

# MP BOARD CLASS 10 MATHEMATICS MODEL PAPER SET 5 2020

## Part (A)

Q. 1. Choose the correct option:

1. The product of rational number and irrational number will be:

- (a) Always a rational            (b) Always irrational number  
(c) Rational or irrational       (d) None of these.

2. If  $\alpha$  and  $\beta$  are the zeroes of quadratic polynomial  $ax^2 + bx + c$ , then value of  $\alpha + \beta$  will be:

- (a)  $\frac{-b}{a}$             (b)  $\frac{a}{b}$             (c)  $\frac{-a}{b}$             (d)  $\frac{c}{a}$ .

3. Product of zeroes of polynomial  $x^2 + x - 12$  will be :

- (a) 12            (b) -12            (c) +12            (d) 4.

4. If a pair of linear equation is given by  $a_1x + b_1y + c_1 = 0$  and  $a_2x + b_2y + c_2 = 0$

in  $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$  Then we get :

- (a) Unique solution    (b) No solution    (c) Infinitely many solutions .    (d) None of these.

5. Shown line  $x = 7$  is parallel to which axis :

- (a) X-axis            (b) Y-axis            (c) X-axis Y-axis            (d) None of these.

Ans. 1. (b), 2. (a), 3. (b), 4. (c), 5. (b).

Q. 2. Fill in the blanks :

1. The discriminate of the equation  $3x^2 - 2x + \frac{1}{2} = 0$  is.....

2. If  $\frac{1}{2}$  is a root of the equation  $x^2 + kx - \frac{5}{4} = 0$ , then the value of k is.

3. If  $P(\bar{E}) = \frac{2}{3}$ , then  $P(E) = \dots\dots\dots$

4. If the perimeter and the area of a circle are numerically equal then the radius of the circle is .....

5. 11<sup>th</sup> term of A.P. = -3,  $\frac{-1}{2}$ , 2, ..... is.

Ans. 1. 2,            2. 2,            3.  $\frac{1}{3}$             4. 2 units,            5. 22.

Q. 3. Write True or False :

1. The tangents drawn at the end point of diameter of a circle are parallel.

2. The parallelogram circumscribing a circle is a rectangle.

3. The ratio of the areas of two similar triangles is equal to the ratio of the squares of their corresponding sides.

4. Point (-8, 6) is lie on the third coordinate.

5. If any time the height of a tower and length of its shadow is equal, then the value of the angle of elevation of the sun is  $45^\circ$ .

Ans. 1. True, 2. False, 3. True, 4. False, 5. True.

Q. 4. Match the column :

‘A’	‘B’
1. $\operatorname{cosec}^2 \theta - \cot^2 \theta$	(a) 1
2. $\frac{\sin 30^\circ}{\cos 60^\circ} + \frac{\tan 15^\circ}{\cot 75^\circ}$	(b) Undefined
3. $\sin^2 45^\circ + \cos^2 30^\circ$	(c) $\operatorname{cosec} \theta$
4. $\tan 90^\circ$	(d) $\frac{3}{4}$
5. $\sec(90 - \theta)$	(e) 2.

Ans. 1. (a), 2. (e), 3. (d), 4. (b), 5. (c).

Q. 5. Write the answer in one word/sentence :

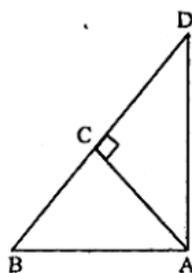
1. What is the sum of the first 10 natural number?
2. Write the formula of deviation method to know the mean?
3. Write the relation between median, mean and mode.
4. Slant height of cone is 13 cm and radius 5 then its height is.
5. What is relation between the diameter (d) and the circumference of the circle.

Ans. 1.55, 2.  $\bar{x} = a + \frac{\sum f_i d_i}{\sum f_i} \times h$ , 3. 3 median = 2 mean + mode, 4. 12 cm, 5.  $\pi$  (where 'd' is diameter)

#### Part (B)

- Q. 6. Using prime factorization method find HCF and LCM of following numbers : 8, 9 and 25.
- Or, State whether the rational number  $\frac{17}{8}$  will have a terminating decimal expansion or non-terminating repeating decimal expansion.
- Q.7. Find the zeroes of the following polynomials and verify, the relationship between the zeroes and the coefficients :  $4s^2 - 4s + 1$
- Or, Divide polynomial  $2x^2 + 3x + 1$  by  $x + 2$ , then find remainder.
- Q. 8. Find the area of triangle whose vertices are: (-5, -1), (3,-5), (5,2)
- Or, Show that the points A (1,7), B (4,2), C (-1,-1) and D(-4, 4) are the vertices of a square.
- Q.9. A game consists of tossing a one rupee coin 3 times and noting its outcome each time. Hanif wins if all the tosses give the same result i.e., three heads or three tails, and losses otherwise. Calculate the probability that Hanif will loss the game.
- Or, A box contains 90 discs which are numbered from 1 to 90. If one disc is drawn at random from a box, find the probability that it bears : a number divisible by 5.
- Q. 10. A die is thrown once. Find the probability of getting an odd number.
- Or, A carton consists of 100 shirts of which 88 are good, 8 have minor defects and 4 have major defects. Jimmy, a trader will only accept the shirt which are good, but Sujata another trader, will only reject the shirts which have major defects one shirt is drawn at random from the carton. What is the probability that: (i) It is acceptable to Jimmy ?, (ii) It is acceptable to Sujata ?

