**Mizoram Board**
**Class IX**
**Mathematics**
**Sample Paper – 2**

**Time: 3 hrs** **Total Marks: 80**

**General Instructions:**

1. The question paper consists of 44 questions.
2. All questions are compulsory.
3. Internal choices have been provided in some questions.
4. Marks allocated to every question are indicated against it.

## Section A
## (Questions 1 to 25 carry 1 mark each)

**1.** On simplifying $\left(6+\sqrt{27}\right)-\left(3+\sqrt{3}\right)+\left(1-2\sqrt{3}\right)$ the solution would have which of the following characteristics:

(i) Positive and irrational
(ii) Negative and rational
(iii) Positive and rational
(iv) Negative and irrational

**2.** The value of the polynomial $x^2 - x - 1$ at $x = -1$ is:

(i) -3
(ii) 1
(iii) -1
(iv) Zero

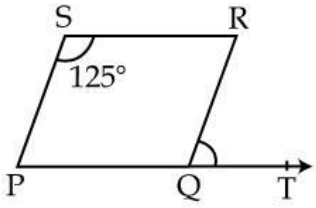
**3.** The number of line segment determined by three given non-collinear points is:

(i) Two
(ii) Three
(iii) Infinitely many
(iv) Four

**4.** If we divide or multiply both sides of a linear equation with a non-zero number, then the solution of the linear equation

(i) Remains the same
(ii) changes
(iii) changes in case of multiplication only
(iv) changes in case of division only

**5.** PQRS is a parallelogram in which m∠PSR = 125°.
m∠RQT =
(i) 75°
(ii) 65°
(iii) 55°
(iv) 85°




**6.** Class marks of a frequency distribution are 6, 10, 14, 18, 22, 26, and 30. Its class size will be
(i) 4
(ii) 5
(iii) 9
(iv) 1

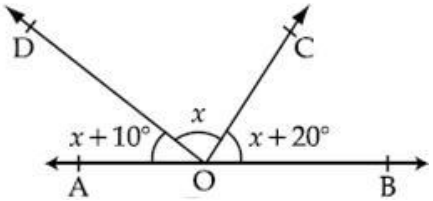
**7.** The decimal form of $\frac{56}{1000}$ is
(i) 0.56
(ii) 0.056
(iii) 0.0056
(iv) 5.6

**8.** The abscissa or x-coordinate of any point on Y-axis is:
(i) 1
(ii) 2
(iii) 0
(iv) 3

**9.** Points (-1,2), (-4,7), (-3,1) and (-2,4) lie in
(i) I quadrant
(ii) II quadrant
(iii) III quadrant
(iv) IV quadrant

**10.** In the given figure, find the value of x.

(i) 50°
(ii) 40°
(iii) 60°
(iv) 70°



**11.** If the probability of winning a game is 0.9 then, the probability of losing the game is

(i) 0.1
(ii) 0.9
(iii) 0.2
(iv) 1

**12.** The median for a data having 99 observations arranged in descending order is the

(i) $49^{th}$ observation
(ii) $50^{th}$ observation
(iii) $51^{st}$ observation
(iv) average of the $48^{th}$ and $49^{th}$ observations

**13.** The volume of a right circular cone of height 12 cm and radius 7 cm is

(i) 666 $cm^3$
(ii) 516 $cm^3$
(iii) 616 $cm^3$
(iv) 606 $cm^3$

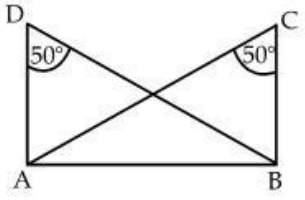
**14.** The area of a triangle with sides 37.5 cm, 37.5 cm and 45 cm and semi-perimeter 60 cm is

(i) 625 $cm^2$
(ii) 675 $cm^2$
(iii) 525 $cm^2$
(iv) 575 $cm^2$

**15.** The point of intersection of the perpendicular bisectors of the sides of a triangle is called

(i) Centroid
(ii) Orthocentre
(iii) Incentre
(iv) Circumcentre

**16.** If $\angle C = \angle D = 50^\circ$ then four points A, B, C, D:




(i) con-cyclic
(ii) do not lie on same circle
(iii) are collinear

(iv) A,B,D and A,B,C lie on different circles

**17.** In a rectangular region the length of rectangle is x units and the breadth of rectangle is y unit, and then find the area of rectangular region.
(i) $x^2y$ square units
(ii) xy cubic units
(iii) $xy^2$ square units
(iv) xy square units

