KENDRIYA VIDYALAYA SANGATHAN, BENGALURU
MODEL QUESTION PAPER -2 (2017-2018)
MATHEMATICS
## CLASS - X

Time Allowed : 03 Hours   Maximum Marks : 80

General Instruction:

(i)   All questions are compulsory.

(ii)   The question paper consists of 30 questions divided into four sections – A, B, C and D.

(iii)   Section-A contains 6 questions of 1 mark each, Section-B comprises of 6 questions of 2 marks each, Section-C comprises of 10 questions of 3 marks each and Section-D comprises of 8 questions of 4 marks each.

(iv)   There is no overall choice however internal choice have been provided in 1 question of 3 marks each and 1 question of 4 marks each. You have to attempt only one of the alternatives in all such questions.

(v)   Use of calculator is not permitted.

SECTION-A

Question numbers 1 to 6 carry 1 mark each.

1. If two positive integers a and b are written as $a = x^3y^2$ and $b = xy^3$, x and y are prime numbers. Find the HCF of (a,b).

2. If 3 is a solution of $3x^2 + (k-1)x + 9 = 0$, then k=?

3. Find the Area of a triangle formed by (1, -4), (3, -2) and (-3, 16).

4. If $\triangle ABC \sim \triangle RPQ$, AB=3cm, BC=5cm, AC=6 cm, RP = 6 cm and PQ = 10 cm. then, find QR.

5. In the figure RQ is a tangent to the circle with centre O. if SQ = 6 cm, QR=4 cm. Find OR.
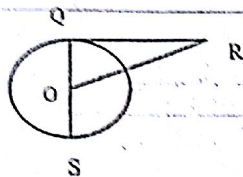
6. Find the probability of getting 53 Fridays in a leap year.

SECTION-B

Question numbers 7 to 12 carry 2 marks each.

7. Show that 9^n cannot end with digit 0 for any natural number n.

8. Find the roots of the quadratic equation $x^2 - \dfrac{x}{5} + \dfrac{1}{100} = 0$

9. Is 68 a term of the A.P. 7, 10, 13,....?.

10 Prove that the tangents drawn at the end points of the diameter of a circle are parallel.

11. If SinA = CosA, find the value of $2\tan^2 A + \sin^2 A + 1$.

12. If the point P(2,2) is equidistant from the points A (-2, k) and B(-2k,-3),find k.

SECTION-C

(Question numbers 13 to 22 carry 3 marks each.)

13. Solve for x : $4x^2 - 2(a^2 + b^2)x + a^2 b^2 = 0$

OR

The sum of two numbers is 8. Determine the numbers if the sum of their reciprocals is $\frac{8}{15}$

14. Show that $3 + 5\sqrt{3}$ is an irrational number.

15. The mean of the following distribution is 18. The frequency f in the class 19—21 is missing. Determine f.

Class interval	11—13	13—15	15—17	17—19	19—21	21—23	23—25
Frequency	3	6	9	13	f	5	4

16. Draw a circle of radius 3cm. Draw a pair of tangents to this circle inclined to each other at an angle of 60^0.

17. A chord of a circle of radius 21cm subtends an angle of 60° at the centre. Find the area of the corresponding minor segment of the circle. [use $\pi = \frac{22}{7}$ and $\sqrt{3} = 1.73$]

18. An open metal bucket is in the shape of a frustum of a cone of height 16cm with radii of its lower and upper ends as 8cm and 20cm respectively. Find the cost of milk which can completely fill the bucket at Rs : 20 per litre. [use $\pi = \frac{22}{7}$]

19. The line segment joining the points A(3, 2) and B(5, 1) is divided at the point P in the ratio 1 : 2 and P lies on the line 3x-18y +k = 0. Find the value of k.

20. From the top of a 7m high building, the angle of elevation of the top of a tower is 60° and the angle of depression of its foot is 45°. Find the height of the tower.
(Take $\sqrt{3} = 1.732$)

21. Prove that:
$$\frac{1}{cosecA - cotA} - \frac{1}{sinA} = \frac{1}{sinA} - \frac{1}{cosecA + cotA}$$

22. The king, queen and jack of diamonds are removed from a pack of 52 playing cards and then the remaining cards are well shuffled. Now one card is drawn at random from the remaining cards. Determine the probability that the card is :
a) a Jack   b) a Heart   c) a red Queen

SECTION-D
(Question numbers 23 to 30 carry 4 marks each)

23. An aeroplane left 40 minutes late due to heavy rains and in order to reach its destination, 1600 Km away in time, it had to increase its speed by 400 Km/hr from its original speed. Find the original speed of the plane.

24. In a flower bed, there are 23 rose plants in the first row, 21 in the second, 19 in the third and so on. There are 5 rose plants in the last row. How many rows are there in the flower bed? Also find the total number of plants.

25. Find the volume of the largest solid right circular cone that can be cut out of solid cube of side 14cm.

OR

A solid is in the form of a cylinder with hemispherical ends. The total height of the solid is 19cm and diameter of the cylindrical and hemispherical parts is 7cm. Find the total surface area of the solid

26. Find graphically the solution of the equations $x + 2y = 8$; $y - x = 1$

Find the coordinates of the points where the two lines meet the y-axis.

27. Two hoardings on cleanliness are put on two poles of equal heights standing opposite to each other on either side of the road, which is 80m wide. From a point between them on the road, the angles of elevation of the top of the poles are $60°$ and $30°$ respectively. Find the height of the poles and the distance of the point from the poles. :
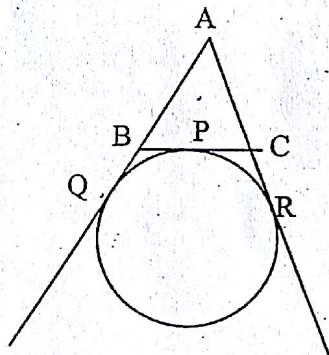a) How can we spread awareness for cleanliness in a society ?
b) Does cleanliness play any role in the development of the society?

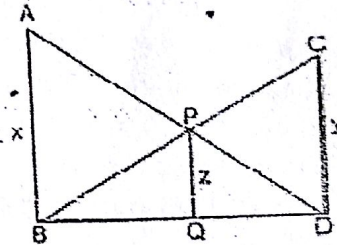28. Prove that a parallelogram circumscribing a circle is a rhombus.
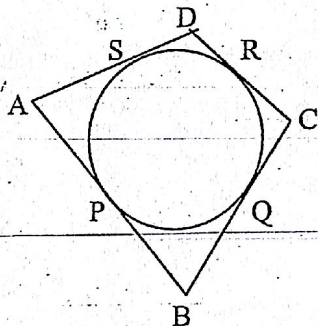
OR

A circle touches the side BC of a triangle ABC at a point P and touches AB and AC produced at Q and R respectively. Show that $AQ = \frac{1}{2}$ (perimeter of triangle ABC)

123

29. In the given figure, AB ∥ PQ ∥ CD, AB = x units, CD = y units and PQ = z units, prove that

$$\frac{1}{x} + \frac{1}{y} = \frac{1}{z}$$

30. lowing table gives the wages of 100 workers:

Wages in (Rs)	20-30	30-40	40-50	50-60	60-70	70-80
Number of Workers	10	15	30	32	8	5

Change the above distribution to less than type distribution and draw its ogive. Hence,

Obtain the median value.

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