

NAME: \_\_\_\_\_ SEC.: \_\_\_\_\_ ROLL NO.: \_\_\_\_\_

**CRPF PUBLIC SCHOOL, ROHINI**  
**SECOND PRE-BOARD EXAMINATION (2019-20)**  
**MATHEMATICS**  
**STANDARD**  
**CLASS-X**

TIME: 3 Hrs.

M.M.:80Marks

**GENERAL INSTRUCTIONS:**

- (i) All questions are compulsory.
- (ii) This question paper consists of 40 questions divided into four sections-A, B, C and D.
- (iii) Q1 to Q 20 CARRIES 1 MARK EACH
- (iv) Q21 to Q 26 CARRIES 2 MARKS EACH
- (v) Q27 to Q 34 CARRIES 3 MARKS EACH
- (vi) Q35 to Q 40 CARRIES 4 MARKS EACH

**SECTION A**

**Q1 to Q10 are multiple choice questions**

**Q1.** The decimal representation of the rational number  $\frac{47}{2^3 5^2}$  will terminate after

- (a) one decimal place
- (b) two decimal places
- (c) three decimal places
- (d) more than three decimal places

**Q2.** If two positive integers a and b are written as  $a=x^4 y^2$ ;  $b=x^2 y^3$ ; a and b are prime numbers, then HCF (a, b) is

- (a)  $x^4 y^3$
- (b) xy
- (c)  $x^2 y^3$
- (d)  $x^2 y^2$

**Q3.**  $3.2\bar{7}$  is

- (a) an integer
- (b) a rational number
- (c) a natural number
- (d) an irrational number

**Q4.** Consider the following frequency distribution table:

Class	0-5	5-10	10-15	15-20	20-25
Frequency	10	15	12	20	9

The sum of lower limits of the median class and modal class is

- (a) 15
- (b) 25
- (c) 30
- (d) 35

**Q5.** The value of k for which the lines  $(k+1)x+3ky+15=0$  and  $5x+ky+5=0$  are coincident is

- (a) 14
- (b) 2
- (c) -14
- (d) -2

**Q6.** If  $\Delta ABC$  is rightangled at C, then the value of  $\sin (A+B)$  is

- (a) 0
- (b) 1
- (c)  $\frac{1}{2}$
- (d)  $\frac{\sqrt{3}}{2}$

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Q7. The value of the expression  $\frac{\sin 60^\circ}{\cos 30^\circ}$  is ( 2 )

- (a)  $\frac{\sqrt{3}}{2}$  (b)  $\frac{1}{2}$  (c) 1 (d) 2

Q8. If  $\sin A + \sin^2 A = 1$ , then the value of  $\cos^2 A + \cos^4 A$  is

- (a) 1 (b)  $\frac{1}{2}$  (c) 2 (d) 3

Q9. If the points  $(1, x)$ ;  $(5, 2)$  and  $(9, 5)$  are collinear, then the value of  $x$  is

- (a)  $\frac{5}{2}$  (b)  $-\frac{5}{2}$  (c) -1 (d) 1

Q10. If  $P(\frac{a}{3}, 4)$  is the mid-point of the line segment joining the points  $Q(-6, 5)$  and  $R(-2, 3)$  then the value of  $a$  is

- (a) -4 (b) -12 (c) 12 (d) -6

Q11-Q15 are Fill in the blanks

Q11. The volume and surface area of a sphere are numerically equal, then the radius of sphere is \_\_\_\_\_ units.

Q12. Sum of zeroes of a cubic polynomial is \_\_\_\_\_.

OR

If  $x=3$  is one root of  $x^2 - 2kx - 6 = 0$ , then the value of  $k$  is \_\_\_\_\_.

Q13. In  $\Delta ABC$ , if  $AB=6\sqrt{3}$ cm,  $AC=12$ cm and  $BC=6$ cm, then  $\angle B=$  \_\_\_\_\_.

Q14. The 6<sup>th</sup> term from the end of the AP 17, 14, 11, \_\_\_\_\_, -40 is \_\_\_\_\_.

Q15. If the probability of an event is  $P$ , the probability of its complimentary event will be \_\_\_\_\_.

Q16-Q20 are short answer type questions.

Q16. Find the quadratic polynomial whose zeroes are -3 and 4.

Q17. If  $\Delta ABC \sim \Delta QRP$ ,  $\frac{ar\Delta ABC}{ar\Delta PQR} = \frac{9}{4}$ ,  $AB = 18$ cm and  $BC=15$ cm, find the length of  $PR$ .