**18.** In a parallelogram the sum of two adjacent angles is
(i) 180°
(ii) 90°
(iii) 360°
(iv) 100°

**19.** Which of the following criterion cannot establish congruence of triangles?
(i) SAS
(ii) ASA
(iii) SSA
(iv) SSS

**20.** Two supplementary angles are in the ratio 4:5. The angles are
(i) 90°, 90°
(ii) 80°, 100°
(iii) 30°, 150°
(iv) 45°, 45°

**21.** The number of line segments determined by three collinear points is
(i) Two
(ii) Three
(iii) Only one
(iv) Four

**22.** The graph of every linear equation in two variables is
(i) straight line
(ii) parabola
(iii) hyperbola
(iv) curve

**23.** Points (-1,2), (-4,7),(-3,1) and (-2,4) lie in
(i) I quadrant
(ii) II quadrant
(iii) III quadrant
(iv) IV quadrant

**24.** Evaluate: $30^3 + 20^3 - 50^3$.

(i) 90000

(ii) 15000

(iii) -90000

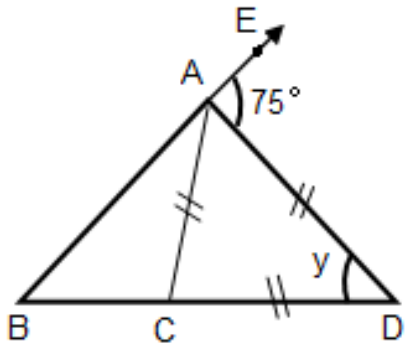
(iv) 36000

## Section B
## (Questions 25 to 34 carry 2 marks each)

**25.** The volume of a cuboid is given by the algebraic expression $ky^2 - 6ky + 8k$. Find the possible expressions of the dimensions of the cuboid.

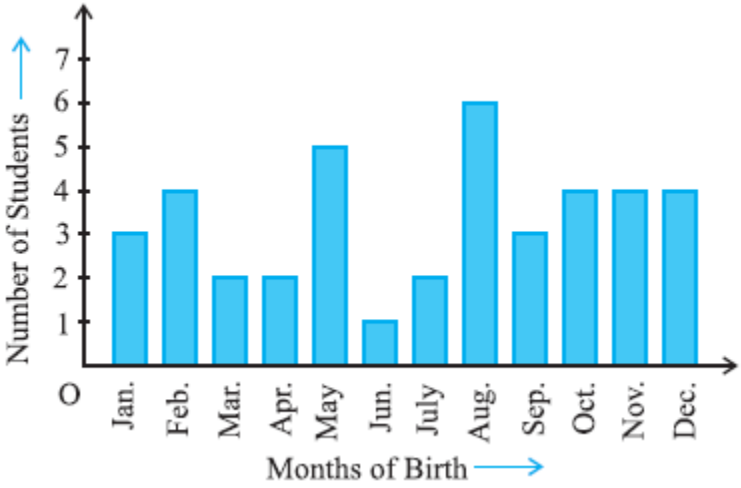
**26.** If a point C lies between two points A and B such that AC = BC, then prove that AC = $\frac{1}{2}$AB. Explain by drawing a figure.

**27.** In the figure below, BC = AC = AD and $\angle$DAE = 75°. Find the value of y.




**28.** The total surface area of a cube is 294 $cm^2$. Find its volume.

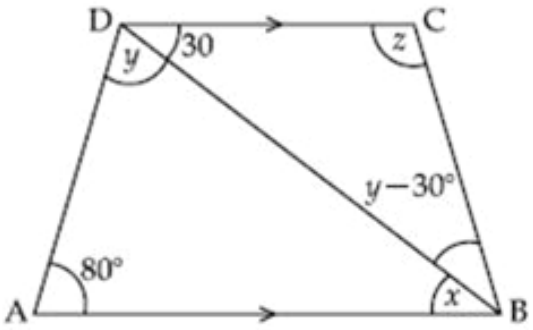
**29.** In a particular section of Class IX, 40 students were asked about their birth month and the following graph was prepared for the data so obtained:




Find the probability that a student of Class IX was born in August.

