CBSE 2024 Maths Standard — Set 2

English Medium

Time Allowed: 3 Hours | Maximum Marks: 80

General Instructions:

1. This question paper contains 38 questions. All questions are compulsory.
2. Section A has 20 MCQs carrying 1 mark each.
3. Section B has 6 questions carrying 2 marks each.
4. Section C has 6 questions carrying 3 marks each.
5. Section D has 4 questions carrying 5 marks each.
6. Section E has 3 case-study based questions carrying 4 marks each.
7. Draw neat figures wherever required.

Section A

Multiple Choice Questions (1 mark each)

Q.1 [1 mark]

The value of k for which the system of equations 3x - y + 8 = 0 and 6x - ky + 16 = 0 has infinitely many solutions, is

(a) -2

(b) 2

(c) 1/2

(d) -1/2

Q.2 [1 mark]

Point P divides the line segment joining the points A(4, -5) and B(1, 2) in the ratio 5:2. Co-ordinates of point P are

(a) (5/2, -3/2)

(b) (11/7, 0)

(c) (13/7, 0)

(d) (0, 13/7)

Q.3 [1 mark]

The common difference of an A.P. in which a(15) - a(11) = 48, is

(a) 12

(b) 16

(c) -12

(d) -16

Q.4 [1 mark]

The quadratic equation x^2 + x + 1 = 0 has _____ roots.

(a) real and equal

(b) irrational

(c) real and distinct

(d) not-real

Q.5 [1 mark]

If the HCF(2520, 6600) = 40 and LCM(2520, 6600) = 252 * k, then the value of k is

(a) 1650
(b) 1600
(c) 165
(d) 1625

Q.6 [1 mark]

In the given figure, triangle ABC is shown. DE is parallel to BC. If AD = 5 cm, DB = 2.5 cm and BC = 12 cm, then DE is equal to

(a) 10 cm
(b) 6 cm
(c) 8 cm
(d) 7.5 cm

Q.7 [1 mark]

If sin theta = cos theta, (0 < theta < 90), then value of (sec theta . sin theta) is

(a) 1/sqrt(2)
(b) sqrt(2)
(c) 1
(d) 0

Q.8 [1 mark]

Two dice are rolled together. The probability of getting the sum of the two numbers to be more than 10, is

(a) 1/9
(b) 1/6

(c) 7/12

(d) 1/12

Q.9 [1 mark]

If alpha and beta are zeroes of the polynomial 5x^2 + 3x - 7, the value of 1/alpha + 1/beta is

(a) -3/7

(b) 3/5

(c) 3/7

(d) 5/7

Q.10 [1 mark]

The perimeters of two similar triangles ABC and PQR are 56 cm and 48 cm respectively. PQ/AB is equal to

(a) 7/8

(b) 6/7

(c) 7/6

(d) 8/7

Q.11 [1 mark]

AB and CD are two chords of a circle intersecting at P. Choose the correct statement from the following:

(a) triangle ADP ~ triangle CBA

(b) triangle ADP ~ triangle BPC

(c) triangle ADP ~ triangle BCP

(d) triangle ADP ~ triangle CBP

Q.12 [1 mark]

If value of each observation in a data is increased by 2, then median of the new data

(a) increases by 2

(b) increases by 2n
(c) remains same
(d) decreases by 2

Q.13 [1 mark]

A box contains cards numbered 6 to 55. A card is drawn at random from the box. The probability that the drawn card has a number which is a perfect square, is

(a) 7/50
(b) 7/55
(c) 1/10
(d) 5/49

Q.14 [1 mark]

In the given figure, tangents PA and PB to the circle centred at O, from point P are perpendicular to each other. If PA = 5 cm, then length of AB is equal to

(a) 5 cm
(b) 5*sqrt(2) cm
(c) 2*sqrt(5) cm
(d) 10 cm

Q.15 [1 mark]

XOYZ is a rectangle with vertices X(-3, 0), O(0, 0), Y(0, 4) and Z(x, y). The length of its each diagonal is

(a) 5 units
(b) sqrt(5) units
(c) x^2 + y^2 units
(d) 4 units

Q.16 [1 mark]

Which term of the A.P. -29, -26, -23, ..., 61 is 16?

(a) 11th
(b) 16th
(c) 10th
(d) 31st

Q.17 [1 mark]

In the given figure, AT is tangent to a circle centred at O. If angle CAT = 40, then angle CBA is equal to

(a) 70
(b) 50
(c) 65
(d) 40

Q.18 [1 mark]

After an examination, a teacher wants to know the marks obtained by maximum number of students in her class. She requires to calculate _____ of marks.

(a) median
(b) mode
(c) mean
(d) range

Q.19 [1 mark]

Assertion (A): If sin A = 1/3 (0 < A < 90), then the value of cos A is 2*sqrt(2)/3.

Reason (R): For every angle theta, sin^2(theta) + cos^2(theta) = 1.

(a) Both A and R are true. R is the correct explanation of A.
(b) Both A and R are true. R does not give correct explanation of A.
(c) A is true but R is not true.
(d) A is not true but R is true.

Q.20 [1 mark]

Assertion (A): Two cubes each of edge length 10 cm are joined together. The total surface area of newly formed cuboid is 1200 cm^2.

Reason (R): Area of each surface of a cube of side 10 cm is 100 cm^2.

(a) Both A and R are true. R is the correct explanation of A.

