

APEEJAY SCHOOL, SHEIKH SARAI
FIRST TERM EXAMINATION, 2019-20

SS-11

CLASS-IX
MATHEMATICS

Time allowed : 3 Hrs.

M.M. : 80

Note :

Section A comprises Q. 1-20 of 1 mark each.

Section B comprises Q. 21-26 of 2 marks each.

Section C comprises Q. 27-34 of 3 marks each.

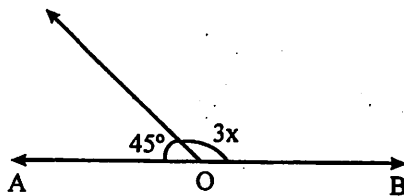
Section D comprises Q. 35-40 of 4 marks each.

SECTION-A

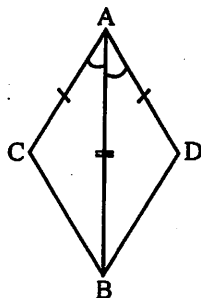
1. Which rational number does not lie between the rational numbers $\frac{2}{3}$ and $-\frac{1}{5}$
(a) $+\frac{2}{15}$ (b) $+\frac{4}{15}$
(c) $-\frac{9}{15}$ (d) $+\frac{6}{15}$
2. 3.777 in the form of $\frac{p}{q}$ is
(a) $\frac{9}{34}$ (b) $\frac{34}{9}$
(c) 37.7 (d) 3.7
3. $7^{1/2} \times 8^{1/2}$ in simplified form is
(a) (7×8) (b) $(7 \times 8)^{2/3}$
(c) $(56)^{1/2}$ (d) $\sqrt[3]{42}$
4. Factors of $ax^2 + bx^2 + ay^2 + by^2$ are
(a) $(a+b)(x^2)$ (b) $(a+b)$ and $(x^2 + y^2)$
(c) $(a+b)$ and y^2 (d) a and b only
5. The polynomial $px^2 + qx + rx^4 + 5$ is of the type
(a) Linear (b) quadratic
(c) cubic (d) biquadratic

P.T.O.

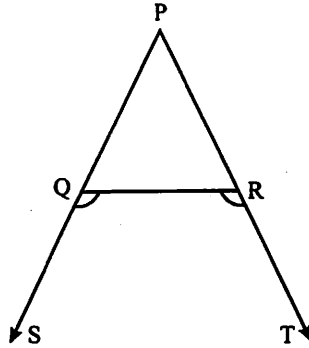
6. If $x+2$ is a factor of $x^3 - 2ax^2 + 16$, then the value of a is
 (a) 3 (b) 1 (c) 4 (d) 2
7. Identify the polynomial
 (a) $x^{-2} + x^{-1} + 5$ (b) $x^2 + 5\sqrt{x} + 7$ (c) $1/x^3 + 7$ (d) $3x^2 + 7$
8. The coordinates of the point which lies on the Y axis at a distance of 8 units from the origin in the negative direction of the Y axis is _____
9. If the coordinates of two points are $P(-5, 3)$ and $Q(8, -9)$, then find (abscissa of Q) - (abscissa of P)
10. The point $P(a, b)$ lies in the IVth Quadrant. Then
 (a) $b < a$ (b) $a = b$ (c) $a < b$ (d) none of these
11. The point $(-2, -3)$ lies in the _____ Quadrant.
12. Through which of the following points, the graph of $y = -x$ passes?
 (a) $(1, 1)$ (b) $(0, 1)$ (c) $(-1, 1)$ (d) $(-1, 0)$
13. Which equation's graph is at a distance of 3 units to the left of Y axis?
 (a) $x = 3$ (b) $x = -3$ (c) $y = x$ (d) $y = 3$
14. If the supplement of an angle is 4 times of its complement, find the angle.
15. In the following figure, AOB is a line. Then find x .



