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CBSE 2019 Sample Question Paper

MATHEMATIC

Time allowed: 3 hours

Maximum marks: 80

General Instructions:

- (i) All question are compulsory.
- (ii) This question paper contains 30 questions divided into 4 sections A, B, C and D..
- (iii) Section A comprises of 6 questions of 1 mark each. Section B comprises of 6 question of 2 marks each. Section C comprises of 10 questions of 3 marks each. Section D comprises of 8 questions of 4 marks each.
- (iv) 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, four question of 3 marks each and three question of 4 marks each. You have to attempt only one of the alternatives in all such questions.
- (v) Use of calculators is not permitted.

Section A

1. Without actually performing the long division, state whether the given rational number will have a terminating decimal expansion or non-terminating repeating decimal expansion :

(a) $\frac{17}{8}$

2. Find the values of K for the given quadratic equation, so that it has two equal roots.
 $Kx(x - 2) + 6 = 0$

OR

In the given AP, find the missing terms in the boxes :

, 38, , , , - 22

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3. Find a relation between x and y such that the point (x, y) is equidistant from the points $(7, 1)$ and $(3, 5)$.

OR

D is a point on the side BC of a triangle ABC such that $\angle ADC = \angle BAC$. Show that $CA^2 = CB \cdot CD$.

4. In ΔPQR , right-angled at Q , $PR + QR = 25\text{cm}$ and $PQ = 5\text{cm}$. Determine the values of $\sin P$, $\cos P$ and $\tan P$.
5. How many two-digit numbers are divisible by 3 ?
6. Do the points $(3, 2)$, $(-2, -3)$ and $(2, 3)$ form a triangle? if so, name the type of triangle formed.

Section B

7. Check whether 6^n can end with the digit 0 for any natural number n .

OR

Show that $5 - \sqrt{3}$ is irrational.

8. Find the 11th term from the last term (towards the first term) of the AP : 10, 7, 4, . . . , -62.

OR

Two APs have the same common difference. The difference between their 100th terms is 100, what is difference between their 1000th terms?

9. Find the ratio in which the y -axis divides the line segment joining the points $(5, -6)$ and $(-1, -4)$. Also find the point of intersection.
10. One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting neither a red card nor a queen.
11. A die is thrown twice. What is the probability that 5 will come up atleast once ?
12. For which values of a and b does the following pair of linear equations have an infinite number of solutions ?
 $2x + 3y = 7$
 $(a-b)x + (a+b)y = 3a + b - 2$

Section C

13. Use Euclid's algorithm to find the HCF of 4052 and 12576.
14. Find the roots of the quadratic equation $3x^2 - 2\sqrt{6}x + 2 = 0$.



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15. Represent the following situation in the form of quadratic equation :

A train travels a distance of 480 km at a uniform speed. If the speed had been 8 km/h less, then it would have taken 3 hours more to cover the same distance. Find the speed of the train.

16. If the point A(6, 1), B(8, 2), C(9, 4) and D (p, 3) are the vertices of a parallelogram, taken in order find the value of p .

OR

Find the value of k if the points A(2, 3), B(4, k) and C(6, -3) are collinear.

17. If A, B and C are interior angles of a triangle ABC, then show that $\sin\left(\frac{B+C}{2}\right) = \cos\frac{A}{2}$.

OR

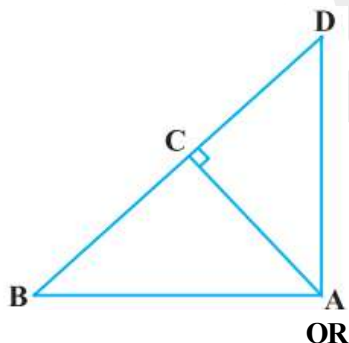
Prove the given identity, where the angle involved is acute angles for which the expressions are defined

$$\frac{1 + \sec A}{\sec A} = \frac{\sin^2 A}{1 - \cos A}$$

18. Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that $\angle PTQ = 2 \angle OPQ$.

19. In Figure, ABD is a triangle right angled at A and $AC \perp BD$. Show that

- (i) $AB^2 = BC \cdot BD$
 (ii) $AC^2 = BC \cdot DC$



OR

In an equilateral triangle ABC, D is a point on side BC such that $BD = \frac{1}{3} BC$. Prove that $9AD^2 = 7AB^2$

20. Find the area of the sector of a circle with radius 4 cm and if angle 30° . Also, find the area of the corresponding major sector (Use $\pi = 3.14$).

21. How many silver coins, 1.75cm in diameter and of thickness 2mm, must be melted to form a cuboid of dimensions 5.5cm \times 10cm \times 3.5cm ?

