10th CBSE MATHEMATICS

2018

1 SECTION A

1.1. Find the value of k for which the roots of a quadratic equation $(k-5)x^2+2(k-5)x+2=0$ are equal ?

1.2. Find the value of y for which the distance between the points (2, -3)and (10, y)is 10 units.

1.3. Write whether the rational number $\frac{13}{3125}$ has a decimal expansion which is terminating or non-terminating repeating.

1.4. Write the n^th term of the A.P $\frac{1}{k}, \frac{1+k}{k}, \frac{1+2k}{k}, ...$

1.5. If $sin\theta + cos\theta = \sqrt{2}cos(90^\circ - \theta)$, find the value of cot$\theta$.

1.6. DE is drawn parallel to the base BC of ,meeting AB at D and AC at E if $\frac{AB}{CD} = 4$and CE=2cm,find AE.

2 SECTION B

2.7. A bag contains 5 red balls and some blue balls.If the probability of drawing a blue ball from the bag is three times that of the red ball, find the number of blue balls in the bag.

2.8. The 5^th and 15^th terms of an A.P are 13 and -17 respectively.Find the sum of first 21 terms of the A.P.

2.9. Using Euclid's Division Algorithm, find the HCF of 225 and 867

2.10. If the point $(0, 2)$ is equidistant t from the points$(3, k)$and $(k, 5)$find the value of k.

2.11. Find the value of 'a' for which the pair of linear equation $2x + 3y = 7$ and $4x + ay = 14$ has infinitely many solutions.

2.12. A card is drawn at random from a well shuffled pack of 52 paying cards.Find the probability of getting (i) a red king (ii) a queen or a jack.

3 SECTION C

3.13. Show that any positive odd integer is of the form 4q + 1 or 4q + 3 for some integer q.

3.14. The ten's digit of a number is twice its unit's digit. The number obtained by interchanging the digits is 36 less than the original number.Find the original number.

3.15. (i)The line segment joining the points $A(2, 1)$and $B(5, -8)$ is trisected at the points P and Q, where P is nearer to A if P lies on the line $2x - y + k = 0$,find the value of k.
or
(ii) The x-coordinate of a points P is twice its y-coordinate.If P is equidistant from the point $Q(2, -5)$ and $R(-3, 6)$,find the coordinates.

3.16. Show that $1, \frac{1}{2}$, and -2 are the zeroes of the polynomial $2x^3 + x^2 - 5x + 2$.

3.17. Prove that the angle between the two tangents draws from an external points to a circle is supplementary to the angle subtended by the line-segment joining the points of contact at the center.

3.18. S and T are points on the sides PR and QR of $\triangle PQR$ Such that $\angle P$ = $\angle RTS$.Show that $\triangle RPQ \sim \triangle RTS$.
or
In an equilateral $\triangle ABC$, D is a point on the side BC such that BD =$\frac{1}{3}BC$, Prove that $9AD^2 = 7AB^2$.

3.19. Prove that : $\frac{1}{\text{cosec}\,\theta+\cot\theta} - \frac{1}{\sin\theta} = \frac{1}{\sin\theta} - \frac{1}{\text{cosec}\,\theta-\cot\theta}$

OR

If $\tan\theta + \sin\theta = m$,$\tan\theta - \sin\theta = n$ show that m^2-$n^2 = 4\sqrt{mn}$

3.20. A chord of a circle, of radius 15 cm,subtends an angel of 60° at the centre of the circle. Find the area of major and minor segments (Take $\pi = 3.14, \sqrt{3} = 1.73$)

3.21. A sphere of diameter 12 cm is dropped in a right circular cylindrical vessel, partly filled with water, If the sphere is completely submerged in water, the water level in the vessel. rises by $3\frac{5}{9}$cm. Find the diameter of the cylindrical vessel.

OR

A cylinder whose height is two-third of its diameter, has the same volume as that of a sphere of radius 4 cm. Find the radius of base of the cylinder.

3.22. The following table gives the daily income of 50 labourers :

Class :	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60-70
Frequency :	5	15	20	23	17	11	9

Find the mean and mode of the above data.

3.23. Two taps together can fill a tank in 6 hours. The tap of larger diameter takes 9 hours less than the smaller one to fill the tank separately. Find the time in which each tap can fill the tank separately.

OR

3.24. Solve for x : $\frac{x+1}{x-1} - \frac{x-1}{x+1} = \frac{5}{6}$,$x \neq 1, -1$

3.25. Prove that the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides.

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

3.26. Write the steps of construction for drawing a $\triangle$ABC in which BC = 8 cm, $\angle$B=45° and $\angle$C=30°. Now write the steps of construction for drawing a triangle whose sides are $\frac{3}{4}$ of the corresponding sides of $\triangle$ABC.

3.27. The sum of the first n terms of an A.P. is $5n^2 + 3n$. If its mth term is 168, find the value of m. Also find the 20^{th} term of the A.P.

OR

The 4^{th} and the last terms of an A.P. are 11 and 89 respectively. If there are 30 terms in the A.P., find the A.P. and its 23^{rd} term.

3.28. Prove that : $\left(\frac{\sin A}{1-\cos A} - \frac{1-\cos A}{\sin A}\right) \cdot \left(\frac{\cos A}{1-\sin A} - \frac{1-\sin A}{\cos A}\right)$ = 4

3.29. A statue, 1.46 m tall, stands on a pedestal. From a point on the ground the angle of elevation of the top of the stature is 60° and from the same point angle of elevation of the top of the pedestal is 45°. Find the height of the pedestal. (use $\sqrt{3 = 1.73}$)

3.30. Sudhakar donated 3 cylindrical drums to store cereals to an orphanage. If radius of each drum is 0.7 m and height 2 m, find the volume of each drum. If m^3, find the amount spent by Sudhakar for orphanage. What value is exhibited in the question. (Use $\pi = \frac{22}{7}$).

3.31. The median of the following data is 52.5. If the total frequency is 100, find the values of x and y.

Class :	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60-70	70-80	80 -90	90 -100
Frequency :	2	5	x	12	17	20	y	7	9	4