16. If two interior angles on the same side of the transversal intersecting two parallel lines are in the ratio 2 : 3, then find the smaller angle.
17. In the figure, the congruency rule used in proving $\triangle ACB \cong \triangle ADB$ is _____

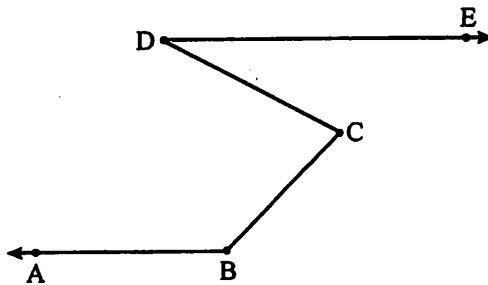


26. In the figure the sides PQ and PR are produced to S and T respectively, $\angle SQR < \angle TRQ$.
 Prove that $PQ > PR$.

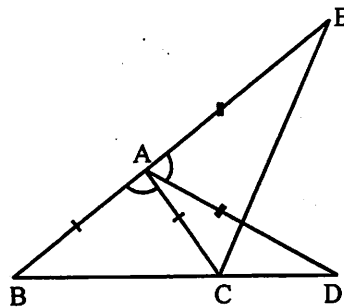


SECTION-C

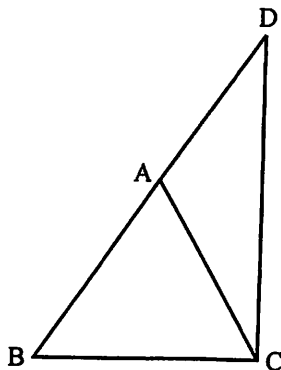
27. Represent $\sqrt{13}$ on the number line.
 28. Simplify : $[5[8^{1/3} + 27^{1/3}]]^{1/4}$
 29. The polynomials $ax^3 + 3x^2 - 13$ and $2x^3 - 5x + a$, when divided by $(x - 2)$ leave the same remainder. Find the value of a .
 30. If $2x + 3y = 12$ and $xy = 6$, find the value of $8x^3 + 27y^3$.
 31. In the figure $AB \parallel DE$. Prove that $\angle ABC + \angle BCD = 180^\circ + \angle CDE$.



32. Prove that the bisectors of a linear pair of angles are perpendicular to each other.
 33. In the given figure, $AB = AC$, $AD = AE$ and $\angle BAC = \angle DAE$. Prove that $\triangle BAD \cong \triangle CAE$.



34. In the figure $AB = AC$. AB is extended to D such that $AD = AC$. Prove that $\angle BCD = 90^\circ$.



SECTION-D

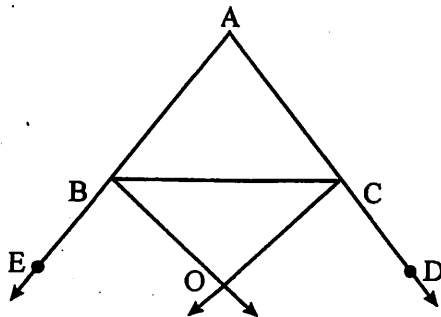
35. Factorise : (a) $9x^2 - 12ax - y^2 - z^2 - 2yz + 4a^2$

(b) $1 - 64a^3 - 12a + 48a^2$.

36. Factorise : $2x^3 - x^2 - 13x - 6$.

37. In the figure, bisectors of the exterior angles of $\triangle ABC$ meet at O . Prove that

$$\angle BOC = 90^\circ - \frac{1}{2} \angle A$$



38. A part of monthly expenses of a family on milk is fixed which is ₹ 500 and the remaining varies with the quantity of milk taken extra at the rate of ₹ 20 per kg. Taking the quantity of extra milk as x kg and the total expense as y , write a linear equation and draw its graph.
39. Prove that the bisectors of a pair of alternate angles are parallel to each other.
40. If $ABCD$ is a square, E is the mid point of AD . BE and CE are joined. Prove that $\triangle BEC$ is an isosceles triangle.



Roll No.	
Name	
Class & Section	

APEEJAY COMMON ANNUAL EXAMINATION, 2019-20

MATHEMATICS

Time Allowed : 3 Hrs.