Q18. If the numbers  $n-2$ ,  $4n-1$ ,  $5n-2$  are in AP, find the value of  $n$ .

Q19. Find the values of  $k$  for which the quadratic equation  $2x^2 - kx + k = 0$  has equal roots.

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Q20. If two tangents inclined at an angle  $60^\circ$  are drawn to a circle of radius 3cm, then find the length of each tangent.

OR

From a point P, which is at a distance of 13cm from the centre O of a circle of radius 5cm, the pair of tangents PQ and PR to the circle are drawn, then find the area of the quadrilateral PQOR.

### SECTION B

Q21. Which term of the AP 5, 15, 25 \_\_\_\_\_ will be 130 more than its 31<sup>st</sup> term?

Q22. Prove that the rectangle circumscribing a circle is a square.

Q23. In a triangle ABC,  $AC > AB$ , D is the mid-point of BC and  $AE \perp BC$ . Prove that  $AB^2 = AD^2 - BC \cdot DE + \frac{1}{4}BC^2$ .

OR

AD is an altitude of an equilateral triangle ABC. On AD as base, another equilateral triangle ADE is constructed. Prove that  $\text{ar}(\triangle ADE) : \text{ar}(\triangle ABC) = 3 : 4$ .

Q24. Cards marked with numbers 5 to 50 (one number on one card) are placed in a box and mixed thoroughly. One card is drawn at random from the box. Find the probability that the number on the card taken out is

(a) a prime number less than 10

(b) a number which is a perfect square.

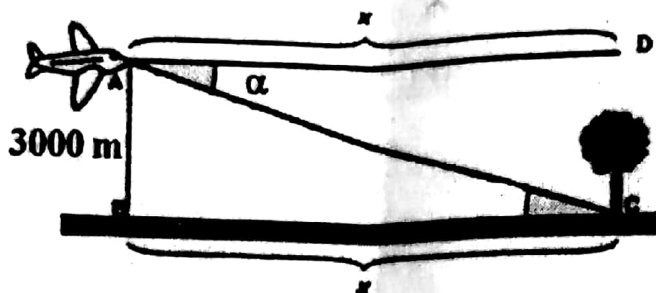
OR

A number x is selected at random from the numbers 1, 2, 3 and 4. Another number y is selected at random from the numbers 1, 4, 9 and 16. Find the probability that the product of x and y is less than 16.

Q25. If the total surface area of a solid hemisphere is  $462\text{cm}^2$ , find its volume (take  $\pi = \frac{22}{7}$ )

Q26. An airplane is a powered, fixed wing aircraft that is propelled forward by thrust from a jet engine, propeller or rocket engine. Airplanes come in a variety of sizes, shapes, and wing configurations. The essential components of an airplane are a wing system to sustain it in a flight, tail surfaces to stabilize the wings, moveable surfaces to control the altitude of the plane in flight, and a power plant to provide the thrust necessary to push the vehicle through the air. Provisions must be made to support the plane when it is at rest on the ground and during take off and landing. Most planes feature an enclosed body (fuselage) to house the crew, passengers and cargo; the cockpit is the area from which the pilot controls an instruments to fly the plane. A passenger is travelling in an airplane. An airplane is flying at

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 a height of 3000m above the level ground. He observes that the angle of depression from the plane to the foot of a tree is  $\alpha$ , such that  $\cos 3\alpha = \sin (120^\circ - 4\alpha)$ . Find the distance that the airplane must fly to be directly above the tree.



**SECTION C**

Q27. Prove that  $3 + 2\sqrt{5}$  is irrational, given  $\sqrt{5}$  is irrational.

OR

Rajesh has two vessels containing 720ml and 405ml of milk respectively. Milk from these containers is poured into glasses of equal capacity to their brim. Find the minimum number of glasses that can be filled.

Q28. In an AP, if  $S_n = \frac{3n^2 + 5n}{2}$ , find its 25<sup>th</sup> term.

Q29. Solve for x and y:

$$27x + 31y = 85; 31x + 27y = 89$$

OR

Solve:  $\frac{x}{a} + \frac{y}{b} = a + b; \frac{x}{a^2} + \frac{y}{b^2} = 2, a, b \neq 0$

Q30. On dividing  $3x^3 + 4x^2 + 5x - 13$  by a polynomial  $g(x)$ , the quotient and remainder were  $3x + 10$  and  $16x - 43$  respectively. Find the polynomial  $g(x)$ .