**30.** If $a = 3 + b$, then prove that $a^3 - b^3 - 9ab = 27$.

**31.** In the figure, AB || DC, $\angle BDC = 30°$ and $\angle BAD = 80°$, find the values of x, y and z.




**Or**

The angles of a quadrilateral are in the ratio 2: 5: 8: 9. Find all the angles in the quadrilateral.

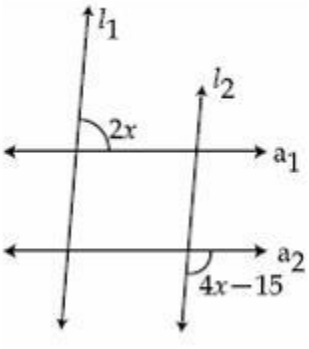
**32.** Use a suitable identity to factorise $27p^3 + 8q^3 + 54p^2q + 36p\,q^2$.

**33.** Factorise: $b^2 + c^2 + 2(ab + bc + ca)$.

**Or**

If the polynomials $az^3 + 4z^2 + 3z - 4$ and $z^3 - 4z + a$ leave the same remainder when divided by z - 3, then find the value of a.

**34.** In the figure, $l_1 || l_2$ and $a_1 || a_2$. Find the value of x.




**Or**

Prove that in an isosceles triangle the angles opposite to the equal sides are equal.

## Section C
## (Questions 35 to 41 carry 3 marks each)

**35.** A bag contains 12 balls out of which x are white. If one ball is taken out from the bag, find the probability of getting a white ball. If 6 more white balls are added to the bag and the probability now for getting a white ball is twice the previous one, find the value of x.

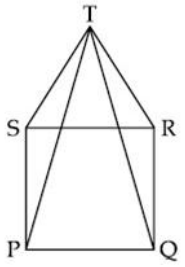
**36.** A storehouse measures 40 m × 25 m × 10 m. Find the maximum number of wooden crates, each measuring 1.5 m × 1.25 m × 0.5 m, which can be stored in the storehouse.

**37.** If AD is the median of ΔABC, then prove that AB + AC > 2AD.

**38.** Simplify: $\frac{16\times 2^{n+1}-4\times 2^{n}}{16\times 2^{n+2}-2\times 2^{n+2}}$

**39.** In the figure, PQRS is a square and SRT is an equilateral triangle. Prove that:

a) $\angle PST = \angle QRT$
b) PT = QT
c) $\angle QTR = 15$




**40.** (a)Simplify: $\left\{5\left(8^{1/3}+27^{1/3}\right)^{3}\right\}^{1/4}$

(b) Represent $\sqrt{7}$ on the number line.

**41.** Find the median of 41, 43, 127, 99, 61, 92, 71, 58, and 57. If 58 is replaced by 85, what will be the new median?

**Or**

A circus tent is cylindrical upto a height of 11 m and conical above it. If the diameter of the base is 24 m and the height of the cone is 5 m, find the length of the canvas required to make the tent if the width of the canvas is 5 m.

## Section D
## (Questions 42 to 44 carry 5 marks each)

**42.** The following table gives the distribution of students of two sections according to the marks obtained by them:

| Section A | | Section B | |
|---|---|---|---|
| **Marks** | **Frequency** | **Marks** | **Frequency** |
| 0 – 10 | 3 | 0 – 10 | 5 |
| 10 – 20 | 9 | 10 – 20 | 19 |
| 20 – 30 | 17 | 20 – 30 | 15 |
| 30 – 40 | 12 | 30 – 40 | 10 |
| 40 – 50 | 9 | 40 – 50 | 1 |

Represent the marks of the students of both the sections on the same graph by two frequency polygons. From the two polygons compare the performance of the two sections.

**43.** Laxmi purchases some bananas and some oranges. Each banana costs Rs. 2 while each orange costs Rs. 3. If the total amount paid by Laxmi was Rs. 30 and the number of oranges purchased by her was 6, then how many bananas did she purchase?

**44.** In a parallelogram, show that the angle bisectors of two adjacent angles intersect at right angles.