



Pre-Board Examination - (January)

Session (2024-25)

Subject: Mathematics Standard

Class: X

TIME: 3 hours

MM: 80

General Instructions:

1. This question paper contains 38 questions and Paper is divided into 5 Sections A, B, C, D and E.
2. In Section A, Questions no. 1-18 are multiple choice questions (MCQs) and Questions no. 19 and 20 are Assertion- Reason based questions of 1 mark each.
3. In Section B, Questions no. 21-25 are very short answer (VSA) type questions, carrying 02 marks each.
4. In Section C, Questions no. 26-31 are short answer (SA) type questions, carrying 03 marks each.
5. In Section D, Questions no. 32-35 are long answer (LA) type questions, carrying 05 marks each.
6. In Section E, Questions no. 36-38 are case study based questions carrying 4 marks each.
7. All Questions are compulsory. However, an internal choice has been Provided in 2 Questions of section B, 2 Questions of section C and 2 Questions of section D and E
8. Draw neat and clean figures wherever required.
9. Take $\pi = 22/7$ wherever required if not stated.
10. Use of calculators is not allowed.

Section A

Section A consists of 20 questions of 1 mark each.

1. The smallest irrational number that can be multiplied by the square root of 20 to get a rational number is $\sqrt{5}$
a) 20 b) 2 c) 5 d) $\sqrt{5}$
2. The HCF and the LCM of 12, 21, 15 respectively are
a) 3, 140 b) 12, 420 c) 3, 420 d) 420, 3
3. If the roots of quadratic equation $4x^2 - 5x + k = 0$ are real and equal, then value of k is
a) $5/4$ b) $25/16$ c) $-5/4$ d) $-25/16$
4. A point on the x-axis divides the line segment joining the points A(2, -3) and B(5, 6) in the ratio 1:2. The point is
a) (4, 0) b) $(7/2, 3/2)$ c) (3, 0) d) (0, 3)

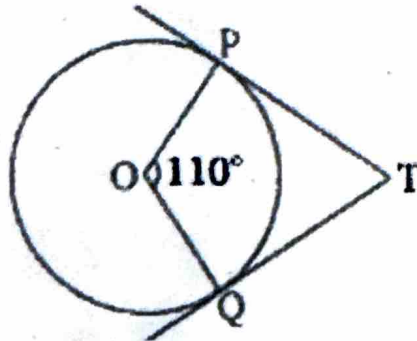
5. In figure, if TP and TQ are the two tangents to a circle with centre O so that $\angle POQ = 110^\circ$, then $\angle PTQ$ is equal to

(a) 60°

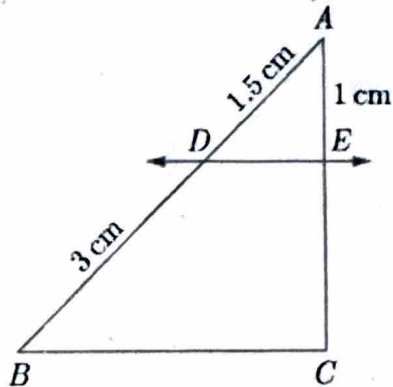
(b) 70°

(c) 80°

(d) 90°



6. In the given figure, $DE \parallel BC$. The value of EC is



(a) 1.5 cm

(b) 3 cm

(c) 2 cm

(d) 1 cm

7. If $13 \sin C = 12$, where $0^\circ < C < 90^\circ$, then $\tan C$ is equal to:

(a) $12/5$

(b) $5/12$

(c) $13/5$

(d) $5/13$

8. Which of the following statements is false?

(a) All isosceles triangles are similar.

(b) All quadrilaterals are similar.

(c) All circles are similar.