Class – IX

Maximum Marks : 80

General Instructions :

- (1) All the questions are compulsory.
- (2) The question paper consist of 40 question divided into four sections A, B, C and D.
- (3) Section-A comprises of 20 questions of 1 mark each. Section B comprises of 6 questions of 2 marks each. Section-C comprises of 8 questions of 3 marks each. Section-D comprises of 6 questions of 4 marks each.
- (4) There is no overall choice. However, an internal choice has been provided in two questions of 1 mark each, two questions of 2 marks each, three questions of 3 marks each, and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
- (5) Use of calculators is not permitted.

Section-A

Q1 - Q10 are multiple choice questions. Select the most appropriate answer from the given options.

1. If $a + b + c = 0$, then $\frac{a^2}{bc} + \frac{b^2}{ca} + \frac{c^2}{ab}$ is
 - (a) 0
 - (b) abc
 - (c) $3abc$
 - (d) 3
2. $(625)^{0.16} \times (625)^{0.09}$ is
 - (a) 5
 - (b) 25
 - (c) 125
 - (d) 625.25

3. If the coordinates of two points A and B are (10, 5) and (-7, -4) respectively. Then, the value of (abscissa of A) - (ordinate of B) is

- (a) -14 (b) 14
(c) -10 (d) -12

4. The graph of the linear equation $2x + 3y = 6$ is a line which meets the x-axis at the point

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

OR

If a linear equation has solutions (-4, 8), (0, 0), (3, -6) then the equation is

- (a) $x - y = 0$ (b) $2x - y = 1$
(c) $x + 2y = 0$ (d) $2x + y = 0$

5. D is a point on the side BC of a $\triangle ABC$ such that AD bisects $\angle BAC$ then,

- (a) $BD = CD$ (b) $BA > BD$
(c) $BD > BA$ (d) $CD > CA$

6. ABCD is a cyclic quadrilateral such that AB is a diameter of the circle circumscribing it and $\angle ADC = 140^\circ$, then $\angle BAC$ is

- (a) 80° (b) 50°
(c) 40° (d) 30°

7. The base of a right triangle is 8 cm and hypotenuse is 10 cm. Its area will be

- (a) 24 cm^2 (b) 40 cm^2
(c) 48 cm^2 (d) 80 cm^2

OR

If the area of an equilateral triangle is $16\sqrt{3} \text{ cm}^2$, then the perimeter of the triangle is

- (a) 48 cm (b) 24 cm
(c) 12 cm (d) 36 cm

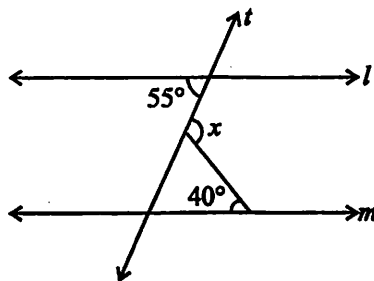
8. The radii of two cones are in the ratio of 2 : 3 and their heights are in the ratio of 5 : 3. The ratio of their volumes is

- (a) 10 : 17 (b) 20 : 27
(c) 17 : 27 (d) 20 : 37

9. Two sides of a triangle are of lengths 5 cm and 1.5 cm. The length of the third side of the triangle cannot be
- (a) 3.6 cm (b) 4.1 cm
(c) 3.8 cm (d) 3.4 cm
10. Median of the data 25, 34, 31, 23, 22, 26, 35, 28, 20, 32 is
- (a) 24 (b) 22
(c) 27 (d) 26

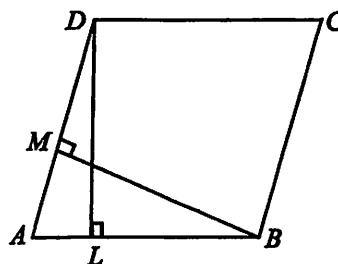
(Q.11-Q.15) Fill in the blanks :

