Total number of printed pages : 5 *NB-N/M/I*

2020

CLASS-IX

MATHEMATICS

Total marks : 80 Time : 3 hours

General Instructions:

i) The question paper consists of 22 questions.

ii) Internal choice has been provided in some questions.

iii) Marks allocated to every question are indicated against it.

N.B: Check that all pages of the question paper is complete as indicated on the top left side.

Section - A

1. **Choose the correct answer from the given alternatives.**

(a) $2^{\frac{4}{3}}$ is same as **1**

(i) $\sqrt[4]{2^3}$ (ii) $\sqrt[3]{4}$ (iii) $\sqrt[3]{2^4}$ (iv) $\sqrt[6]{3^2}$

(b) If $p(x) = x^2 - 2\sqrt{3}x + 1$, then $p(2\sqrt{3})$ is equal to **1**

(i) 0 (ii) 1 (iii) $4\sqrt{2}$ (iv) $8\sqrt{2} + 1$

(c) If $(x-1)$ is a factor of $mx^2 - \sqrt{2}x + 1$, then the value of *m* is **1**

(i) $\sqrt{2}$ (ii) $\sqrt{2} + 1$ (iii) 1 (iv) $\sqrt{2} - 1$

(d) The equation of the line whose graph does not pass through the origin, is **1**

(i) $x + y = 0$ (ii) $x - y = 0$ (iii) $x + 2y = 0$ (iv) $x - 2y = 1$

(e) If *x*-coordinate of a point is zero, then it always lies on **1**

(i) quadrant I (ii) quadrant II (iii) *x*-axis (iv) *y*-axis

(f) Lines AB and CD intersect at O. If $\angle AOC : \angle BOC = 5 : 7$, then $\angle BOD =$ **1**

(i) 105° (ii) 100° (iii) 75° (iv) 60°

(g) In ΔABC, if AB = AC & $\angle A = 80°$, then values of $\angle B$ & $\angle C$ respectively are **1**

(i) 50°, 60° (ii) 50°, 50° (iii) 40°, 40° (iv) 80°, 50°

(h) In a parallelogram ABCD, bisectors of two adjacent angles A and B meet at O. The measure of $\angle AOB$ is equal to **1**

(i) 90° (ii) 120° (iii) 180° (iv) 200°

(i) If the area of an equilateral triangle is $9\sqrt{3}$ cm^2, then its perimeter is **1**
(i) 10 cm (ii) 18 cm (iii) 21 cm (iv) 24 cm

(j) An experiment was conducted. Probabilities of an event was calculated by some students. Which of the following could be the correct answer? **1**
(i) 1.6 (ii) $-\frac{2}{5}$ (iii) $\frac{3}{2}$ (iv) $\frac{2}{3}$

Section - B

2. Simplify: $\left(3+\sqrt{3}\right)\left(2+\sqrt{2}\right)$ **2**

3. If the point (3, 4) lies on the graph of the equation $3y = ax + 7$, find the value of a. **2**

4. Write the coordinates of the point which: (i) lies on the x-axis with abscissa –3, (ii) lies on the y-axis with ordinate 5. **2**

5. If $\Delta ABC \cong \Delta PQR$, $\angle A + \angle B = 100°$, AB = 3 cm, BC = 5 cm, then find:
(i) the measure of $\angle R$, (ii) sum of the lengths of PQ and QR. **2**

6. The following observations have been arranged in ascending order. If the median of the data is 63, find the value of x. **2**
29, 32, 48, 50, x, (x + 2), 72, 78, 84, 95

Section - C

7. **a.** Express $\frac{21}{3\sqrt{5}+\sqrt{3}}$ with rational denominator.

Or **3**

b. Visualise 3.765 on the number line, using successive magnification

8. **a.** Find $p(0)$, $p(1)$ and $p(2)$ for the polynomial, $p(t) = 2 + t + 2t^2 - t^3$.

Or **3**

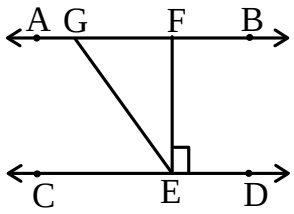
b. Find the value of k, if $x-1$ is a factor of $p(x) = kx^2 - \sqrt{2}\,x + 1$

9. Draw a quadrilateral PQRS on a graph paper whose vertices are P(–3, 3), Q(3, 3), R(3, –3) and S(–3, –3). What is the special name of the quadrilateral PQRS? **3**

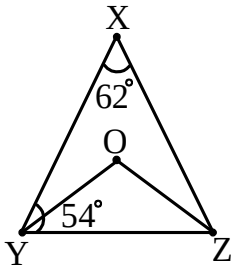
10. **a.** It is given that $\angle XYZ = 64°$ and XY is produced to point P. Draw a figure from the given information. If ray YQ bisects $\angle ZYP$, find $\angle XYQ$ and reflex $\angle QYP$.

Or **3**

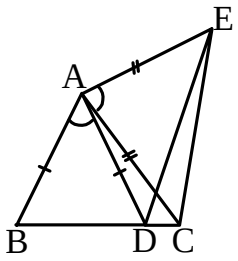
b. In the given figure, if AB || CD, EF ⊥ CD and ∠GED = 126°, find ∠AGE, ∠GEF and ∠FGE.



