## Class X 2023-24

#### Mathematics

### Task 1 - Holiday's Homework assignment

- **1.** Show that  $\sqrt{3}$  is irrational.
- 2. Show that  $5 \cdot 2\sqrt{3}$  is an irrational number.
- 3. In a school there are two sections, namely A and B, of class X. There are 30 students in section A and 28 students in section B. Find the minimum number of books required for their class library so that they can be distributed equally among students of section A or section B.
- 4. If one zero of the polynomial  $3x^2 + 8x + k$  is the reciprocal of the other, then find the value of k
- 5. If  $p(x) = 5x^2 + 6x + 2$ , then find the value of

(i) 
$$\frac{1}{\alpha} + \frac{1}{\beta}$$

(ii) 
$$\alpha^2 + \beta^2$$

(iii) 
$$\alpha^2 \beta^4 + \beta^2 \alpha^4$$

- 6. If  $\alpha$  and  $\beta$  are the zeroes of the quadratic polynomial  $p(x) = 2x^2 5x + 7$ , find a polynomial whose zeroes are  $2\alpha + 3\beta$  and  $3\alpha + 2\beta$
- 7. A card is drawn at random from a well-shuffled deck of 52 playing cards.
  Find the probability that the card drawn is (i) a card of spades or an ace, (ii) a black king, (iii) neither a jack nor a king, (iv) either a king or a queen.
- 8. Find the probability of having 53 Sundays in a leap year
- 9. In a competitive examination, 1 mark is awarded for each correct answer while ½ marks is deducted for each wrong answer. Jayanti answers 120 questions and got 90 marks. How many questions did she answer correctly?
- 10. Draw the graph of the following equations. 2x-y = 1 and x+ 2y = 13
  - (i) Find the solution of the equation from the graph

(ii) Shade the triangular region formed by the lines and the y-axis and find the area of the region

11. Find the value of k for which the pair of linear equations

kx + 3y = k-2 and 12x + ky = k

has no solution.

12. Find the four angles of cyclic quadrilateral ABCD in which  $\angle A = (2x-1)^0$ ,  $\angle B = (y+5)^0$ ,  $\angle C = (2y+15)^0$  and  $\angle D = (4x-7)^0$ .

**13.** Find the value of m for which the following pair of linear equations have infinitely many solutions:

2x + 3y - 7 = 0 and

(m-1)x + (m+1)y = 3m - 1

- 14. If 31x + 43y = 117 and 43x + 31y = 105, then find the value of x y
- 15. Places A and B are 100 km apart on a highway. 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?
- **16.** Solve the following system of linear equations:

$$\frac{x}{a} + \frac{y}{b} = a + b$$
$$\frac{x}{a^2} + \frac{y}{b^2} = 2$$

## **Case Study Based Questions:**

17. Amit is planning to buy a house and the layout is given below. The design and the measurement has been made such that areas of two bedrooms and kitchen together is 95 sq.m



# Based on the above information, answer the following questions:

i) Form the pair of linear equations in two variables from this situation.

- ii) Find the length of the outer boundary of the layout.
- iii) Find the area of each bedroom and kitchen in the layout.
- iv) Find the area of living room in the layout.
- v) Find the cost of laying tiles in kitchen at the rate of Rs. 50 per sq.m
- 18. In a car park, there are 125 cars, 3p bikes, 10 bicycles and 20 buses.One of the vehicle leaves the parking at random.



Based on the above situation, answer the following questions:

(i) Find the probability that the vehicle leaving the park is a bus

(ii) If the probability that the vehicle leaving the park is a bike is  $\frac{9}{40}$ , then

find the value of p

(iii) Using the above value of p, find the probability of a car leaving the park

(iv) What is the sum of the probabilities of vehicles leaving the park as car, bike, bus and bicycle?

19. Following picture is the snapshot of the Angry Bird game. The objective of the game is to eliminate the pigs and destroy their buildings at the same time. This is done by the birds launching themselves. The picture shows the path covered by the bird at a particular time



Based on the above information, answer the following questions:

(i) Name the shape of the path covered by the bird.

(ii) What type of polynomial is represented by the graph made in the picture?

(iii) Write the number of zeroes of the polynomial representing the graph in the picture.

(iv) Write the zeroes of the polynomial representing the graph in the picture.

(v) Find the quadratic polynomial representing the graph

20. Shalvi wants to organize her birthday party. She is very happy on her birthday. She is very health conscious, thus she decided to serve fruits only in her birthday party. She has 36 apples and 60 bananas at home and decided to serve them. She wants to distribute fruits among guests. She does not want to discriminate among guests, so she decided to distribute fruits equally among all.

Based on the above information, answer the following questions:

- (i) How many maximum guests Shalvi can invite?
- (ii) How many apples and bananas will each guest get?
- (iii) Shalvi decides to add 42 mangoes also. In this case how many maximum guests Lavanya can invite?
- (iv) How many total fruits will each guest get?
- (v) If Shalvi decides to add 3 more mangoes and remove 6 apples in total fruits, in this case how many maximum guests Lavanya can invite?

## Task 2 – Art Integration

## 1. Write a short note on fractals in Nature.

For Roll No. 1 to 15 - Prepare a fractal card using A4 size Sheet Roll No. 16 onwards - Collect the Pictures of fractals in Nature and Prepare a collage on A3 size sheet

 For Roll No. 1 to 15: Prepare a <u>traditional/tribal toy of Andaman and</u> <u>Nicobar Islands</u> using 3D objects and find its surface area and volume. For Roll No. 16 onwards: Prepare a <u>traditional/tribal toy of Lakshdweep</u> <u>Islands</u> using 3D objects and find its surface area and volume.

<u> Task 3 – G20 Awareness</u>



# **Disaster Risk Reduction Working Group**

G20 | Presidency of India | NDMA

(This website is towards outreach support to NDMA by UNDRR)

India on assuming the Presidency of the G20 from Indonesia established the first G20 working group on Disaster Risk Reduction, to encourage collective work by the G20, undertake multi-disciplinary research and exchange best practices on disaster risk reduction.

Growing disasters around the world, the majority of which are currently driven by climate change, but also bearing in mind the destructive power of deadly geophysical hazards, threaten the lives of millions and are taking an increasing toll on economic development.

Disasters impact all countries and threaten our collective future, the establishment of this working group is a clear demonstration of the Presidency's commitment to the theme of 'Vasudhaiva Kutumbakam' – 'One Earth, One Family, One Future.'

Write a short note on disaster risk index of a country and prepare an infographic on disaster risk index worldwide.