

2019
CLASS-IX
MATHEMATICS

Total marks : 80

Time : 3 hours

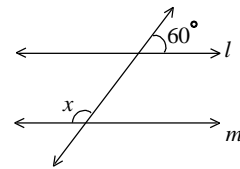
General Instructions:

- i) Approximately 15 minutes is allotted to read the question paper and revise the answers.
- ii) The question paper consists of 22 questions.
- iii) All questions are compulsory.
- iv) Internal choice has been provided in some questions.
- v) 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) If $a > 0$ is a real number and p & q are rational numbers, then $\frac{a^p}{a^q}$ is equal to **1**
- (i) a^{pq} (ii) a^{p+q} (iii) a^{p-q} (iv) $a^{\frac{p}{q}}$
- (b) When $p(y)$ is divided by $(y + a)$, then the remainder is **1**
- (i) $p(0)$ (ii) $p(-a)$ (iii) $p(y)$ (iv) $p(a)$
- (c) Which one of the following lies on y-axis? **1**
- (i) (0,5) (ii) (5,0) (iii) (5,5) (iv) $(-5, 0)$
- (d) The equation of the line whose graph passes through the origin is **1**
- (i) $2x + 3y = 1$ (ii) $2x + 3y = 0$
(iii) $2x + 3y = 6$ (iv) $2x + 3y = -4$
- (e) The point $(a, -a)$ lies on **1**
- (i) quadrant I (ii) quadrant II
(iii) quadrant III (iv) quadrant IV
- (f) In the figure if $l \parallel m$, then the value of x is **1**
- (i) 120° (ii) 100°
(iii) 90° (iv) 80°



- (g) In a ΔABC , if $AB = 3$ cm and $AC = 4$ cm, then BC is **1**
- (i) 7 cm (ii) less than 7 cm
(iii) more than 7 cm (iv) none of these

- (h) If three angles of a quadrilateral are 100° , 85° and 105° , then the measure of the fourth angle is 1
 (i) 100° (ii) 90° (iii) 80° (iv) 70°
- (i) One side of an equilateral triangle is a , then the semi perimeter of a triangle is 1
 (i) $\frac{a^3}{2}$ (ii) a (iii) $\frac{a}{2}$ (iv) $\frac{3a}{2}$
- (j) The probability of getting a whole number when a die is thrown. 1
 (i) -1 (ii) 0 (iii) $\frac{1}{6}$ (iv) 1

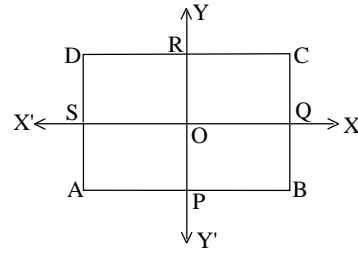
Section – B

2. Insert eight rational numbers between x and $|x|$, where $x = \frac{-5}{11}$ 2
3. If $p(x) = x^2 - x + 1$, then find the value of $\frac{p(1) - p(-1)}{2}$ 2
4. In the adjoining figure, ABC is an equilateral triangle. Find the co-ordinates of A. 2
-
5. In the adjoining figure, if $AC = BD$, then prove that $AB = CD$. 2
-
6. Eleven bags of wheat flour, each marked 5 kg, actually contained the following weights of flour (in kg):
 4.97 5.05 5.08 5.03 5.00 5.06
 5.08 4.98 5.04 5.07 5.00
- Find the probability that any of these bags chosen at random contains:
 (i) more than 5 kg flour.
 (ii) less than 5 kg flour. 2

Section - C

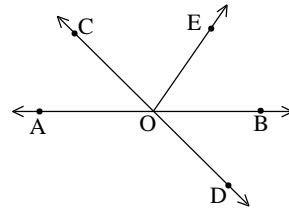
7. a. Locate $\sqrt{3}$ on the number line. 3
 Or
- b. Simplify by rationalising the denominator $\frac{4 + \sqrt{5}}{4 - \sqrt{5}} + \frac{4 - \sqrt{5}}{4 + \sqrt{5}}$
8. a. Find the value of $(x - a)^3 + (x - b)^3 + (x - c)^3 - 3(x - a)(x - b)(x - c)$, when $a + b + c = 3x$ 3
 Or
- b. Give possible expressions for the length and breadth of a rectangle which has area $25a^2 - 35a + 12$

9. In the adjoining figure, ABCD is a rectangle in which $AB = 8$ unit and $BC = 6$ unit. If P, Q, R and S are the mid-points of AB, BC, CD and AD. Then find the co-ordinate of A, B, C, and D.



3

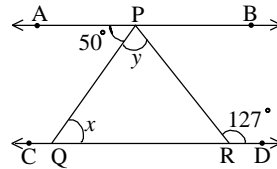
10. a. In the adjoining figure, lines AB and CD intersect at O. If $\angle AOC + \angle BOE = 70^\circ$ and $\angle BOD = 40^\circ$. Find $\angle BOE$ and reflex $\angle COE$.



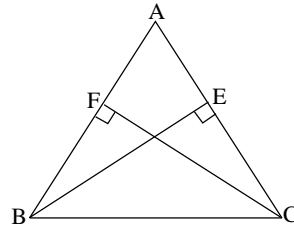
Or

3

- b. In the adjoining figure, if $AB \parallel CD$, $\angle APQ = 50^\circ$ and $\angle PRD = 127^\circ$, find x and y .



11. a. In the adjoining figure, ABC is an isosceles triangle in which altitudes BE and CF are drawn to equal sides AC and AB respectively. Show that these altitudes are equal.



