

PRE- BOARD EXAMINATION – 2 (JANUARY – 2020)

CLASS: X

MATHEMATICS (STANDARD)

Time: 3 hrs.

MAX. MARKS: 80

General Instructions :

- (i) All questions are compulsory
- (ii) The question paper consists of 40 questions divided into 4 sections A, B, C, and D.
- (iii) Section A comprises of 20 questions of 1 mark each. Section B comprises of 6 questions of 2 marks each. Section C comprises of 8 questions of 3 marks each. Section D Comprises of 4 questions of 4 marks each.
- (iv) There is no overall choice. However, an internal choice has been provided in two questions of 1 mark each, two questions of 2 marks each, three questions of 3 marks and three questions of 4 marks each. You have to attempt only one of the alternatives in all such cases.
- (v) Use of calculators is not permitted.

SECTION-A

1. The HCF of 65 and 117 is expressible in the form $65m - 117$, then the value of m is 1
 (a) 4 (b) 2 (c) 1 (d) 3
2. The arithmetic mean and mode of a data are 24 and 12 respectively, then its median is 1
 (a) 25 (b) 18 (c) 20 (d) 12
3. The product of smallest prime number and smallest composite number is 1
 (a) 10 (b) 6 (c) 8 (d) 4
4. If the equations $kx - 5y = 2$ and $6x + 2y = 7$ have no solution, then k is equal to 1
 (a) -10 (b) -5 (c) -6 (d) -15
5. The height of a tower is 200 m. When the altitude of the sun is 30° , the length of its shadow is 1
 (a) $100\sqrt{3}$ m (b) $200\sqrt{3}$ m (c) $300\sqrt{3}$ m (d) $200\sqrt{3}$ m
6. $4 \tan 85^\circ \tan 30^\circ \tan 5^\circ$ is equal to 1
 (a) $\frac{4}{\sqrt{3}}$ (b) $4\sqrt{3}$ (c) 1 (d) 4
7. The value of $\sin(45^\circ + \theta) - \cos(45^\circ - \theta)$ is equal to 1
 (a) $2 \cos \theta$ (b) 0 (c) $2 \sin \theta$ (d) 1
8. If the point P(x, y) is equidistant from A(5,1) and B(-1,5) then 1
 (a) $5x = y$ (b) $x = 5y$ (c) $3x = 2y$ (d) $2x = 3y$
9. The ratio in which (4,5) divides the join of (2,3) and (7,8) is 1
 (a) -2:3 (b) -3:2 (c) 3:2 (d) 2:3

10. If k , $2k-1$ and $2k+1$ are three consecutive terms of an AP, the value of k is 1
 (a) -2 (b) 3 (c) -3 (d) 6
11. A cylinder with base radius of 8cm and height 2cm is melted to form a cone of height 6cm. The radius of the cone is 1
12. If α, β are the zeroes of polynomial $f(x) = x^2 - p(x + 1) - c$, then $(\alpha + 1)(\beta + 1) = \dots\dots$ 1
OR
- If α, β are the zeroes of $f(x) = px^2 - 2x + 3p$ and $\alpha + \beta = \alpha\beta$ then the value of p is.....
13. The sides of two triangles are in the ratio 4:9. Areas of these triangles are in the ratio 1
14. Two different coins are tossed simultaneously. The probability of getting at least one head is 1
15. The first term of an AP is p and its common difference is q . The 10th term is 1
16. The decimal expansion of the rational number $\frac{43}{2^4 5^3}$ will terminate after how many places of decimals? 1
17. Two poles of heights 6m and 11m stand on a plane ground. If the distance between their feet is 12m, find the distance between their tops. 1
18. If TP and TQ are two tangents to a circle with center O so that $\angle POQ = 110^\circ$, then find $\angle PTQ$. 1

OR

If the radii of two concentric circles are 4cm and 5cm, then find the length of each chord of one circle which is tangent to the other circle.

19. Find the sum of the first 25 terms of an AP whose n th term is given by $a_n = 2 - 3n$ 1
20. If one root of the quadratic equation $2x^2 + kx - 6$ is 2, find the value of k . Also find the other root. 1

SECTION -B

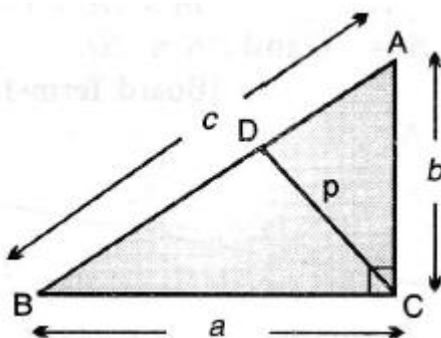
21. How many numbers of two digits are divisible by 7? 2
22. Prove that the tangent lines at the end points of a diameter of a circle are parallel. 2
23. ABC is a right triangle right angled at B. Let D and E be any points on AB and BC respectively. Prove that $AE^2 + CD^2 = AC^2 + DE^2$. 2

OR

ABC is a right triangle right angled at C. Let $BC = a$, $CA = b$, $AB = c$ and let p be the length of the perpendicular from c on AB .