(d) None of the above

9. The number 385 can be expressed as a product of prime factors as

a) $5 \times 11 \times 13$

b) $5 \times 7 \times 11$

c) $5 \times 7 \times 13$

d) $5 \times 11 \times 17$

10. The 5th term from the end of the A.P -8, -5, -2, ... ,49 is

- a) 37 b) 40 c) 1 d) 43

11. If $\theta = 30^\circ$ then the value of $3\sin\theta$ is

- a) 1 b) $1/\sqrt{3}$ c) $\sqrt{3}/2$ d) not defined

12. The height and radius of a right circular cone are 24 cm and 7 cm respectively. The slant height of the cone is

- a) 24 cm b) 31 cm c) 26 cm d) 25 cm

13. A card is drawn from a well shuffled deck of 52 playing cards. The probability that drawn card is a red queen, is :

- a) $3/26$ b) $2/13$ c) $1/52$ d) $1/26$

14. The distance of the point (-12,5) from the origin is

- a) 12 b) 5 c) 13 d) 169

15. The mode and mean is given by 7 and 8, respectively. Then the median is:

- a) $1/13$ b) $13/3$ c) $23/3$ d) 33

16. Three coins are tossed together. The probability of getting exactly one tail, is :

- a) $3/8$ b) $1/4$ c) $1/52$ d) $1/56$

17. The distance between the points (m, -n) and (-m, n) is

- a) $\sqrt{m^2 + n^2}$ b) $\sqrt{m + n}$ c) $2\sqrt{m^2 + n^2}$ d) $\sqrt{2m^2 + 2n^2}$

18. A card is drawn from a well shuffled deck of playing cards. The probability of getting red face card is

- a) $3/13$ b) $1/2$ c) $3/52$ d) $3/26$

DIRECTION: In the question number 19 and 20, a statement of **Assertion (A)** is followed by a statement of **Reason (R)**.

Choose the correct option.

- A) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A)
- B) Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A)
- C) Assertion (A) is true but reason (R) is false.
- D) Assertion (A) is false but reason (R) is true

19.Assertion: The H.C.F. of two numbers is 16 and their product is 3072. Then their L.C.M. = 162.

Reason: If a and b are two positive integers, then $H.C.F. \times L.C.M. = a \times b$

20.Assertion : $13/3125$ is a terminating decimal fraction.

Reason : If $2^m 5^n$ where m, n, are non-negative integers, then p/q is a terminating decimal fraction.

Section B

Section B consists of 5 questions of 2 marks each.

21. (a) Two numbers are in ratio 2:3 and their LCM is 180, what is their HCF

OR

(b) Find the least number which when divided by 12, 16, 24 and 36 leaves a remainder 7 in each case.

22. A die is thrown once. Find the probability of getting a number which (i) is a prime number (ii) lies between 2 and 6.

OR

Two different dice are thrown together. Find the probability that the numbers obtained (i) have a sum less than 7 (ii) have a product less than 16.

23. Evaluate: $2\sqrt{2} \cos 45^\circ \sin 30^\circ + 2\sqrt{3} \cos 30^\circ$.

24. Find the point on the y-axis which is equidistant from the points (5, -2) and (-3, 2).

25. Show that the points A(-5, 6), B(3, 0) and C(9, 8) are the vertices of an isosceles triangle.

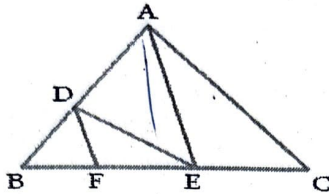
Section C

Section C consists of 6 questions of 3 marks each.

26. If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.

OR

In Fig., $DE \parallel AC$ and $DF \parallel AE$. Prove that $BF/BE = FE/EC$.



27. Sum of the areas of two squares is 544 m^2 . If the difference of their perimeters is 32 m, find the sides of the two squares.

28. Find the value of k such that the polynomial $x^2 - (k+6)x + 2(2k - 1)$ has the sum of its zeroes equal to half of their product.

29. Prove the identity: $\frac{\tan A}{1 - \cot A} + \frac{\cot A}{1 - \tan A} = 1 + \sec A \cdot \operatorname{cosec} A$

30. The minute hand of a clock is 10 cm long. Find the area of the face of the clock described by the minute hand between 9 a.m. to 9.35 a.m.

OR

A car has two wipers which do not overlap. Each wiper has a blade of length 21 cm sweeping through an angle 120° . Find the total area cleaned at each sweep of the blades (Take $\pi = 22/7$)

31. Prove that $\sqrt{3}$ is an irrational number.

Section D

Section D consists of 4 questions of 5 marks each

32. (a) Five years hence, the age of Jacob will be three times that of his son. Five years ago, Jacob's age was seven times that of his son. What are their Present ages?

OR

- (b) The sum of the digits of a two-digit number is 9. Also, nine times this number is twice the number obtained by reversing the order of the digits. Find the number.

