

CLASS 9th (A,B,C,D) HOLIDAY HOMEWORK 2023-2024

Mathematics Holiday Home Work

NUMBER SYSTEM

SECTION A

1. Express each of the following decimals in the form $\frac{p}{q}$:

(i) 0.39

(ii) 0.750

(iii) 2.15

(iv) 7.010

(v) 9.90

(vi) 1.0001

2. Express each of the following decimals in the form $\frac{p}{q}$:

(i) $0.\bar{4}$

(ii) $0.3\bar{7}$

(iii) $0.5\bar{4}$

(iv) $0.\bar{6}2\bar{1}$

(v) $125.\bar{3}$

(vi) $4.\bar{7}$

(vii) $0.4\bar{7}$ [NCERT]

(viii) $0.12\bar{3}$ [NCERT EXEMPLAR]

3. Express $0.6 + 0.\bar{7} + 0.4\bar{7}$ in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$.

[NCERT EXEMPLAR]

SECTION B

1. Simplify the following:

(i) $3(a^4b^3)^{10} \times 5(a^2b^2)^3$

(ii) $(2x^{-2}y^3)^3$

(iii) $\frac{(4 \times 10^7)(6 \times 10^{-5})}{8 \times 10^4}$

(iv) $\frac{4ab^2(-5ab^3)}{10a^2b^2}$

(v) $\left(\frac{x^2y^2}{a^2b^3}\right)^n$

(vi) $\frac{a^{3n-9}b^6}{a^{2n-4}}$

2. If $a = 3$ and $b = -2$, find the values of:

(i) $a^a + b^b$

(ii) $a^b + b^a$

(iii) $(a + b)^{ab}$

3. If x, y, a, b are positive real numbers, prove that:

(i) $\left(\frac{x^a}{x^b}\right)^c \times \left(\frac{x^b}{x^c}\right)^a \times \left(\frac{x^c}{x^a}\right)^b = 1$

(ii) $\frac{1}{1 + x^{a-b}} + \frac{1}{1 + x^{b-a}} = 1$

4. Solve the following equations for x :

(i) $7^{2x+3} = 1$

(ii) $2^{x+1} = 4^{x-3}$

(iii) $2^{5x+3} = 8^{x+3}$

(iv) $4^{2x} = \frac{1}{32}$

(v) $2^{3x-7} = 256$

5. Prove that:

(i) $\frac{a+b+c}{a^{-1}b^{-1} + b^{-1}c^{-1} + c^{-1}a^{-1}} = abc$

(ii) $(a^{-1} + b^{-1})^{-1} = \frac{ab}{a+b}$

(iii) $\left(\frac{x^a}{x^b}\right)^{a^2+ab+b^2} \times \left(\frac{x^b}{x^c}\right)^{b^2+bc+c^2} \times \left(\frac{x^c}{x^a}\right)^{c^2+ca+a^2} = 1$

6. Simplify the following:

(i) $\frac{3^n \times 9^{n+1}}{3^{n-1} \times 9^{n-1}}$

(ii) $\frac{5 \times 25^{n+1} - 25 \times 5^{2n}}{5 \times 5^{2n+3} - (25)^{n+1}}$

