+c$. Parabolas are symmetric about a vertical line known as the **Axis of Symmetry**. The Axis of Symmetry runs through the maximum or minimum point of the parabola which is called the



(i) If the highway overpass is represented by x^2-2x-8 then its zeroes are

- (a) (2,-4) (b) (4,-2) (c) (-2,-2) (d) (-4,-4)

1M

(ii) The highway overpass is represented graphically. Zeroes of a polynomial can be expressed graphically. Number of zeroes of polynomial is equal to number of points where the graph of polynomial

1M

- (a) intersects x axis (b) intersects y axis (c) intersects y axis or x axis (d) None of the above

(iii) Graph of a quadratic polynomial is a

- (a) straight line (b) circle (c) parabola (d) ellipse

1M

(iv) The representation of highway underpass whose one zero is 6 and sum of the zeroes is 0, is

- (a) x^2-6x+2 (b) x^2-36 (c) x^2-6 (d) x^2-3

1M

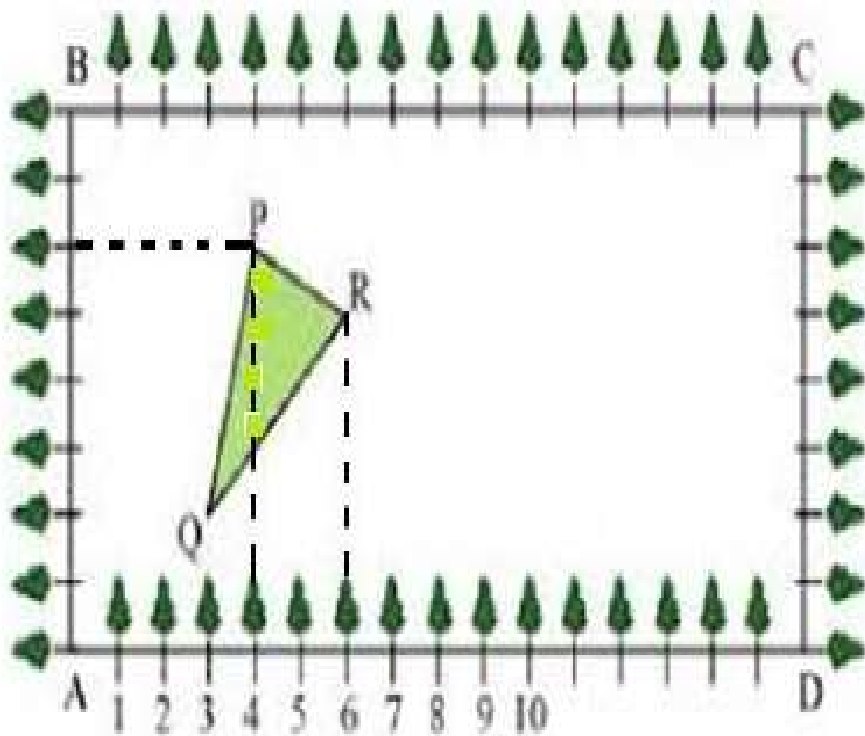
(v) The number of zeroes that polynomial $f(x)=(x-2)^2+4$ can have is

- (a) 1 (b) 2 (c) 0 (d) 3

1M

19. Case Study Based -3

Class X students of a secondary school in Krishnagar have been allotted a rectangular plot of a land for gardening activity . Saplings of Gulmohar are planted on the boundary at a distance of 1m from each other. There is a triangular grassy lawn in the plot as shown in the figure. The students are to sow seeds of flowering plants on the remaining area of the plot.



Considering A as origin , answer questions (i) to (v)

(i) Considering A as the origin, what are the coordinates of A?

- (a) (0,1) (b) (1,0) (c) (0,0) (d) (-1,-1) 1M

(ii) What are the coordinates of P?

- (a) (4,6) (b) (6,4) (c) (4,5) (d) (5,4) 1M

(iii) What are the coordinates of R?

- (a) (6,5) (b) (5,6) (c) (6,0) (d) (7,4) 1M

(iv) What are the coordinates of D?

- (a) (16,0) (b) (0,0) (c) (0,16) (d) (16,1) 1M

(v) What are the coordinates of P if D is taken as the origin?

- (a) (12,2) (b) (-12,6) (c) (12,3) (d) (6,10) 1M

20. Case Study based-4

When two dice are thrown together following are the possible outcomes.