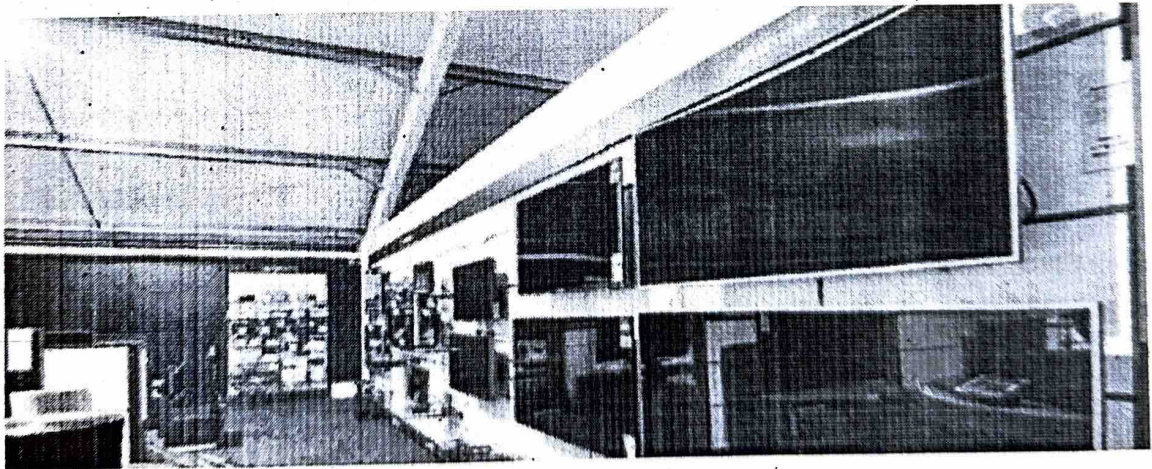
33. Prove that the angle between the two tangents drawn from an external point to a circle is supplementary to the angle subtended by the line-segment joining the points of contact at the centre.
34. From a point on a bridge across a river, the angles of depression of the banks on opposite sides of the river are 30° and 45° , respectively. If the bridge is at a height of 3 m from the banks, find the width of the river.
35. The mean of the following distribution is 48 and sum of all the frequencies is 50. Find the missing frequencies x and y .

Class	20-30	30-40	40-50	50-60	60-70
Frequency	8	6	x	11	y

Section E

Section E consists of 3 case study based questions of 4 marks each.

36. India is a competitive manufacturing location due to the low cost of manpower and strong technical and engineering capabilities contributing to higher quality production runs. The production of TV sets in a factory increases uniformly by a fixed number every year. It produced 16000 sets in 6th year and 22600 in 9th year.



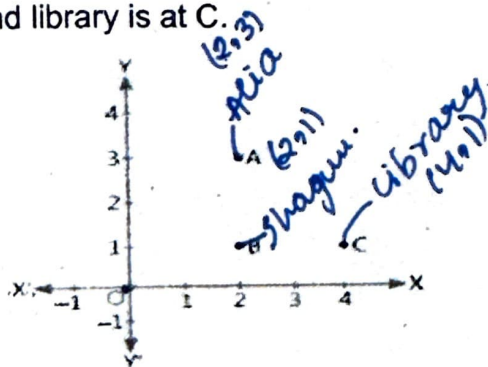
Based on the above information, answer the following questions:

1. Find the production during the first year.
2. Find the production during 8th year.
3. Find the production during the first 3 years.
4. In which year, the production is Rs 29,200.

OR

5. Find the difference of the production during 7th year and 4th year.

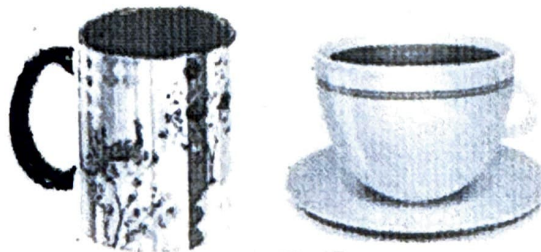
37. Alia and Shagun are friends living on the same street in Patel Nagar. Shagun's house is at the intersection of one street with another street on which there is a library. They both study in the same school and that is not far from Shagun's house. Suppose the school is situated at the point O , i.e., the origin, Alia's house is at A . Shagun's house is at B and library is at C .



Based on the given information, answer the following questions

- (i) How far is Alia's house from Shagun's house?
- (ii) How far is the library from Shagun's house?
- (iii) Show that for Shagun, school is farther compared to Alia's house and library.

38. In a coffee shop, coffee is served in two types of cups. One is cylindrical in shape with diameter 7 cm and height 14 cm and the other is hemispherical with diameter 21 cm.



Based on the above information, solve the following questions:

- (i) Find the area of the base of the cylindrical cup.
- (ii) What is the curved surface area of the cylindrical cup?
- (iii) What is the capacity of the hemispherical cup?

OR

Find the capacity of the cylindrical cup?