

PRE BOARD – I
MATHEMATICS – X
OBJECTIVE PAPER

Time Allowed : 1 Hour

Maximum marks : 30

General Instructions :

1. It consists of two sections : Section I and Section II
2. Section I consists of 14 questions of 1 mark each. Internal choice is provided in 5 questions.
3. Section II has 4 questions on case study. Each case study has 5 case-based sub parts. Student has to attempt any 4 out of 5 sub-parts.

Section I (14 Marks)

(This section has 14 questions 1 mark each. Internal choice is provided in 5 questions.)

1. If $HCF(26, 169) = 13$ then find $LCM(26, 169)$

OR

State Fundamental Theorem of Arithmetic

2. If -3 is zero of the polynomial $x^2 + 11x + k$, find value of k.
3. For what values of k, will the system of equations : $x + 2y = 5$; $3x + ky = 15$ has unique solution.
4. Find the discriminant of the quadratic equation : $3\sqrt{3}x^2 + 10x + \sqrt{3} = 0$
5. If the sum and product of the roots of the equation $kx^2 + 6x + 4k = 0$ are equal, find value of k.
6. In an A.P., if the common difference is -4 and the seventh term is 4, then find the first term.

OR

For what value of p, the three consecutive terms $2p + 1, 13, 15p - 3$ form an A.P.

7. 20 students of a class took part in Science quiz. The number of boys is 2 more than the number of girls. Represent this situation as a System of Linear Equations in Two Variables.
8. Given that $\triangle ABC \sim \triangle PQR$, if $\frac{AB}{PQ} = \frac{1}{3}$, then find $\frac{ar(\triangle ABC)}{ar(\triangle PQR)}$
9. If PQ and PR are two tangents to a circle with centre O and $\angle QPR = 46^\circ$, find $\angle QOR$.

OR

AP and AQ are tangents from a point A to a circle with centre O and radius 9 cm. If $OA = 15$ cm, then find AP

10. State Basic Proportionality Theorem.
11. If $\operatorname{cosec} \theta = \sqrt{10}$, find $\cot \theta$.
12. If $x = \operatorname{asec} \theta$ and $y = \operatorname{atan} \theta$, find value of $x^2 - y^2$.
13. If the diameter of a semi-circular piece is 14cm., find its perimeter.

OR

How many revolutions a circular wheel of radius 1m makes in covering a distance of 44m.

14. Volume and surface area of a solid hemisphere are numerically equal. What is the diameter of the hemisphere?

OR

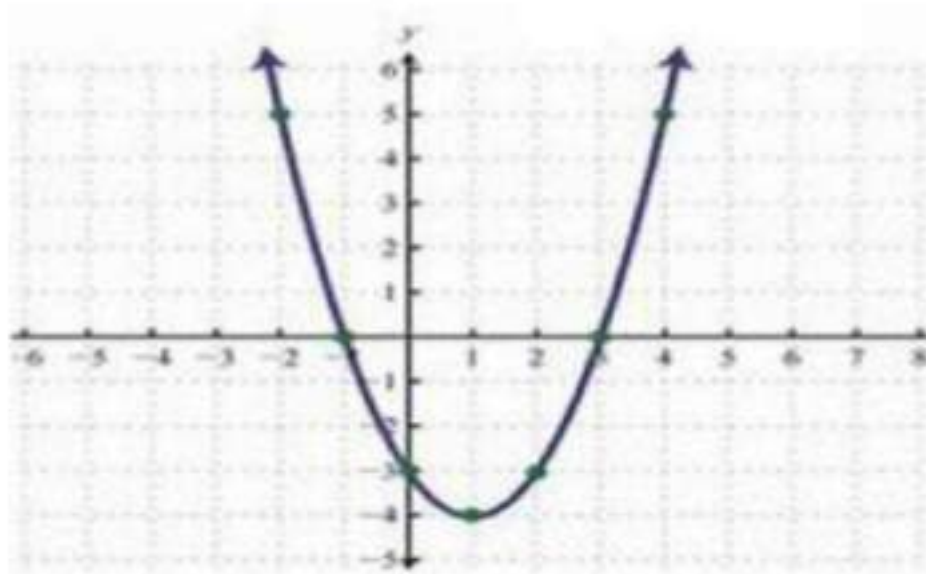
A cylinder and a cone are of the same base radius and of same height. Find the ratio of the volume of the cylinder to that of the cone.