11. If $\left(\frac{-1}{3}, 0\right)$ is a solution of the linear equation $2x + 3y = k$, then the value of k is
12. If $x = -2$ is a zero of the polynomial $p(x) = 8x^3 - ax^2 - x + 2$, then the value of a is
13. In a cricket match, a batsman hits a boundary 8 times out of 30 balls he plays. Then, the probability that he does not hit a boundary is
14. The three vertices of a rectangle $ABCD$ are $A(2, 2)$, $B(-3, 2)$ and $C(-3, 5)$, then the coordinates of D are
15. In the given figure, if $l \parallel m$, then the value of x is

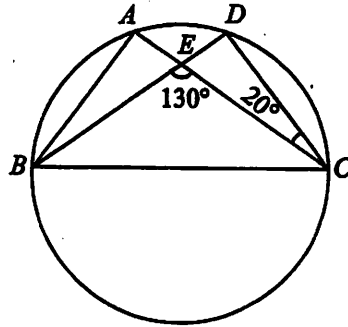


(Q.16 to Q.-20) Answer the following :

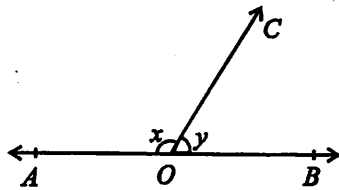
16. $ABCD$ is a parallelogram. DL is perpendicular to AB and BM is perpendicular to AD . If $AB = 16$ cm, $DL = 8$ cm and $BM = 10$ cm, find BC .



17. What is the degree of the zero polynomial?
18. In the given figure, A, B, C, D are four points on a circle AC and BD intersect at a point E such that $\angle BEC = 130^\circ$ and $\angle ECD = 20^\circ$. Find $\angle BAC$.



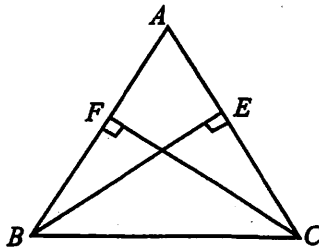
19. Find the mean of prime numbers between 1 and 30.
20. In the given figure, x is greater than y by one third of a right angle. Find the value of x .



Section-B

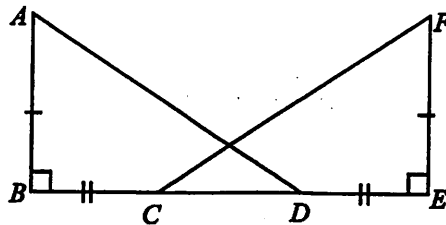
Question numbers 21 to 26 carry 2 marks each.

21. The perpendicular distance of a point from the x-axis is 2 units and its perpendicular distance from the y-axis is 5 units. Write the coordinates of such a point if it lies in the
- | | |
|------------------|-----------------|
| (a) I Quadrant | (b) II Quadrant |
| (c) III Quadrant | (d) IV Quadrant |
22. The angles of quadrilateral are in the ratio $3 : 5 : 9 : 13$. Find all the angles of the quadrilateral.
23. The mean of 10 observations is 20. The mean of first six observation is 18 and that of last six observations is 21. The fifth observation is 12. Find the sixth observation.
24. If $a - b = 12$ and $ab = 14$, find $a^2 + ab + b^2$.
25. ABC is a triangle in which altitudes BE and CF are equal. Show that
- $\triangle ABE \cong \triangle ACF$
 - $AB = AC$



OR

In the given figure $AB = EF$, $BC = ED$, $AB \perp BD$ and $FE \perp EC$. Prove that $\triangle ABD \cong \triangle FEC$.



26. 1000 families with 2 children were, selected randomly and the following data were recorded.

Number of boys in a family	0	1	2
Number of families	140	560	300

If a family is chosen at random, find the probability that it has

- (i) No boy
- (ii) Atleast,1 boy

OR

A recent survey found that the ages of workers in a factory is distributed as follows :

Age (in years)	20-29	30-39	40-49	50-59	60 and above
Number of workers	38	27	86	46	3

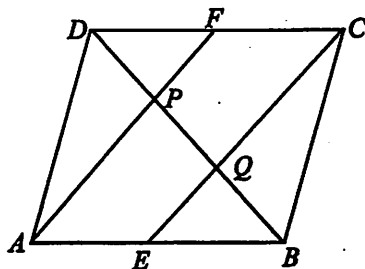
If a person is selected at random, find the probability that the person's age is

- (i) 40 years or more
- (ii) under 50 but over 29 years.