OR

A container shaped like a right circular cylinder having diameter 12 cm and height 15 cm is full of ice cream. The ice cream is to be filled into cones of height 12 cm and diameter 6cm, having a hemispherical shape on the top. Find the number of such cones which can be filled with ice cream.



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22. A student noted the number of cars passing through a spot on a road for 100 periods each of 3 minutes and summarised it in the table given below. Find the mode of the data :

Number of cars	0–10	10–20	20–30	30–40	40–50	50–60	60–70	70–80
Frequency	7	14	13	12	20	11	15	8

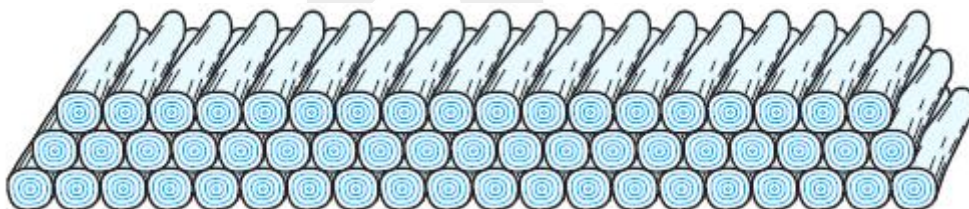
Section D

23. Two water taps together can fill a tank in $9\frac{3}{8}$ hours. The tap of larger diameter takes 10 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.

OR

A motor boat whose speed is 18 km/h in still water takes 1 hours more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream.

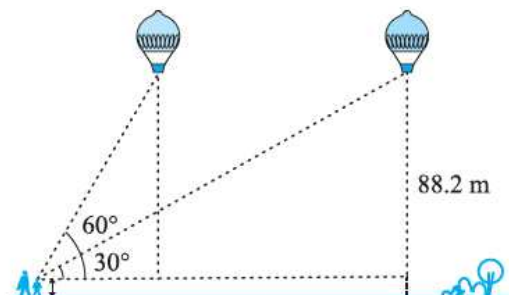
24. 200 logs are stacked in the following manner: 20 logs in the bottom row, 19 in the next row, 19 in the row next to it and so on (See Figure). In how many rows are the 200 logs placed and how many logs are in the top row ?



25. Construct a triangle similar to a given triangle ABC with its sides equal to $\frac{3}{4}$ of the corresponding sides of the triangle ABC (i.e., of scale factor $\frac{3}{4}$).

26. Prove that in a triangle, if square of one side is equal to the sum of the squares of the other two sides, then the angle opposite the first side is a right angle.

27. A 1.2 m tall girl spots a balloon moving with the wind in a horizontal line at a height of 88.2 m from the ground. The angle of elevation of the balloon from the eyes of the girl at any instant is 60° . After some time, the angle of elevation reduces to 30° (see Figure). Find the distance travelled by the balloon during the interval.



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OR

A straight highway leads to the foot of a tower. A man standing at the top of the tower observes a car at an angle of depression of 30° , which is approaching the foot of the tower with a uniform speed. Six seconds later, the angle of depression of the car is found to be 60° . Find the time taken by the car to reach the foot of the tower from this point.

28. During the medical check-up of 35 students of a class, their weights were recorded as follows :

Weight (in kg)	Number of students
Less than 38	0
Less than 40	3
Less than 42	5
Less than 44	9
Less than 46	14
Less than 48	28
Less than 50	32
Less than 52	35

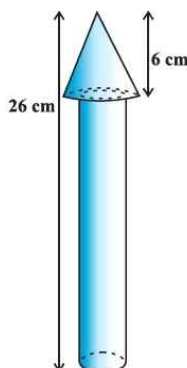
Draw a less than type ogive for the given data. Hence obtain the median weight from the graph and verify the result by using the formula.

OR

If the median of the distribution given below is 28.5, find the values of x and y

Class interval	Frequency
0 – 10	5
10 – 20	x
20 – 30	20
30 – 40	15
40 – 50	y
50 – 60	5
Total	60

29. A wooden toy rocket is in the shape of cone mounted on a cylinder, as shown in the height of the entire rocket is 6cm. The base of the conical portion has a diameter of 5 cm, while the base diameter of the cylindrical portion is 3 cm. If the conical portion is to be painted orange and the cylindrical portion is 3 cm . If the conical portion is to be painted orange and the cylindrical portion yellow, find the area of the rocket painted with each of these colours. (Take $\pi = 3.14$)


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30. Prove the given identity, where the angle involved is acute angle for which the expressions is defined.

$$\frac{\cos A - \sin A + 1}{\cos A + \sin A - 1} = \operatorname{cosec} A + \cot A, \text{ using the identity } \operatorname{cosec}^2 A = 1 + \cot^2 A.$$

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