FIRST PRE - BOARD EXAMINATION 2017 -18
MATHEMATICS
(CODE NO. 041)
CLASS-X

Time Allowed: 3 Hours   **Maximum Marks: 80**

General Instructions:
1.   All questions are compulsory.

2.   The question papers consisit of 30 questions divided into four sections A, B, C and D.

3.   Section A xconsists 6 questions of 1 mark each. Section B contains 6 questions of 2 marks each. Section C contains 10 questions of 3 marks each. Section D contains 8 question of

4.   There is no overall choice. However an internal choice has been provided in four questions of 3   marks each and 3 questions of 4 mark each. You have to attempt only one of the alternatives   in all such questions.

5.   Use of calculator is not permitted.

SECTION A

(Question numbers 1 to 6 carry 1 mark each)

1.   State whether the rational number $\frac{27}{180}$ will have a terminating decimal expansion or a non terminating repeating decimal expansion

2.   Find quadratic equation whose roots are $\frac{2+\sqrt{5}}{2}$ and $\frac{2-\sqrt{5}}{2}$

3.   If $\sqrt{3}\sin\theta = \cos\theta$ find the value of $\frac{3\cos^2\theta + 2\cos\theta}{3\cos\theta + 2}$

4   Find the value of x
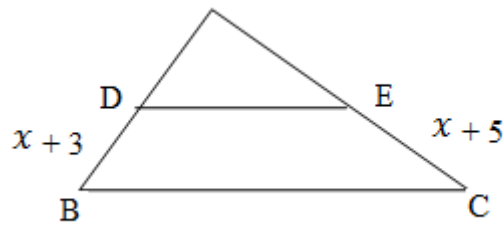
5.   Find the 9th term from the last term of an A.P. 5, 9, 13............. , 185.

6.   A box contains cards numbered 7 to 51. A card is drawn at random from the box. Calculate the probability that the drawn card has number which is a perfect square.

SECTION B
(Question numbers 7 to 12 carry 2 marks each)

7.   Find the value of m so that the quadratic equation $mx\,(x-7)+\,49=0$ has two equal roots.

8.   Which term of A. P. 14, 11, 8 ...., is -1?

9.   Find the ration in which the point $(-3,k)$ divides the line segment joining the points $(-5,-4)$ and $(-2,3)$. Also find the value of k.

10. Explain why $3\,\times 7\,\times 13\,\times 19+26$ is a composite number.

11. An unbiased die is thrown once. Find the probability of getting

        i. An even number which is multiple of 3

        ii. A number between 3 and 6

12. The length of minute hand of a clock is $14cm$. Find the area swept by the minute hand in 5 minutes.

SECTION C
(Question number 13 to 22 carry 3 marks each)

13. Prove that $5 + 3\sqrt{2}$ is irrational.

14. Solve the pair of linear equations.

$$62x + 37y = 13$$

$$37x + 62y = -112$$

15. ₹6500 were divided equally among a certain number of persons. Had there been 15 more persons, each would have got ₹30 less. Find the original number of persons.

16. The points $A(4,7), B(P,3)$ and $C(7,3)$ are the vertices of a right triangle, right angled at B. Find the value of P.

OR

If the coordinators of point A and B are $(-2,-2)$ and $(2,-4)$ respectively, find the co ordinates of P such that $AP = \dfrac{3}{7}$ AB, where P lies on the line segment AB.

17. Find the value of

$$\frac{\sin^2 65° + \sin^2 25°}{\text{Sec}^2 30° - \cot^2 60°} + 2\sin 36° \sin 42° \, Sec \, 48° \sec 54°$$

OR

Prove the identity:

$$\sin A \, (1 + \tan A) + \cos A \, (1 + \cot A) = SecA + Cosec \, A$$

18. Show that $\dfrac{1}{2}$ and $\dfrac{-3}{2}$ are the zeroes of the polynomial $4x^2 + 4x - 3$ and verify the relationship between zeroes and coefficient of polynomial.