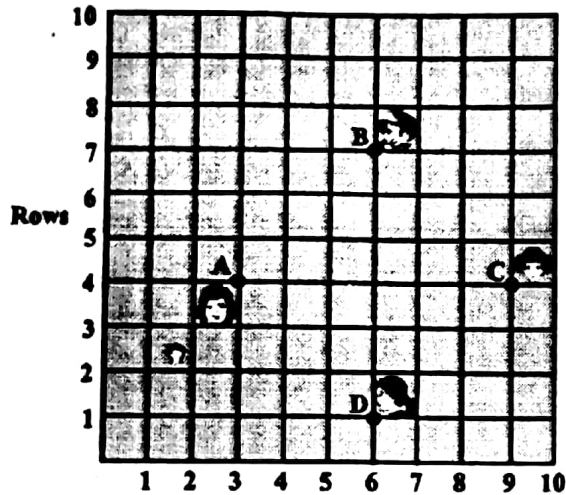
Q31. Evaluate:

$$\frac{\sec 41^\circ \sin 49^\circ + \cos 29^\circ \operatorname{cosec} 61^\circ - \frac{2}{\sqrt{3}} (\tan 20^\circ \tan 60^\circ \tan 70^\circ)}{2(\sin^2 31^\circ + \sin^2 59^\circ)}$$

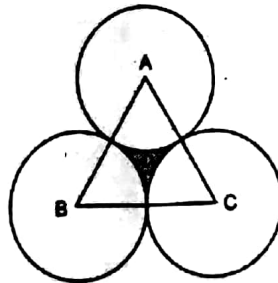
OR

Prove that:  $\frac{\sin \theta}{1 + \cos \theta} + \frac{1 + \cos \theta}{\sin \theta} = 2 \operatorname{cosec} \theta$

**Q32.** In a classroom four friends are seated at the points A, B, C and D as shown in below figure. Champa and chameli walk into the class and after observing for a few minutes champa ask chameli." Don't you think ABCD is a square?" Chameli disagrees , chameli performed certain calculations and claimed that ABCD is a square. State how did she arrive at this conclusion.



**Q33.** The area of an equilateral triangle ABC is  $17320.5\text{cm}^2$ . With each vertex of the triangle as centre, a circle is drawn with radius equal to half the length of the side of the triangle. Find the area of the shaded region. (Use  $\pi = 3.14, \sqrt{3} = 1.73205$ )



**Q34.** The table below shows the salaries of 280 persons. Find the mean salary.

Salary(in thousand Rs)	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50
Number of persons	49	133	63	15	6	7	4	2	1

**SECTION D**

**Q35.** State and prove converse of Pythagoras theorem.

**Q36.** Solve for x:  $\frac{1}{x+1} + \frac{2}{x+2} = \frac{4}{x+4}, x \neq -1, -2, -4$

**OR**

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Two taps running together can fill a tank in  $3\frac{1}{13}$  hours. If one tap takes 3 hours more than the other to fill the tank, then how much time will each tap take to fill the tank?

**Q37.** A straight highway leads to the foot of a tower. A man standing at the top of the tower observes a car at an angle of depression of  $30^\circ$ , which is approaching the foot of the tower with a uniform speed. 6 seconds later, the angle of depression of the car is found to be  $60^\circ$ . Find the time taken by the car to reach the foot of the tower from this point.

**Q38.** A well of diameter 3m is dug 14m deep. The earth taken out of it has been spread evenly all around it in the shape of a circular ring of width 4m to form an embankment. Find the height of the embankment.

OR

A hollow cone is cut by a plane parallel to the base at some height and the upper portion is removed. If the curved surface area of the remaining portion is  $\frac{8}{9}$  of the curved surface area of the whole cone, find the ratio of the two parts into which the cone's altitude is divided.

**Q39.** Construct an isosceles triangle whose base is 8cm and altitude 4cm and then another triangle whose sides are  $1\frac{1}{2}$  times the corresponding sides of the isosceles triangle.

OR

Draw a line segment AB of length 8cm. Taking A as centre, draw a circle of radius 4cm and taking B as centre, draw another circle of radius 3cm. Construct tangents to each circle from the centre of the other circle.

**Q40.** The following table gives production yield per hectare of wheat of 100 farms of a village:

Production yield (in kg/ha)	50-55	55-60	60-65	65-70	70-75	75-80
Number of farms	2	8	12	24	38	16

Change the distribution to a more than type distribution, draw its ogive. Hence obtain the median weight from the graph and verify the result by using the formula.