11. In the adjoining figure, ∠X = 62°, ∠XYZ = 54°. If YO and ZO are the bisectors of ∠XYZ and ∠XZY respectively of ΔXYZ, then find ∠OZY and ∠YOZ **3**

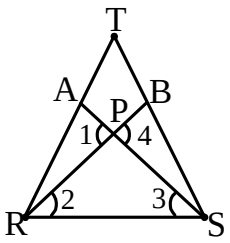


12. **a.** In the adjoining figure, AC = AE, AB = AD and ∠BAD = ∠EAC. Show that BC = DE. **3**



Or

b. In the adjoining figure, if TR = TS, ∠1 = 2∠2 and ∠4 = 2∠3, then prove that ΔRBT ≅ ΔSAT **3**



13. Construct a triangle ABC in which BC = 8 cm, ∠B = 45° and AB – AC = 3.5 cm. (Traces of construction only is required.) **3**

14. **a.** The length, breadth and height of a room are 5m, 4m and 3m respectively. Find the cost of white washing the walls of the room and the ceiling at the rate of `7.50 per m^2.

Or **3**

b. The inner diameter of a circular well is 3.5 m. It is 10 m deep. Find:
(i) its inner curved surface area,
(ii) the cost of plastering this curved surface at the rate of `40 per m^2.

15. The weight of 50 apples (in grams) from a consignment are as below:

113	131	75	82	204	81	84	118	110	104
107	80	141	111	123	136	78	90	115	90
110	98	106	99	84	107	186	76	82	109
100	115	125	107	115	93	119	187	139	129

130 68 123 195 111 125 86 92 126 70

Construct a grouped frequency distribution table for the above data taking class width of 20 grams if the mid-value of the first class interval is 70 grams. **3**

16. 1500 families with 2 children were selected randomly and the following data were recorded:

Number of girls in a family	2	1	0
Number of families	475	814	211

Compute the probability of a family, chosen at random, having
(i) 2 girls, (ii) 1 girl, (iii) No girl.
Also check whether the sum of these probabilities is 1. **3**

Section – D

17. **a.** Let R_1 and R_2 be the remainder when the polynomials $x^3 + 2x^2 - 5ax - 7$ and $x^3 + ax^2 - 12x + 6$ are divided by $(x + 1)$ and $(x - 2)$ respectively. If $2R_1 + R_2 = 6$, find the value of a.

Or **5**

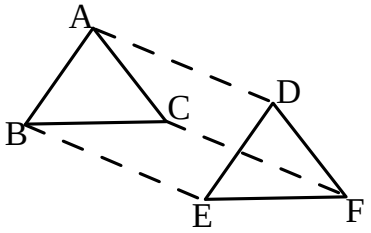
b. Without actual division, prove that $(2x^4 - 6x^3 + 3x^2 + 3x - 2)$ is exactly divisible by $(x^2 - 3x + 2)$

18. **a.** The taxi fare in a city is as follows:
For the first kilometre, the fare is `8 and for the subsequent distance, it is `5 per km. Taking the distance covered as x km and total fare as `y, write a linear equation for this information and draw its graph.

Or **5**

b. The force exerted to pull a cart is directly proportional to the acceleration produced in the body. Express this statement as a linear equation in two variables and draw the graph of the same by taking the constant mass equal to 6 kg. Read from the graph the force required when the acceleration produced is: (i) 5m/sec^2 (ii) 6 m/sec^2.

19. **a.** In ΔABC and ΔDEF, AB = DE, AB || DE, BC = EF and BC || EF. Vertices A, B and C are joined to vertices D, E and F respectively. Show that:
(i) quadrilateral ABED is a parallelogram,
(ii) quadrilateral BEFC is a parallelogram,
(iii) AD || CF and AD = CF,
(iv) quadrilateral ACFD is a parallelogram,
(v) AC = DF.



Or **5**

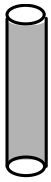
b. ABCD is a rhombus and P, Q, R and S are the mid-points of the sides AB, BC, CD and DA respectively. Show that the quadrilateral PQRS is a rectangle.

20. **a.** A triangle and a parallelogram have the same base and the same area. If the sides of the triangle are 26 cm, 28 cm and 30 cm, and the parallelogram stands on the base 28 cm, find the height of the parallelogram.

Or **5**

b. A field is in the shape of a trapezium whose parallel sides are 25 m and 10 m. The non-parallel sides are 14 m and 13 m. Find the area of the field.

21. **a.** A metal pipe is 77 cm long. The inner diameter of a cross section is 4 cm, the outer diameter being 4.4 cm. Find its: (i) inner curved surface area, (ii) outer curved surface area, (iii) total surface area.



Or **5**

b. A bus stop is barricaded from the remaining part of the road, by using 50 hollow cones made of recycled cardboard. Each cone has a base diameter of 40 cm and height 1 m. If the outer side of each of the cones is to be painted and the cost of painting is `12 per m^2, what will be the cost of painting all these cones? (Use $\pi = 3.14$ and take $\sqrt{1.04} = 1.02$)

22. **a.** The following data on the number of girls (to the nearest ten) per thousand boys in different sections of Indian society is given below:

Section	**Number of girls per thousand boys**
Scheduled Caste (SC)	940
Scheduled Tribe (ST)	970
Non SC/ST	920
Backward districts	950
Non-backward districts	920
Rural	930
Urban	910

Represent the information above by a bar graph.

Or **5**

b. The length of 40 leaves of a plant are measured correct to one millimetre and the obtained data is represented in the following table:

Length (in mm)	118-126	127-135	136-144	145-153	154-162	163-171	172-180
Number of leaves	3	5	9	12	5	4	2

Draw a histogram to represent the given data.

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