

# MP BOARD CLASS 10 MATHEMATICS MODEL PAPER SET 8 2020

## Part (A)

Q. 1. Choose the correct option:

1. For some integer  $m$ , every even integer is of the form :

- (a)  $m$  (b)  $m-1$  (c)  $2m$  (d)  $2m + 1$ .

2. If  $\alpha, \beta, \gamma$  are the zeroes of the cubic polynomial  $ax^3 + bx^2 + cx + d$ , then  $\alpha + \beta + \gamma$  will be:

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

3. Maximum number of zero, liner polynomials will be:

- (a) One (b) Two (c) Three (d) None of these.

4. Lines  $5x - 4y + 8 = 0$  and  $7x + 6y - 9 = 0$  are:

- (a) Intersect (b) Coincide (c) Parallel (d) Infinitely many solution.

5. If  $3x - y + 8 = 0$  and  $6x - ky = -16$  represent coincident lines, then the value of  $k$  will be :

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

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

Q. 2. Fill in the blanks :

1. If  $b^2 - 4ac = 0$ , then both roots of the quadratic equation  $ax^2 + bx + c = 0$  are .....

2. Find the nature of roots of quadratic equation  $2x^2 + 2x + 2 = 0$  .....

3. Arithmetic mean of  $\sqrt{2} + 1$  and  $\sqrt{2} - 1$  be .....

4. From a pack of 52 cards the probability of getting an ace is .....

5. Circumference of a circle bears a constant ratio with its diameter this constant ratio is called .....

Ans. 1. Equal, 2. Imaginary, 3.  $\sqrt{2}$ , 4.  $\frac{1}{13}$ , 5.  $\pi$

Q.3. Write True or False :

1. The angle between the tangent line and the radius going from the touch point is right.

2. There can be many tangents with an infinite number of circles.

3. In right angled triangle hypotenuse is the largest side.

4. Angle of depression is always obtuse angle.

5. If a point whose coordinate is zero then that point is located on the Y axis.

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

Q.4. Match the column :

'A'

'B'

1.  $\sin 48^\circ \sec 42^\circ + \cos 48^\circ \operatorname{cosec} 42^\circ$  (a) 0

2.  $\frac{\sec \theta}{\tan \theta}$  (b)  $\cot \theta$
3.  $\frac{\sqrt{1 - \sin^2 \theta}}{\sin \theta}$  (c)  $\operatorname{cosec} \theta$
4.  $\sin 55^\circ - \cos 35^\circ$  (d) 3
5.  $\frac{\tan 60^\circ}{\cot 60^\circ}$  (e) 2.

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

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

1. What is the formula of the sum of the first n terms of an arithmetic progression.
2. What is the name of cumulative frequency curve ?
3. What is most frequently used measure of central tendency.
4. Write the formula volume of frustum of a cone .....
5. What is the relation between the diameter d and the area of the circle.

Ans. 1.  $S_n = \frac{n}{2}[2a + (n-1)d]$ , 2. Ogive, 3. The mean 4.  $\frac{1}{3}\pi h(r_1^2 + r_2^2 + r_1r_2)$ , 5.  $\frac{1}{4}\pi d^2$ .

Part (B)

Q.6. State whether the rational number (i)  $\frac{13}{3125}$  will have a terminating decimal expansion or non-terminating repeating decimal expansion.

Or, In any parade, a group of 616 number of soldiers (army) has to march behind the army band of 32 members. Both groups has to march in equal number of columns. What will be the maximum No. of coloumn in which they can march?

Q.7. If  $\alpha, \beta, \gamma$  are the zeroes of cubic polynomial, then find the value of  $\alpha + \beta + \gamma$  and  $\alpha\beta\gamma$  if cubic polynomial is  $3x^3 - 5x^2 - 11x - 3$ .

Or, Divide the polynomial P(x) by the polynomial g(x) and find the quotient and remainder in each of the following:

$$p(x) = x^3 - 3x^2 + 5x - 3, \quad g(x) = x^2 - 2$$

Q.8. Find a relation between x and y such that the point (x, y) is equidistant from the points (3,6) and (-3, 4).

Or, Find the coordinate of the point which divides the join of (-1,7) and (4,-3) in the ratio 2:3.

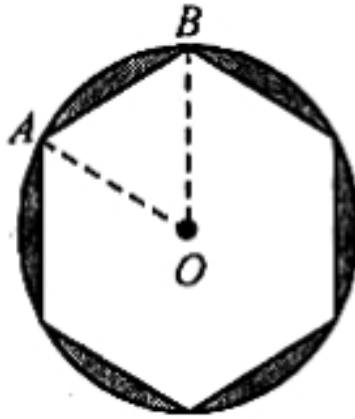
Q.9. A box contains 90 discs which are numbered from 1 to 90. If one disc is drawn at random from a box, find the probability that it bears a two-digit number.

Or, Harpreet tosses two different coins simultaneously. What is the probability that she gets at least one head ?

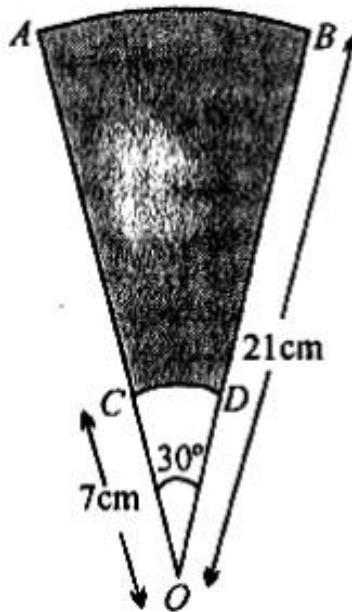
Q. 10. 12 defective pens are accidentally mixed with 132 good ones. It is not possible to just look at a pen and tell whether or not it is defective. One pen is taken out a random from this lot. Determine the probability that the pen taken out is a good one.