Or

3

- b. AD is an altitude of an isosceles triangle ABC in which $AB = AC$. Show that
 (i) AD bisects BC (ii) AD bisects $\angle A$

12. Prove that parallelograms on the same base and between the same parallels are equal in area.

3

13. Construct a triangle ABC in which $BC = 7$ cm, $\angle B = 75^\circ$ and $AB + AC = 13$ cm
 [Traces of construction only is required]

3

14. a. The radius of a spherical balloon increases from 7 cm to 14 cm as air is being pumped into it. Find the ratio of surface areas of the balloon in the two cases.

Or

3

- b. The inner diameter of a cylindrical wooden pipe is 24 cm and its outer diameter is 28 cm. The length of the pipe is 35 cm. Find the mass of the pipe, if 1 cm^3 of wood has a mass of 0.6 gram.

15. The blood group of 40 students of class IX are recorded as follows:

A, B, O, A, O, AB, A, O, A, O,
 B, A, O, B, A, O, A, O, AB, A,
 O, A, AB, O, A, A, O, O, AB, B,
 A, O, B, A, B, O, A, B, A, O

Represent this data in the form of frequency distribution table. Which is the most common and which is the rarest, blood group among these students.

3

16. In a mathematics test given to 15 students, the following marks (out of 100) are recorded:

41, 39, 48, 52, 46, 62, 54, 40,
 96, 52, 98, 40, 42, 52, 60

Find the mean, median and mode of this data.

3

Section – D

17. a. The polynomial $p(x) = x^4 - 2x^3 + 3x^2 - ax + 3a - 7$ when divided by $x + 1$, leaves the remainder 19. Find the value of a . Also, find the remainder when $p(x)$ is divided by $x + 2$.

Or

5

- b. Factorise $x^3 + 13x^2 + 32x + 20$ by using the Factor Theorem.

18. a. If the work done by a body on application of a constant force is directly proportional to the distance travelled by the body, express this in the form of an equation in two variables and draw the graph of the same by taking the constant force as 5 units. Also, read from the graph the work done when the distance travelled by the body is
 (i) 2 units (ii) 0 unit

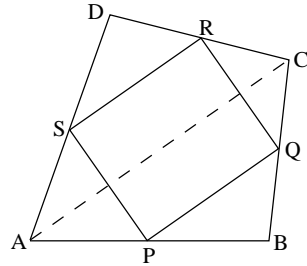
Or

5

- b. In countries like USA and Canada temperature is measured in Fahrenheit, whereas in countries like India, it is measured in Celsius. Here is the linear equation that converts Fahrenheit to Celsius $F = \left(\frac{9}{5}\right)C + 32^\circ$. Draw the graph of the linear equation above using Celsius for x -axis and Fahrenheit for y -axis.

19. a. In the adjoining figure, ABCD is a quadrilateral in which P, Q, R and S are mid points of the sides AB, BC, CD and DA. AC is a diagonal. Show that:

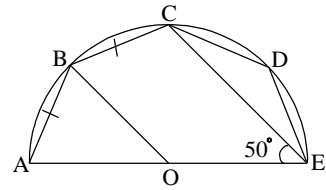
- (i) $SR \parallel AC$ and $SR = \frac{1}{2} AC$
- (ii) $PQ = SR$
- (iii) PQRS is a parallelogram



Or

5

- b. In the adjoining figure, AE is the diameter of the semi-circle with centre O. If $AB = BC$ and $\angle AEC = 50^\circ$, then prove that $BO \parallel CE$. Also find: (i) $\angle CBE$ (ii) $\angle CDE$ (iii) $\angle AOB$

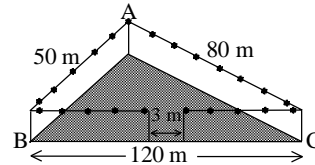


20. a. A park in the shape of a quadrilateral ABCD has $\angle C = 90^\circ$, $AB = 9$ m, $BC = 12$ m, $CD = 5$ m and $AD = 8$ m. How much area does it occupy?

Or

5

- b. In the adjoining figure, a triangular park ABC has sides 120 m, 80 m and 50 m. A gardener Dhania has to put a fence all around it and also plant grass inside. How much area does she need to plant? Find the cost of fencing it with barbed wire at the rate of ₹20 per metre leaving a space 3 m wide for a gate on one side.



21. a. A cloth having an area of 165 m^2 is shaped into the form of a conical tent of radius 5 m.
- (i) How many students can sit in the tent if a student on an average occupies $\frac{5}{7} \text{ m}^2$ on the ground?
 - (ii) Find the volume of the cone.

Or

5

- b. A plastic box 1.5 m long, 1.25 m wide and 65 cm deep is to be made. It is opened at the top. Ignoring the thickness of the plastic sheet, determine:
- (i) The area of the sheet required for making the box.
 - (ii) The cost of sheet for it, if a sheet measuring 1 m^2 costs ₹20.

22. a. Construct a frequency polygon for the following data:

Marks	Number of students
0-5	5
5-10	11
10-15	4
15-20	9
20-25	10
25-30	3
30-35	2
35-40	5

Or

5

b. The following table gives the life time of 400 neon lamps:

Life time (in hours)	Number of lambs
300-400	14
400-500	56
500-600	60
600-700	86
700-800	74
800-900	62
900-1000	48

- (i) Represent the given information with the help of a histogram.
- (ii) How many lamps have a life time of more than 700 hours?