(b) Both A and R are true. R does not give correct explanation of A.

(c) A is true but R is not true.

(d) A is not true but R is true.

Section B

Very Short Answer Questions (2 marks each)

Q.21 [2 marks]

Can the number (15)^n, n being a natural number, end with the digit 0? Give reasons.

Q.22 [2 marks]

Find the type of triangle ABC formed whose vertices are A(1, 0), B(-5, 0) and C(-2, 5).

Q.23 [2 marks]

Evaluate: 2 sin^2(30) sec(60) + tan^2(60).

OR

Q.23 [2 marks]

If 2 sin(A + B) = sqrt(3) and cos(A - B) = 1, then find the measures of angles A and B. 0 <= A, B, (A + B) <= 90.

Q.24 [2 marks]

In the given figure, AB and CD are tangents to a circle centred at O. Is angle BAC = angle DCA? Justify your answer.

Q.25 [2 marks]

In what ratio is the line segment joining the points (3, -5) and (-1, 6) divided by the line y = x?

OR

Q.25 [2 marks]

A(3, 0), B(6, 4) and C(-1, 3) are vertices of a triangle ABC. Find the length of its median BE.

OR

Q.26 [2 marks]

In an A.P., the sum of three consecutive terms is 24 and the sum of their squares is 194. Find the numbers.

Section C

Short Answer Questions (3 marks each)

Q.30 [3 marks]

In a test, the marks obtained by 100 students (out of 50) are given below:

Marks obtained: 0-10, 10-20, 20-30, 30-40, 40-50
Number of students: 12, 23, 34, 25, 6

Find the mean marks of the students.

Q.31 [3 marks]

In a 2-digit number, the digit at the unit's place is 5 less than the digit at the ten's place. The product of the digits is 36. Find the number.

Q.32 [3 marks]

Using graphical method, solve the following system of equations: 3x + y + 4

= 0 and 3x - y + 2 = 0.

OR

Q.32 [3 marks]

Tara scored 40 marks in a test, getting 3 marks for each right answer and losing 1 mark for each wrong answer. Had 4 marks been awarded for each correct answer and 2 marks been deducted for each wrong answer, then Tara would have scored 50 marks. Assuming that Tara attempted all questions, find the total number of questions in the test.

Section D

Long Answer Questions (5 marks each)

Q.34 [5 marks]

From the top of a 45 m high light house, the angles of depression of two ships, on the opposite side of it, are observed to be 30 and 60. If the line joining the ships passes through the foot of the light house, find the distance between the ships. (Use sqrt(3) = 1.73)

Q.35 [5 marks]

The perimeter of a certain sector of a circle of radius 5.6 m is 20.0 m. Find the area of the sector.

Q.36(a) [5 marks]

A ball is thrown in the air so that t seconds after it is thrown, its height h metre above its starting point is given by the polynomial h = 25t - 5t^2. Write zeroes of the given polynomial.

Q.36(b) [5 marks]

A ball is thrown in the air so that t seconds after it is thrown, its height h metre above its starting point is given by the polynomial h = 25t - 5t^2. Find

the maximum height achieved by the ball.

Q.36(c) [5 marks]

A ball is thrown in the air so that t seconds after it is thrown, its height h metre above its starting point is given by the polynomial h = 25t - 5t^2. After throwing upward, how much time did the ball take to reach the height of 30 m?

OR

Q.36(c) [5 marks]

A ball is thrown in the air so that t seconds after it is thrown, its height h metre above its starting point is given by the polynomial h = 25t - 5t^2. Find the two different values of t when the height of the ball was 20 m.

Q.37(a) [4 marks]

A circus tent is cylindrical upto a height of 8 m and conical above it. The diameter of the base is 28 m and total height of the tent is 18.5 m. Find the slant height of the conical part.

Q.37(b) [4 marks]

A circus tent is cylindrical upto a height of 8 m and conical above it. The diameter of the base is 28 m and total height of the tent is 18.5 m. Determine the floor area of the tent.

Q.37(c) [4 marks]

A circus tent is cylindrical upto a height of 8 m and conical above it. The diameter of the base is 28 m and total height of the tent is 18.5 m. Find the area of the cloth used for making the tent.

OR

Q.37(c) [4 marks]

A circus tent is cylindrical upto a height of 8 m and conical above it. The diameter of the base is 28 m and total height of the tent is 18.5 m. Find the total volume of air inside an empty tent.

Q.38(a) [4 marks]

In a survey on holidays, 120 people were asked to state which type of transport they used. The pie chart shows sectors: Train, Bus, Car (177 degrees), Ship (33 degrees), Aeroplane. If one person is selected at random, find the probability that he/she travelled by bus or ship.

Q.38(b) [4 marks]

In a survey on holidays, 120 people were asked to state which type of transport they used. The pie chart shows sectors for Train, Bus, Car (177 degrees), Ship (33 degrees), Aeroplane. Which is the most favourite mode of transport and how many people used it?

Q.38(c) [4 marks]

In a survey on holidays, 120 people were asked to state which type of transport they used. If the probability that a randomly selected person did not use train is 4/5, find the number of people who used train.

OR

Q.38(c) [4 marks]

In a survey on holidays, 120 people were asked to state which type of transport they used. The probability that a randomly selected person used aeroplane is 7/60. Find the revenue collected by the air company at the rate of Rs 5000 per person.