Or, It is given that in a group of 3 students, the probability of 2 students not having the same birthday is 0.992. What is the probability that the 2 students have the same birthday?

- Q.11. If the points A (6,1), B (8,2), C (9,4) and D (P, 3) are the vertices of a parallelogram, taken in order, find the value of P.
- Or, Find the coordinate of the points which divides the line segment joining A(-2, 2) and B (2,8) into four equal parts.
- Q. 12. If  $\sin 3A = \cos(A-26^\circ)$ , whose  $3A$  is an acute angle, find the value of A.
- Or, Prove by geometrical method :  $1 + \tan^2 A = \sec^2 A$
- Q. 13. PQ is a chord of length 8 cm of a circle of radius 5 cm. The tangent at P and Q intersect at a point T. Find the length of TP.
- Or, If tangent PA and PB from a point P to a circle with centre O are inclined to each other at angle of  $80^\circ$ , then find the value of  $\angle POA$ .
- Q. 14. A horse is tied to a peg at one corner of a square shaped grass field of side 15 m by means of a 5 m long rope. Find :
- (i) The area of that part of the field in which the horse can graze.
- (ii) The increase in the grazing area if the rope were 10 m long instead of 5 m. (Use  $\pi=3.14$ )
- Or, The radii of two circles are 19 cm and 9 cm respectively. Find the radius of the circle which has circumference equal to the sum of the circumference of the two circles.
- Q. 15. Prove that the rational number is irrational :  $7\sqrt{5}$ .
- Or, Use Euclid's division algorithm to find H.C.F. of 867 and 255.
- Q. 16. Find all the zeroes of  $2x^4 - 3x^3 - 3x^2 + 6x - 2$ , if you know that two of its zeroes are  $\sqrt{2}$  and  $-\sqrt{2}$ .
- Or, Obtain all other zeroes of  $3x^4 + 6x^3 - 2x^2 - 10x - 5$ , if two of its zeroes are  $\sqrt{\frac{5}{3}}$  and  $-\sqrt{\frac{5}{3}}$ .
- Q. 17. For which values of 'p' does the pair of equation given below has unique solution :
- $$4x + py + 8 = 0, 2x + 2y + 2 = 0.$$
- Or, Solve the following pair of linear equations by substitution method :
- (i)  $x + y = 14$ ,           (ii)  $x - y = 4$ .
- Q. 18. In an A.P., given  $a=5$ ,  $d = 3$ ,  $a_n = 50$ . Find n and S<sub>n</sub>,
- Or, If the 3rd and the 9th terms of an A.P. are 4 and - 8 respectively, which term of the A.P. is zero ?
- Q. 19. A vertical pole of length 6m casts a shadow 4m long on the ground and at the same time a tower casts a shadow 28m long. Find the height of the tower. <http://www.mpboardonline.com>
- Or, Let  $\Delta ABC \sim \Delta DEF$  and their areas be  $64\text{cm}^2$  and  $121\text{cm}^2$ , respectively. If  $EF = 15.4$  cm, Find BC.
- Q. 20. The angle of elevation of the top of a tower from two points at a distance of 4 m and 9m from the base of the tower and in the same straight line with it are complementary. Prove that the height of tower is 6 m.
- Or, From the top of a 7 m high building, the angle of elevation of the top of a cable tower is  $60^\circ$  and the angle of depression of its foot is  $45^\circ$ . Determine the height of the tower.
- Q. 21. A round table cover has six equal designs as shown in figure. If the radius of the cover is 28cm, find the cost of making the designs at the rate of Rs. 0.35 per  $\text{cm}^2$  (Use  $\sqrt{3} = 1.7$ )



Or, AB and CD are respectively arcs of two concentric circles of radii 21 cm and 7 cm and centre O (see figure).



If  $\angle AOB = 30^\circ$ , find the area of shaded region.

Q. 22. Find the roots of the following equation :

$$\frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30}, x \neq -4, 7.$$

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

Q. 23. Prove that:  $(\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$ .

Or, Prove the identity  $\operatorname{cosec} \theta - \cot \theta = \sqrt{\frac{1 - \cos \theta}{1 + \cos \theta}}$ .

Q. 24. Draw a line segment of length 7.6 cm and divide in the ratio 5:8. Measure the two parts.

Or, Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle  $60^\circ$ . <http://www.mpboardonline.com>

Q. 25. Metallic spheres of radii 6 cm, 8 cm and 10 cm respectively are melted to form a single solid sphere. Find the radius of resulting sphere.

Or, Water in a canal, 6 m wide and 1.5 m deep is flowing with a speed of 10 km/h. How much area will it irrigate in 30 minutes if 8 cm of standing water is needed ?

Q.26. If the median of the distribution given below is 28-5 find the value of x and y:

Class interval	Frequency
0-10	5
10-20	x
20-30	20
30-40	15
40-50	y
50-60	5
Total	60

Or, The following table gives the literacy rate (in percentage) of 35 cities. Find the mean literacy rate :

Literacy rate in %	45 - 55	55 - 65	65-75	75-85	85-95
Number of cities	3	10	11	8	3