TARUN CLASSES OF MATHEMATICS

MATHEMATICS –STANDARD (041)
Class X – 2019-2020

MAX. MARKS : 80   DURATION : 3HOURS

SECTION –A

Q 1- Q 10 are multiple choice questions. Select the most appropriate answer from the given options.

1) What is the least possible number which when divided by 24, 32 or 42 in each case it leaves the remainder 5?

    (A) 557   (B) 677   (C) 777   (D) None of these

2) If the ratio of mode and median of a certain data is 6:5, then find the ratio of its mean and median.

    (A) 9:10   (B) 5:6   (C) 5:8   (D) 5:7

3) The LCM of smallest two digit composite number and smallest composite number is:

    A) 12   B) 4   C) 20   D) 44

4) If $\sin\theta + \cos\theta = \sqrt{2}\sin(90 - \theta)$, find $\cot\theta$.

    A) $\sqrt{2}-1$ B) $\sqrt{2}+1$ C) $\sqrt{2}$ D) None of these

5) For which value(s) of p ,will the lines represented by the following pair of linear equations be parallel:

                   3x -y – 5 = 0   , 6x – 2y - p = 0

    A) All real numbers Except 10   B) 10   C) $\frac{5}{2}$ D) $\frac{1}{2}$

6) $7\sin^2\theta + 3\cos^2\theta = 4$ then $\tan\theta$:

    A) $\frac{1}{\sqrt{2}}$ B) $\frac{1}{2}$ C) $\frac{1}{\sqrt{3}}$ D) $\frac{1}{3}$

7) A triangle is formed by joining points (0,0), (5,0), (0,5). How many integral points lie strictly within the triangle?

    A) 10   B) 17   C) 16   D) 6

8) If the distance of the point (4,a) from x-axis is half the distance from y-axis , then the value of 'a'.

    A) 2   B) 8   C) 4   D) 6

9) The fourth vertex D of a parallelogram ABCD whose three vertices are A (−2, 3), B (6, 7) and C (8, 3) is

    (A) (0, 1)   (B) (0, −1)   (C) (−1, 0)   (D) (1, 0)

10) If $\cos 9\alpha = \sin\alpha$ and $9\alpha < 90°$, then value of $\tan 5\alpha$ is:

    A) $\frac{1}{\sqrt{3}}$ B) $\sqrt{3}$ C) 1   D)0

11) A solid cylinder of radius r and height h is placed over other cylinder of same height and radius. The total surface area of the shape so formed is…………………

12) If the zeroes of the polynomial $f(x) = x^3 - 12x^2 + 39x + a$ are in AP, find the value of a.   OR

Arushi and Aahna started solving a quadratic equation. Arushi made a mistake while copying the constant term and got the roots as 5 and 9. Aahna made a mistake in the coefficient of x and she got the roots as 12 and 4.What is the equation?

13) The perimeters of two similar triangles ΔABC and ΔPQR are 35cm and 45cm respectively, then the ratio of the areas of the two triangles is_____

14) A number x is chosen at random from the numbers   -4,-3, -2, -1, 0, 1, 2, 3,4 . The probability that

   $|x| \leq 2$…………..

15) If following numbers are in AP: a, 7, b, 23, c , then Evaluate : a – 2b + c.

16) ABCD is a trapezium in which AB|| DC and P, Q are points on ADand BC respectively such that PQ || DC. If PD = 18 cm, BQ = 35 cm and QC = 15 cm, find AD.

17) The first three terms of an A.P are b, c and 2b, then find the ratio of b and c.

18) In the given figure O is a tangent to the circle with Centre O such that OT=4 cm and ∟OTA is 30^0 then find the length of TA.
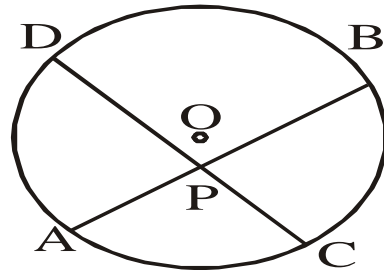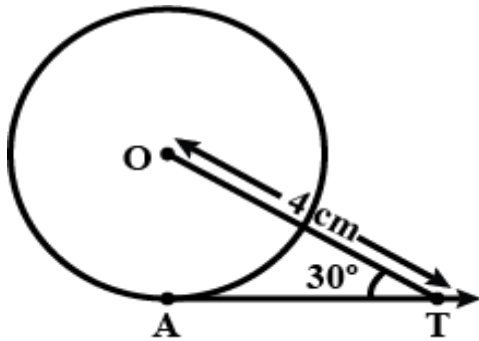
OR

In the given figure, AP = 2 cm, BP = 6 cm and CP = 3 cm. Find DP.