Section II (16 Marks)

(This section consists of 4 case study based questions, each containing 5 sub-parts. Attempt any four sub-parts of each questions. Each sub-part carries 1 mark)

15. Case Study 1 (4 Marks)

Due to heavy storm an electric wire got bent as shown in the figure. It followed a mathematical shape as shown.

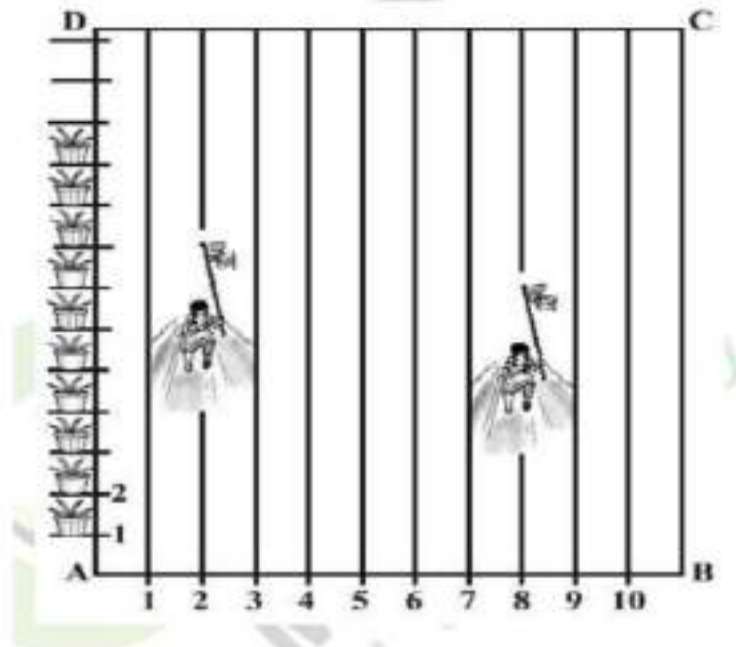


Answer the questions below (any 4):-

- (i) Name the shape in which wire is bent.
a) Spiral b) eclipse c) linear d) parabola
- (ii) How many zeros are there for the polynomial representing the given shape?
a) 2 b) 3 c) 4 d) 0
- (iii) The zeros of the polynomial are
a) -1, 3 b) -1, 5 c) 3, 5 d) -1, 0
- (iv) What will be the expression of the polynomial representing the given shape?
a) $x^2 + 2x - 3$
b) $x^2 - 2x + 3$
c) $x^2 - 2x - 3$
d) $x^2 + 2x + 3$
- (v) What is the value of the polynomial when $x = -2$?
a) 11 b) 10 c) 4 d) 5

16. Case Study II (4 Marks)

A school is organizing Annual Sports Day in a rectangular shaped ground ABCD. The tracks are marked with the gap of 1m each in the form of straight lines. 120 flower pots are placed with a distance of 1m each along AD. Shruti runs $\frac{1}{3}$ rd of the distance AD in second line and post her flag. Saanvi runs $\frac{1}{5}$ th of the distance AD on the eighth line and post her flag.



