



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 ΔABC 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

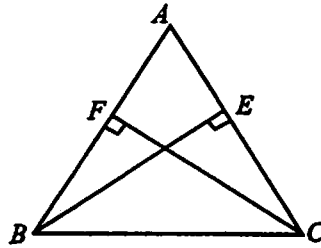
OR

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

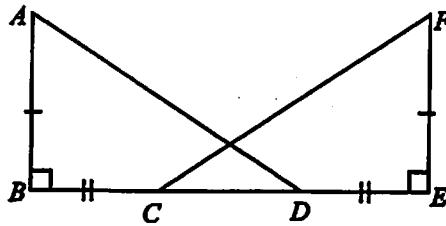
8. The radii of two cones are in the ratio of 2 : 3 and their heights are in the ratio of 5 : 3. The ratio of their volumes is

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



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

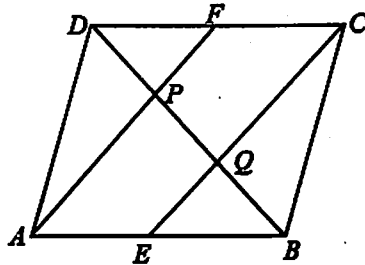
If a person is selected at random, find the probability that the person's age is

- (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 $AB - AC = 35\text{ cm}$. 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?