{ (1,1),(1,2),(1,3),(1,4),(1,5),(1,6)
(2,1),(2,2),(2,3),(2,4),(2,5),(2,6)
(3,1),(3,2),(3,3),(3,4),(3,5),(3,6)
(4,1),(4,2),(4,3),(4,4),(4,5),(4,6)
(5,1),(5,2),(5,3),(5,4),(5,5),(5,6)
(6,1),(6,2),(6,3),(6,4),(6,5),(6,6)}

Rahul throws two dice simultaneously. Based on this answer the following questions.

(i) What is the probability that sum on the two dice is 9

- (a) $\frac{1}{5}$ (b) $\frac{1}{9}$ (c) $\frac{1}{6}$ (d) $\frac{1}{7}$ 1M

(ii) What is the probability of getting the same number on both the dice?

- (a) $\frac{1}{9}$ (b) $\frac{1}{8}$ (c) $\frac{1}{6}$ (d) $\frac{1}{7}$ 1M

(iii) Probability of getting a prime on both dice is

- (a) $\frac{1}{9}$ (b) $\frac{1}{8}$ (c) $\frac{1}{6}$ (d) $\frac{1}{4}$ 1M

(iv) Probability of getting a perfect square on both the dice is

- (a) $\frac{1}{9}$ (b) $\frac{1}{6}$ (c) $\frac{1}{7}$ (d) $\frac{1}{8}$ 1M

(v) Probability that sum on the two dice is less than 7 is

- (a) $\frac{1}{12}$ (b) $\frac{7}{12}$ (c) $\frac{5}{12}$ (d) $\frac{11}{12}$ 1M

Part- B

All questions are compulsory. In case of internal choices , attempt any one.

21. Find the unknown values in the following

2M

Class interval	Frequency	Cumulative frequency
0-10	5	5
10-20	7	x_1
20-30	x_2	18
30-40	5	x_3
40-50	x_4	30

22. Three bells ring at interval of 4,7 and 14 minutes. All three bell rang at 6am. When the three bells will ring together next?

OR

Find HCF of 26 and 420

2M

23. Find a point on x axis which is equidistant from the points (2,-2) and (-4,2).

2M

OR

P(-2,5) and Q(3,2) are two points. Find the coordinates of point R on PQ such that PR= 2QR

24. Find a quadratic polynomial whose zeroes are $5-3\sqrt{2}$ and $5+3\sqrt{2}$

2M

25. Draw a line segment AB of length 9cm .With A and B as centres , draw circles of radius 5cm and 3cm respectively. Construct tangents to each circle from the centre of other circle.

2M

26. Find probability of getting an odd number on a single throw of die.

2M

27. Find zeroes of the polynomial $4x^2+4x-3$ and verify the relationship between zeroes and the coefficients.

3M

28. Find mode of the following distribution.

3M

Classes	25-30	30-35	35-40	40-45	45-50	50-55
Frequency	25	34	50	42	38	14

29. Prove that $\sqrt{3}$ is an irrational number.

OR

Find HCF and LCM of 336 and 54 by prime factorization.

3M

30. Three different coins are tossed together. Find the probability of getting
 (i) exactly two heads (ii) at least two heads (iii) at most two heads

OR

An integer is chosen between 70 and 100. Find the probability that it is

- (i) a prime number (ii) divisible by 7 (iii) a perfect square 3M
31. Construct a tangent to a circle of radius 4cm from a point on the concentric circle of radius 6cm. 3M
32. Prove that the point (3,0) , (6,4) and (-1,3) are the vertices of a right angled isosceles triangle. 3M
33. Check whether $\frac{23}{2^4 \times 5^3}$ will terminate or not?. If terminating write its decimal expansion without actual division. 3M
34. If A(-2,1) , B(a,0), C(4,b) and D(1,2) are the vertices of a parallelogram ABCD, find the values of 'a' and 'b' . Hence find the lengths of its sides. 5M
35. The mean of the following distribution is 53. Find the missing frequency 'p'. 5M

Class	0-20	20-40	40-60	60-80	80-100
Frequency	12	15	32	p	13

OR

If the median of the following distribution is 31 find the values of x and y.

Class	0-10	10-20	20-30	30-40	40-50	50-60	Total
Frequency	5	x	6	y	6	5	40

36. From a pack of 52 playing cards Jacks, Queens and Kings of red colour are removed. From the remaining , a card is drawn at random. Find the probability of getting
 (i) a black king (ii) a card of red color (iii) a card of black color
 (iv) a face card (v) a card of spade 5M