19. E is a point on the side AD produced of a parallelogram $ABCD$ and BE intersects CD at F show that $\Delta\ ABE \sim \Delta\ CFB$

<div align="center">OR</div>

In $\Delta\ ABC$ in which $AB = AC$ and D is any point on BC prove that
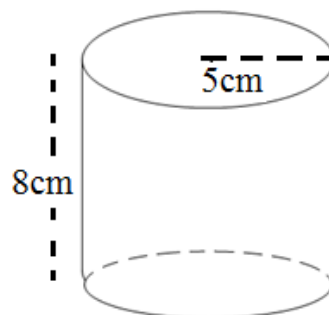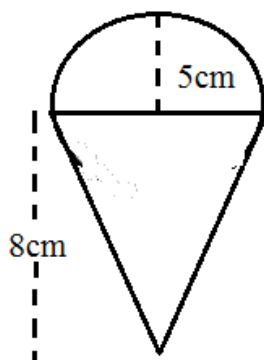
$AB^2 - AD^2 = BD.CD$

20. From each corner of a square of side $4cm$ a quadrant of a circle of radius $1cm$ is cut and also a circle of diameter $2cm$ is cut a shown in figure. Find the area of remaining portion of square
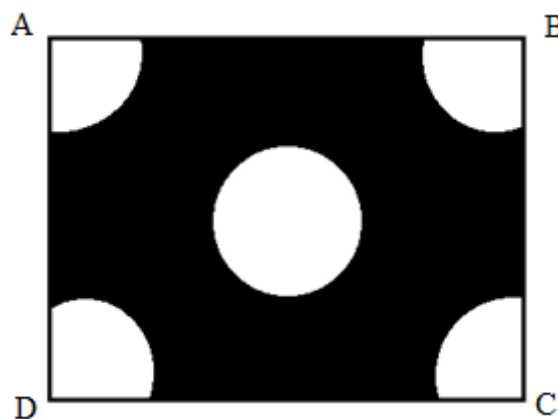
21. An ice cream seller sells his ice cream in two ways:

    (A) In a cone of $r = 5cm, h = 8cm$

    (B) In a cup shape of a cylinder with $r = 5cm\ and\ h = 8cm$

He charges the same price for both, but prefers to sell cone ice cream.

    (a) Find the volume of Cone and Cup.

    (b) Which out of two has more capacity

(c) By choosing a cone, which value is not being followed by the ice cream seller?

OR

Due to a sudden flood, some welfare association jointly requested to the Government to get 100 tents fixed immediately and offered to contribute 50% of the cost. If the lower part of the each tent is of the form of a cylinder of diameter 4.2 m and height 4m with the conical upper part of same diameter but of height 2.8m and the canvas to be used cost ₹100 $per\ sq.m$ find the amount, the association will have to pay $(use\ \pi = \ ^{22}/_7)$ What value are shown by these association?

22. Find mean and median of following data

Class	0 – 4	4 – 8	8 – 12	12 – 16	16 – 20
Frequency	3	5	9	5	3

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

23. The sum of digit of a two digit number is 12. The number obtained by interchanging the two digits exceeds the given number by 18. Find the number.

OR

Solve the following for x

$$\frac{1}{2a+b+2x} = \frac{1}{22a} + \frac{1}{b} + \frac{1}{20c}$$

24. Find the 60th term of an A. P. 8, 10, 12 ... ..., if it has a total of 60 terms and hence find the sum of its Last 10 term.

25. Draw $\Delta\ ABC$ with $BC\ 7cm\ \angle B45°$ and $\angle C60°$ then construct another triangle, whose sides are $^3/_5$ times the corresponding sides of $\Delta\ ABC$

26. ***'The ratio of area of similar triangles is equal to the ratio of the squares of the corresponding side'***

Prove using above theorem that the area of equilateral triangle described on the side of a square is half of area of equilateral triangle described on its diagonal.

OR

Show that in a right triangle the square of the hypotenuse is equal to the sum of squares of the other two sides.

27. The angle of elevation of top of a tower from a point on the ground is 60^0. From another point $10m$ vertically above the first, the angle of elevation is 30^0. Find the height of the tower.

28. Prove that

$$\frac{\tan \theta}{1-\cot \theta} + \frac{\cot \theta}{1-\tan \theta} = 1 + \sec \theta \csc \theta$$

29. A tent consist of a frustum of a cone surmounted by a cones; if the diameter of the upper and lower circular ends of the frustum be $14 \, m \, and \, 26 \, m$ respectively, the height of the frustum be 8m and slant height of surrounded conical portion be $12m$ find the area of canvas required to make the tent.

30. Mode of the following frequency distribution is 65 and sum of all frequencies is 70. Find the missing frequencies $x \, and \, y$

Class	0 – 20	20 – 40	40 – 60	60 – 80	80 – 100	100 – 120	120 – 140	140 – 160
Frequency	8	11	x	12	y	9	9	5

OR

Draw a more than ogive for the following distribution and hence find its median

Class	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80	80 – 90
Frequency	25	15	10	6	24	12	8