Prove that (i) $cp = ab$

(ii) $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$



24. Two men on either side of the cliff 80m high observe the angles of elevation of the top of the cliff to be 30° and 60° respectively. Find the distance between the two men. 2
25. Find the probability that a number selected at random from the numbers 1,2,3.....35 is a
(i) Prime number (ii) multiple of 5 2
26. A 20m deep well with diameter 7m is dug and the earth from digging is evenly spread out to form a platform 22m by 14m. Find the height of the platform. 2

OR

A cone of height 24cm and radius of base 6cm is made up of modelling clay. A child reshapes it in the form of a sphere. Find the radius of the sphere.

SECTION – C

27. Given that $\text{HCF}(435,725) = 145$, find $\text{LCM}(435,725)$ 3
28. If the m th term of an AP is $\frac{1}{n}$ and the n th term is $\frac{1}{m}$, show that the sum of mn terms is $\frac{1}{2}(mn + 1)$ 3

OR

The sum of the 4th and 8th term of an AP is 24 and the sum of its 6th and 10th term is 44. Find the first three terms of the AP.

29. Places A and B are 100 km apart on a high way. One car starts from A and another from B at the same time. If the cars travel in the same direction at different speeds, they meet in 5 hours. If they travel towards each other, they meet in 1 hour. What are the speeds of the two cars? 3
30. If the polynomial $6x^4 + 8x^3 + 17x^2 + 21x + 7$ is divided by another polynomial $3x^2 + 4x + 1$, the remainder comes out to be $ax + b$, find a and b . 3

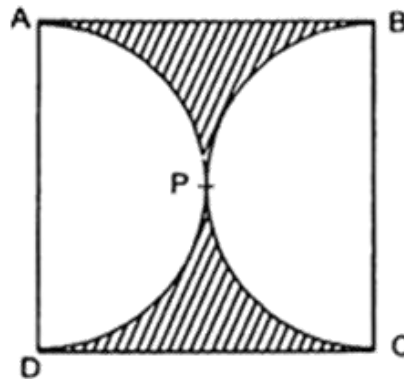
OR

Obtain all the zeroes of the polynomial $f(x) = 3x^4 + 6x^3 - 2x^2 - 10x - 5$ if two of its zeroes are $\sqrt{\frac{5}{3}}$ and $-\sqrt{\frac{5}{3}}$.

31. Find the value of k for which the points $(7,-2)$, $(5, 1)$ and $(3,k)$ are collinear. 3
32. Prove that $\sin A (1 + \tan A) + \cos A (1 + \cot A) = \sec A + \text{cosec } A$. 3

OR

33. If $\sec\theta + \tan\theta = m$, show that $\frac{m^2 - 1}{m^2 + 1} = \sin\theta$. 3
Find the area of the shaded region in the figure if ABCD is a square of side 14 cm and APD and BPC are semicircles.



34. Calculate the mean of the following distribution. 3

Class	10-30	30-50	50-70	70-90	90-110	110-130
Frequency	5	8	12	20	3	2

SECTION-D

35. Construct a triangle with sides 5cm, 6cm and 7cm and then another triangle whose sides are $\frac{3}{5}$ of the corresponding sides of the first triangle. 4
36. Prove that the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides. 4
37. While boarding an Aero plane, a passenger got hurt. The pilot showing promptness and concern, made arrangements to hospitalize the injured and so the plane started late by 30 minute to reach, 1500km away in time, the pilot increased the speed by 100km/hr. Find the original speed of the plane. 4

OR

Find the dimensions of a rectangular park whose perimeter is 60m and area 200m².

38. A bucket made of metal, is in the form of a cone where height is 35cm and radii of circular ends are 30cm and 12cm. How many liters of milk it contains if it is full to the brim? If the milk is sold at ₹ 40 per liter, find the amount received by the person. 4

OR

A right circular cylinder having diameter 12cm and height 15cm is full of ice-cream. The ice-cream is to be filled in cones of height 12cm and diameter 6cm having a hemispherical shape on the top. Find the number of such cones which can be filled with ice-cream.

39. The angle of elevation of a cloud from a point 60m above a lake is 30° and the angle of depression of the reflection of the cloud in the lake is 60°. Find the height of the cloud. 4

OR

The angle of elevation of the top of the building from the foot of the tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 60°. If the tower is 50m high, find the height of the building.

40. The following table gives production yield per hectare of wheat of 100 farms of a village. 4

Production yield (in kg/ha)	50-55	55-60	60-65	65-70	70-75	75-80
No. of farms	2	8	12	24	38	16

Change the distribution to a more than type distribution and draw its ogive.