DAV PUBLIC SCHOOL

PRE-BOARD EXAMINATION

Time: 3 hrs

Class – X (2017-18)

Mathematics (SET-I)

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General Instructions:

(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 contains 6 questions of 2 marks each. Section C contain questions of 3 marks each. Section D contains 8 questions of 4 marks each.

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

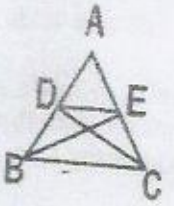
(v) Use of calculators is not permitted.

Section – A (1 x 6 = 6)

1. State Euclid division Algorithm.
2. Find the Probability that a leap year selected at random will have 53 Sundays.
3. Determine the 15^{th} term from the end in **A.P 8, 13, 18....., 153.**
4. Find the value of K, if the Quadratic equation $3x^2 - K\sqrt{3}x + 4 = 0$ has equal roots.
5. Give two different examples of pair of Non similar figures.
6. If θ be an acute angle and **5 cosec** $\theta = 7$, then evaluate $\sin^2\theta - \cos^2\theta$.

Section – B (2 x 6 = 12)

7. Prove that $\sqrt{5}$ is an Irrational number.
8. Represent the Zeroes of a Quadratic Polynomial $x^2 - 8x + 12$ graphically.
9. In Fig. if $\Delta ABC \sim \Delta ACD$. Prove that $\Delta ADE \sim \Delta ABC$



10. If $\frac{\cos\theta - \sin\theta}{\cos\theta + \sin\theta} = \frac{1-\sqrt{3}}{1+\sqrt{3}}$ and $0^0 < \theta < 90^0$ find angle θ.
11. Find the number of Integers between **200** and **500** which are divisible by 7.
12. A Card is drawn from a well shuffled pack of 52 Cards. Find the Probability of drawing **(a) A Red face card (b)A Red King.**

Section – C (3 x 10 = 30)

13. A Circular field has a circumference of **360 km**. Two cyclists Sumeet and John start together and can cycle at speed of **12 km/hr** and **15 km/hr** respectively, round the circular field. After how many hours will they meet again at the starting point.
14. Solve $2x^2 - 5x + 3 = 0$ by method of completing perfect square.
15. If $\tan\theta - \sin\theta = a$ and $\tan\theta - \sin\theta = b$, show that $a^2 - b^2 = 4\sqrt{ab}$.
16. Find the co-ordinates of the circumcentre of a triangle whose vertices are **(8, 6), (8, –2) and (2, –2).**

OR

17. For what value of **K**, the point **(4, 2), (7, K) and (3, 8)** are collinear.
Prove that ratio of Areas of two similar triangles is equal to square of the ratio of their corresponding Medians.

OR

D is Mid Point of side **BC** of a triangle **ABC**. **AD** is bisected at the point **E** and **BE** produced cuts **AC** at the point **X**. Prove that **BE : EX = 3 : 1.**

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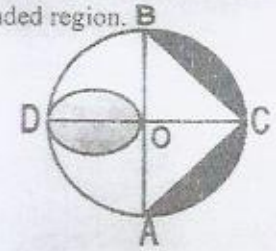
18. **AB** and **CD** are two diameters of a circle with centre **O**, Perpendicular to each other and **OD** is t diameter of small circle. If **OA = 7 cm**. Find Area of shaded region.

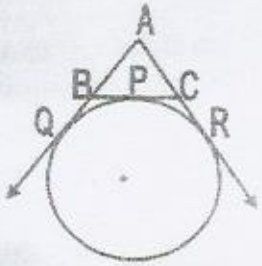


19. If $\sin\theta + \cos\theta = \sqrt{2}$, then evaluate $\tan\theta + \cot\theta$.

OR

Prove that $\frac{\tan\theta}{1-\cot\theta} + \frac{\cot\theta}{1-\tan\theta} = 1 + \sec\theta\ cosec\ \theta$.

20. A circle touching the side **BC** of a **triangle ABC** at **P** and is touching **AB** and **AC** when produced at **Q** & **R** respectively. Prove that $AQ = \frac{1}{2}$ (Perimeter of **triangle** ABC)



21. A well, whose diameter is **7 m** has been drug **22.5 m** deep and the earth dug out is used to from an embankment **10.5 m** wide around it. Find height of embankment.

OR

From a solid cylinder whose height is **2.4 cm** and diameter **1.4 cm** a conical cavity of same height and same diameter is hollowed out. Find the total surface area of remaining solid to the nearest cm^2.

22. Find the mode of the Data.

Class Interval	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
Frequency	6	11	21	23	14	5

Section – D (4 x 8 = 32)

23. A Train travels **360 km** at a uniform speed. If the speed had been **5 km / hr** more it would have taken **1 hour** less for the same journey. Find speed of train.

OR

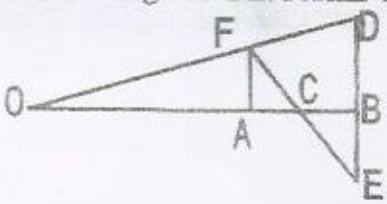
Using quadratic formula solve: $a^2b^2x^2 - (4b^4 - 3a^4)\,x - 12\,a^2b^2 = 0$.

24. The houses of row are numbered consecutively from **1 to 49**. Show that there is a value of x such that the sum of the numbers of the houses preceding the house numbered x is equal to the sum of number of the houses following it. Find the value of x.

25. State and prove **Basic proportionality theorem.**

OR

In the fig. **OB** is perpendicular bisector of the line segment **DE**. **FA** $\perp$ **OB** and FE intersect **OB** at the point C. Prove that $\frac{1}{OA} + \frac{1}{OB} = \frac{2}{OC}$.



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26. If the angle of elevation of a cloud from a point **'h'** meters above a lake is α and the angle of depression of its reflection in the lake is β. Prove that the distance of the cloud from the point of observation is

$$\frac{2h \sec \alpha}{\tan \beta - \tan \alpha}$$

27. Construct a **triangle ABC** in which **CA = 7cm, AB = 4cm** and **angle BAC = 45°** then construct a triangle similar to the given triangle whose sides are **6/5** of corresponding sides of **triangle ABC**.

28. If two opposite Vertices of square are **(-1, 2)** and **(3, 2)**. Find the co-ordinates of other two vertices.

29. A Container made up of metal sheet is in the form of frustum of a cone of height **16 cm** with radii of its lower and upper ends as **8 cm** and **20 cm** respectively. Find the cost of the milk which can completely fill the container at the rate of **Rs. 15** per litre and the cost of the metal sheet used if it cost **Rs. 5** per **100 cm²** **(use $\pi = 3.14$)**.

30. The mean of the following Data is **42**. Find the missing frequencies

Class Interval	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80
Frequency	7	10	X	13	Y	10	14	9

OR

Change the following, frequency distribution to less than type distribution and draw its Ogive. Hence obtain median value.

Class Interval	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80
Frequency	5	15	18	25	11	9	8

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