19) Can two numbers have 28 as their HCF and 812 as their LCM? Give reasons.

20) If x = 3 is root of the equation x^2 -x + k = 0, find the value of p so that the roots of the equation x^2 + k(2x + k

   +2)+ p = 0 are equal.

SECTION – B

21) Find the sum of all natural no. between 101 & 304 which are divisible by 3 or 5.

22) A girl of height 90 cm is walking away from the base of a lamp-post at a speed of 1.2 m/s. If the lamp is 3.6 m above the ground, find the length of her shadow after 4 seconds.   OR

The perpendicular AD on the base BC of a ΔABC intersects BC at D so that DB = 3CD , prove that : 2 AB^2 = 2 AC^2 + BC^2.
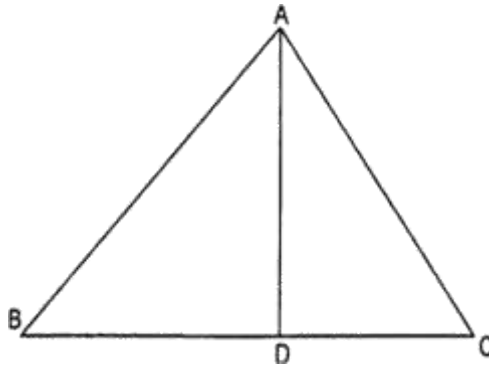
23) If a chord is drawn through the point of contact of a tangent to a circle, then the angles which this chord makes with the given tangent are equal respectively to the angle formed in the corresponding alternate segment.

24) A tree is broken at certain height and its upper part $9\sqrt{2}$ m long not completely separated meet the ground at an angle of α such that $\csc 5\alpha = \sec(135^0 - 6\alpha)$. Find the height of the tree before it was broken and also find the distance from the root of the tree to the point where the top of the tree meets the ground.

25) A box has cards numbered 12 to 97. Cards are mixed throughly and a card is drawn from the bag at random. Find the probability that the number on the card, drawn from the box is : (i) no divisible by 4 or 6 (ii) a number divisible by 7 (iii) Number on card is prime .

<div align="center">(Remember : 25 prime lie between first 100 natural numbers)   OR</div>

Two dice are thrown together. Find the probability that :
  i)   P(a multiple of 2 on one die or a multiple of 3 on other die
  ii)   P(getting sum as a composite number)
  iii)   P(Getting 5 at least once)

26) Due to sudden floods, some welfare associations jointly requested the government to get 100 tents fixed immediately and offered to contribute 50% of the cost. If the lower part of each tent is of the form of a cylinder of diameter 4.2 m and height 4 m with the conical upper part of same diameter but height 2.8 m, and the canvas to be used costs Rs 100 per sq. m, find the amount, the association will have to pay.

<div align="center">SECTION – C</div>

27) A circular field has a circumference of 360 km . Three cyclists start together & can cycle 48 , 60 & 72 km per day, round the field . When will they meet again ?   OR

 If 'd ' is the H.C.F of 963 & 657, Find the value of x & y satisfying d = 963x + 657y.

28) Sum of first m terms of an AP is n & sum of first n terms is m, then show that the $S_{(m+n)} = -(m+n)$.

29) 90% & 97 % pure acid solutions are mixed to obtain 21 litres of 95 % pure acid solutions .Find the amount of each type of acid to be mixed to form the mixture .   OR
 Solve : i) 21x + 47y = 110, 47x + 21y = 162   ii) (a - b) x + (a +b) y = a^2 – 2ab - b^2 & (a + b)(x + y) = a^2 + b^2

30) If the polynomial $x^4 - 6x^3 + 16x^2 - 25x + 10$ is divided by another polynomial $x^2 - 2x + k$, the remainder comes out to be $x + a$, find k and a.