Answer the questions given below (any 4):-

- The coordinates where Shruti post her flag are
a) (2, 40) b) (40, 2) c) (2, 30) d) (3, 40)
- The coordinates where Saanvi post her flag are
b) (3, 40) b) (24, 8) c) (5, 32) d) (8, 24)
- If Reena has to post her blue flag exactly halfway between the line segment joining two flags, the coordinates where she should post her flag are
a) (2, 40) b) (2, 30) c) (5, 32) d) (10, 64)
- The distance between the two flags is
a) $2\sqrt{73}$ b) $3\sqrt{73}$ c) $\sqrt{273}$ d) $\sqrt{73}$
- In what ratio, Reena divides the distance between Shruti and Saanvi?
a) 1 : 2 b) 2 : 1 c) 1 : 1 d) 1 : 3

17. Case Study III (4 Marks)

During Annual Sports Day organized in a school, 100m race event was organized. 25 students participated in the event and time taken to complete the race by each student was recorded in the following table:-



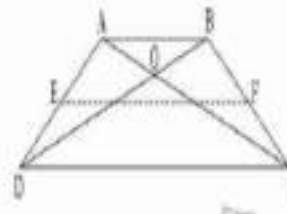
Time (in Seconds)	0 - 20	20 - 40	40 - 60	60 - 80	80 - 100
No. of Students	5	10	6	3	1

Answer the following questions (any 4) :-

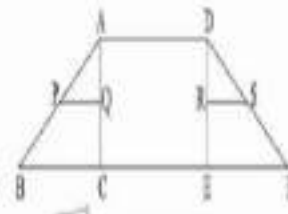
- What will be the lower limit of Modal Class?
a) 40 b) 60 c) 20 d) 80
- How many students took less than 40 seconds?
a) 10 b) 15 c) 21 d) 24
- How many students took more than or equal to 1 minute?
a) 1 b) 4 c) 3 d) 6
- Which is the median class?
a) 0 - 20 b) 20 - 40 c) 40 - 60 d) 60 - 80
- Which one is incorrect?
a) $\text{Mode} = 3\text{Median} - 2\text{Mean}$
b) $2\text{Mean} = 3\text{Median} - \text{Mode}$
c) $3\text{Median} = \text{Mode} + 2\text{Mean}$
d) $3\text{Median} = \text{Mode} + 3\text{Mean}$

18. Case Study IV (4 Marks)

In a country, one of its states is known as tropical paradise of waving palms and wide sandy beaches. Its map shows that its area can be approximated using simple straight sided shape. The shape has two parallel sides 561 km. and 261km. long. The other two sides are 180 km and 211 km. long. Its parallel sides are 100 km. apart. Raghav observed the shape formed by four straight lines and explored it in his notebook in different ways shown below:-



Shape 1



Shape 2

Answer the following questions (any 4) :-

Refer to Shape 1

- i) ABCD is a trapezium with $AB \parallel DC$ and $EF \parallel DC$. Now $\frac{AE}{DE} =$
 - a) $\frac{BF}{BC}$
 - b) $\frac{BF}{DC}$
 - c) $\frac{BF}{CF}$
 - d) $\frac{BF}{AB}$
- ii) If $DO = 3x - 19$, $BO = x - 5$, $CO = x - 3$ and $AO = 3$, value of x is
 - a) -8 or -9
 - b) 8 or 9
 - c) -8 or 9
 - d) 8 or -9
- iii) Which one is correct?
 - a) $\triangle AOB \sim \triangle DOC$
 - b) $\triangle AOB \sim \triangle COD$
 - c) $\triangle AOB \sim \triangle DCO$
 - d) $\triangle BOA \sim \triangle DCO$

Refer to Shape 2

- iv) In $\triangle ABC$, $PQ \parallel BC$, $AP = 2.4\text{cm}$, $AQ = 2\text{cm}$, $QC = 3\text{cm}$. Value of AB is
 - a) 5cm.
 - b) 6cm.
 - c) 4cm.
 - d) 7cm.
- v) In $\triangle DEF$, $RS \parallel EF$, $DR = 4x - 3$, $DS = 1$, $ER = 2$, $FS = 2$. Value of x is
 - a) 1
 - b) 2
 - c) 3
 - d) 4