Section-C

Question numbers 27 to 34 carry 3 marks each.

27. A hemispherical bowl made of brass has inner diameter 1.05 dm. Find the cost of tin-plating it on the inside at the rate of ₹ 16 per 100 cm^2 .
28. Represent $\sqrt{78}$ on the number line.
29. In a parallelogram $ABCD$, E and F are the mid-points of sides AB and CD respectively. Show that the line-segment AF and EC trisects the diagonal BD .



OR

In $\triangle ABC$, AD is the median through A and E is the mid-point of AD . BE produced meets AC in F . Prove that $AF = \frac{1}{3} AC$.

30. Factorise completely

$$2x^3 - 3x^2 - 17x + 30$$

OR

Factorise completely

$$x^4 + x^2 + 1$$

31. $ABCD$ is a trapezium with $AB \parallel DC$. A line parallel to AC intersects AB at X and BC at Y . Prove that $ar(ADX) = ar(ACY)$.
32. The sides AB and AC of $\triangle ABC$ are produced to points E and D respectively. If bisectors BO and CO of $\angle CBE$ and $\angle BCD$ respectively meet at point O , then prove that $\angle BOC = 90^\circ - \frac{1}{2} \angle BAC$.

33. If the polynomials $az^3 + 4z^2 + 3z - 4$ and $z^3 - 4z + a$ leave the same remainder when divided by $z - 3$, find the value of a .
34. In a city, the weekly observations made in a study on the cost of living index are given in the following table.

Cost of living index	Number of weeks
140-150	5
150-160	10
160-170	20
170-180	9
180-190	6
190-200	2
Total	52

Draw a frequency polygon for the data given above.

OR

100 surnames were randomly picked up from a local telephone directory and a frequency distribution of the number of letters in the English alphabet in the surnames was found as follows :

Number of letters	Number of surnames
1-4	6
4-6	30
6-8	44
8-12	16
12-20	4

Draw a histogram to depict the given information.

Section-D

Question numbers 35 to 40 carry 4 marks each.

35. Sides of a triangle are in the ratio 12 : 17 : 25 and its perimeter is 540 cm. Find its area. Also, find the length of its smallest altitude.
36. Prove that the angle subtended by an arc of a circle at the centre is double the angle subtended by it at any point on the remaining part of the circle.

OR

AB is a diameter of the circle with centre O , CD is a chord equal to the radius of the circle. AC and BD when extended intersect at a point E . Prove that $\angle AEB = 60^\circ$.

37. Construct $\triangle ABC$ in which $BC = 8\text{cm}$, $\angle B = 45^\circ$ and $AB - AC = 3.5\text{ cm}$. Write its justification also.

38. If $a = \frac{3 - \sqrt{5}}{3 + \sqrt{5}}$ and $b = \frac{3 + \sqrt{5}}{3 - \sqrt{5}}$, find $a^2 - b^2$.

OR

If $x = 2 + \sqrt{3}$, find the value of $x^3 + \frac{1}{x^3}$.

39. Part of monthly expenses of a family on milk is fixed which is Rs. 50 and remaining varies with quantity of a milk taken at the rate of Rs. 25 per litre. Taking quantity of milk required as x litres and total expenditure on milk as Rs. y write a linear equation representing the given information and draw its graph.
40. Find the curved surface area of a closed cylindrical petrol storage tank, which is 4.2 m in diameter and 4.5 m high. Also find how much steel was actually used, if $\frac{1}{12}$ of the steel actually used was wasted in making the tank?

OR

A small village having a population of 10800 requires 30 litres of water per head per day. The village has got an overhead tank of measurement $50\text{m} \times 27\text{m} \times 24\text{m}$. For how many days will the water of this tank last?