31) The area of a triangle is 5. Two of its vertices area(2, 1) and (3, -2). The third vertex lies on y = x + 3. Find the third vertex.

32) If a sinθ + b cosθ = c, then prove that a cos θ - b sin θ = $\pm\sqrt{a^2 + b^2 - c^2}$ OR

   Prove that : $\dfrac{\tan^3\alpha}{1+\tan^2\alpha} + \dfrac{\cot^3\alpha}{1+\cot^2\alpha}$ = secα. Cosecα - 2 sinα cosα.

33) Following table shows the ages of patients admitted in Hospital during a year :

Age(Years)	5-15	15-25	25-35	35-45	45-55	55-65
Patients	6	11	21	23	14	5

   Find the Mode & Mean of data Given Above. Compare & Interpret two measures of central tendency .

34) A sector of circle centre O Containing an angle $\theta°$ .Prove that perimeter of the shaded region is r(tan θ + sec θ + $\pi\dfrac{\theta}{180}$ - 1) and area of the shaded region is$\dfrac{r^2}{2}$ (tan θ - $\pi\dfrac{\theta}{180}$).
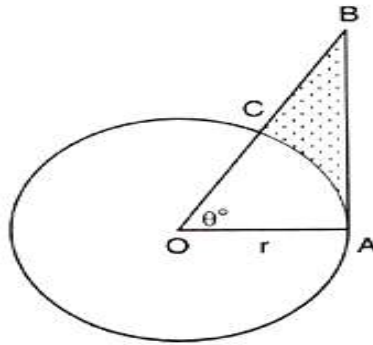
SECTION - D

35) The angle of elevation of a cloud from a point 20 m above a lake is 30° and the the angle of depression of the reflection of the cloud in the lake is 60° find the height of the cloud from the surface of the lake ?Also Find the distance of cloud from point of observation.

36) Let ABC be a right triangle in which AB = 6 cm, BC = 8 cm and ∟B = 90°. BD is the perpendicular from B on AC. The circle through B, C, D is drawn. Construct the tangents from A to this circle.   OR

   Draw a triangle ABC with side BC = 7 cm, ∟ B = 45°, ∟ A = 105°. Then, construct a triangle whose sides are $\dfrac{3}{4}$ times the corresponding sides of ∆ABC.

37) At present Asha's age (in years) is 2 more than the square of her daughter Nisha's age. When Nisha grows to her mother's present age, Asha's age would be one year less than 10 times present age of Nisha. Find the present ages of both Asha & Nisha.   OR

   If the roots of equation , p(q-r)x^2 + q(r-p)x + r(p-q)=0 are equal , show that , $\dfrac{1}{p}+\dfrac{1}{r}+ = \dfrac{2}{q}$.

38) The annuals profits earned by 30 shops of a shopping complex in a locality give rise to following dist.

Profit (lakhs)	More than or equal to 5	More than or equal to 10	More than or equal to 15	More than or equal to 20	More than or equal to 25	More than or equal to 30	More than or equal to 35
Shops	30	28	16	14	10	7	3

Draw Both Ogives , Hence Find median Profit.

39)Prove that ratio of area of two similar triangles is equal to ratio of their corresponding sides. Use this result:

ΔABC & ΔDBC are two triangles on the same base BC . If AD intersects BC at O , Show that $\frac{ar\,\Delta ABC}{ar\,\Delta DBC} = \frac{AO}{DO}$.

40) A solid metallic right circular cone 20 cm high and whose vertical angle is 60°, is cut into two parts at the

middle of its height by a plane parallel to its base. If the frustum so obtained be drawn into a wire of

diameter $\frac{1}{12}$ cm, find the length of the wire.   OR

The barrel of a fountain pen, cylindrical in shape, is 7 cm long and 5 mm in diameter. A full barrel of ink in the pen is used up on writing 3300 words on an average. How many words can be written in a bottle of ink containing one fifth of a litre?

Remember : This paper is fully based on CBSE marking scheme only for mind set up For better results download all sample papers & Important worksheet.

''WELL DONE IS BETTER THAN WELL SAID , MAN IS GREAT BY DEEDS NOT BY BIRTH''

TARUN SHARMA