- Q. 11. Find the area of the quadrilateral whose vertices taken in order are A(-4,-2), B(-3,-5), C(3,-2) and D(2, 3).
- Or, Find the ratio in which the line segment joining the points A(-3, 10) and B(6,8) is divided by (-1,6).
- Q. 12. If  $\tan A = \cot B$ , prove that  $A + B = 90^\circ$ .
- Or, Prove by geometrical method : (ii)  $\sin^2 A + \cos^2 A = 1$ .
- Q. 13. The length of a tangent from a point A at distance 5 cm from the centre of the circle is 4 cm. Find the radius of the circle.
- Or, Two concentric circles are of radii 5 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle.
- Q. 14. The wheels of a car are of diameter 80 cm each. How many complete revolution does each wheel make in 10 minutes when the car is travelling at a speed of 66 km per hour ?
- Or, The radii of two circles are 8 cm and 6 cm respectively. Find the radius of the circle having area equal to the sum of the areas of the two circles.
- Q. 15. Use Euclid's division lemma to show that the square of any positive integer is either of the form  $3m$  or  $3m + 1$  for some integer  $m$ . <http://www.mpboardonline.com>
- Or, Find the L.C.M. and H.C.F. of the pair of integers 510 and 92 and verify that  $\text{LCM} \times \text{HCF} = \text{Product of the two numbers}$ .
- Q. 16. Divide the polynomial  $p(x)$  by the polynomial  $g(x)$  and find the quotient and remainder in each of the following:  
 $P(x) = x^4 - 3x^2 + 4x + 5$ ,  $g(x) = x^2 + 1 - x$
- Or, Check whether the first polynomial is a factor of the second polynomial by dividing the second polynomial by the first polynomial.
- Q. 17. Solve  $2x + 3y = 11$  and  $2x - 4y = -24$  and hence find the value of 'm' for which  $y = mx + 3$ .
- Or, The difference between two numbers is 26 and one number is three times the other. Find them.
- Q. 18. If the sum of first 7 terms of an A.P. is 49 and that of 17 term is 289, find the sum of first  $n$  terms.
- Or, Show that  $a_1, a_2, \dots, a_n, \dots$  from A. P. where,  $a_n$  is defined as below :  $a_n = 3 + 4n$ . Also find the sum of the first 15 terms.
- Q. 19. ABCD is a trapezium in which  $AB \parallel DC$  and its diagonal intersect each other at point O.  
 Show that  $\frac{AO}{BO} = \frac{CO}{DO}$ .



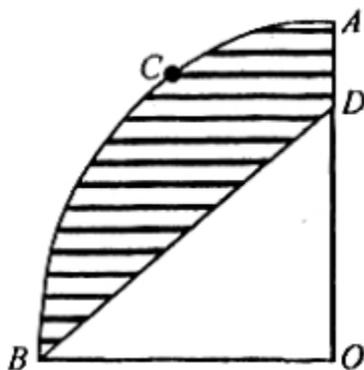
- Or, In figure ABD is a right angled triangle at A and AC  $\perp$  BD. Show that: (i)  $AB^2 = BC \cdot BD$   
 (ii)  $AC^2 = BC \cdot DC$

Q. 20. Two poles of equal heights are standing opposite to each other on either side of the road, which is 80m wide from a point between them on the road, the angles of elevation of the top of the poles are  $60^\circ$  and  $30^\circ$ , respectively. Find the height of the poles and the distance of the point from the poles. <http://www.mpboardonline.com>

Or, A kite is flying at a height of 60 m above the ground. The string attached to the kite is temporarily tied to a point on the ground. The inclination of the string with the ground is  $60^\circ$ . Find the length of the string, assuming that there is no slack in the string.

Q. 21. The cost of fencing a circular field at the rate of Rs. 24 per metre is 5280. The field is to be ploughed at the rate of 0.50 per  $m^2$ . Find the cost of ploughing the field (take  $\pi = \frac{22}{7}$ )

Or, In figure OACB is a quadrant of a circle with centre O and radius 3.5cm if OD=2cm, find the area of the : (i) Quadrant OACB, (ii) Shaded region.



Q. 22. The difference of squares of two numbers is 180. The square of the smaller number is 8 times the larger number. Find the two numbers.

Or, The altitude of a right triangle is 7cm less than its base. If the hypotenuse is 13cm, then find the other two sides.

Q.23. Prove that:  $(\operatorname{cosec} A - \sin A)(\sec A - \cos A) = \frac{1}{\tan A + \cot A}$ .

Or, If  $\sin(A - B) = \frac{1}{2}$ ,  $\cos(A + B) = \frac{1}{2}$ ,  $0^\circ < A < 90^\circ$  and  $A > B$ . Find A and B.

Q. 24. Construct a triangle with sides 5cm, 6cm and 7cm and then other triangle whose sides are  $\frac{7}{5}$  of the corresponding sides of the first triangle.

Or, Draw a circle of radius 6 cm from a point 10 cm away from its centre, construct the pair of tangents to the circle and measure their length. <http://www.mpboardonline.com>

Q.25. The slant height of frustum of a cone is 4 cm and the perimeter (circumference) of its circular ends are 18 cm and 6 cm. Find the curved surface area of frustum.

Or, A solid iron pole consists of a cylinder of height 220cm and base diameter 24 cm, which is surmounted by another cylinder of height 60 cm and radius 8 cm. Find the mass of the pole, given that  $1\text{cm}^3$  of iron has approximately 8 g mass. (use  $\pi = 3.14$ )

Q. 26. The length of 40 leaves of a plant are measured correct to the nearest millimeter and the data obtained is represented in the following step :

Length (in mm)	No. of leaves
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118-126	3
127-135	5
136-144	9
145-153	12
154-162	5
163-171	4
172-180	2

Find the median length of the leaves.

Or, The following distribution gives the daily income of 50 workers of a factory:

Daily income (in Rs.)	100 - 120	120 - 140	140 - 160	160 - 180	180 - 200
Number of workers	12	14	8	6	10

Convert the distribution above to a less than type commutative frequency distribution and draw its ogive.