(iii) $\frac{6(8)^{n+1} + 16(2)^{3n-2}}{10(2)^{3n+1} - 7(8)^n}$

7. Solve the following equations for x :

(i) $2^{2x} - 2^{x+3} + 2^4 = 0$

(ii) $3^{2x+4} + 1 = 2 \cdot 3^{x+2}$

(iii) $4^{x-1} \times (0.5)^{3-2x} = \left(\frac{1}{8}\right)^x$

8. If $49392 = a^4b^2c^3$, find the values of a, b and c , where a, b and c are different positive primes.

9. If $1176 = 2^a \times 3^b \times 7^c$, find a, b and c .

10. Given $4725 = 3^a 5^b 7^c$, find (i) the integral values of a, b and c (ii) the value of $2^{-a} 3^b 7^c$

11. If $a = xy^{p-1}, b = xy^{q-1}$ and $c = xy^{r-1}$, prove that $a^{q-r} b^{r-p} c^{p-q} = 1$.

SECTION C

1. Rationalise the denominator of each of the following (i – vii):

(i) $\frac{3}{\sqrt{5}}$

(ii) $\frac{3}{2\sqrt{5}}$

(iii) $\frac{1}{\sqrt{12}}$

(iv) $\frac{\sqrt{2}}{\sqrt{5}}$

(v) $\frac{\sqrt{3}+1}{\sqrt{2}}$

(vi) $\frac{\sqrt{2}+\sqrt{5}}{\sqrt{3}}$

(vii) $\frac{3\sqrt{2}}{\sqrt{5}}$

2. Find the value to three places of decimals of each of the following. It is given that $\sqrt{2} = 1.414$, $\sqrt{3} = 1.732$, $\sqrt{5} = 2.236$ and $\sqrt{10} = 3.162$.

(i) $\frac{2}{\sqrt{3}}$

(ii) $\frac{3}{\sqrt{10}}$

(iii) $\frac{\sqrt{5}+1}{\sqrt{2}}$

(iv) $\frac{\sqrt{10}+\sqrt{15}}{\sqrt{2}}$

(v) $\frac{2+\sqrt{3}}{3}$

(vi) $\frac{\sqrt{2}-1}{\sqrt{5}}$

3. Express each one of the following with rational denominator:

(i) $\frac{\sqrt{6}}{\sqrt{2}+\sqrt{3}}$ [NCERT EXEMPLAR]

(ii) $\frac{1}{\sqrt{6}-\sqrt{5}}$

(iii) $\frac{16}{\sqrt{41}-5}$ [NCERT EXEMPLAR]

(iv) $\frac{30}{5\sqrt{3}-3\sqrt{5}}$

(v) $\frac{1}{2\sqrt{5}-\sqrt{3}}$

(vi) $\frac{\sqrt{3}+1}{2\sqrt{2}-\sqrt{3}}$

(vii) $\frac{6-4\sqrt{2}}{6+4\sqrt{2}}$

(viii) $\frac{3\sqrt{2}+1}{2\sqrt{5}-3}$

(ix) $\frac{b^2}{\sqrt{a^2+b^2}+a}$

(x) $\frac{2+\sqrt{3}}{2-\sqrt{3}}$

[NCERT EXEMPLAR]

4. Rationalise the denominator and simplify:

(i) $\frac{2\sqrt{6}-\sqrt{5}}{3\sqrt{5}-2\sqrt{6}}$

(ii) $\frac{5+2\sqrt{3}}{7+4\sqrt{3}}$

(iii) $\frac{1+\sqrt{2}}{3-2\sqrt{2}}$

(iv) $\frac{4\sqrt{3}+5\sqrt{2}}{\sqrt{48}+\sqrt{18}}$

[NCERT EXEMPLAR]

(v) $\frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$

[NCERT EXEMPLAR]

(vi) $\frac{3\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}}$

[NCERT EXEMPLAR]

5. Simplify:

(i) $\frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}} + \frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}+\sqrt{3}}$

(ii) $\frac{1}{2+\sqrt{3}} + \frac{2}{\sqrt{5}-\sqrt{3}} + \frac{1}{2-\sqrt{5}}$

(iii) $\frac{2}{\sqrt{5}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{2}} - \frac{3}{\sqrt{5}+\sqrt{2}}$

6. In each of the following determine rational numbers a and b :

$$(i) \frac{\sqrt{3}-1}{\sqrt{3}+1} = a - b\sqrt{3} \quad (ii) \frac{4+\sqrt{2}}{2+\sqrt{2}} = a - \sqrt{b} \quad (iii) \frac{3+\sqrt{2}}{3-\sqrt{2}} = a + b\sqrt{2}$$

$$(iv) \frac{\sqrt{11}-\sqrt{7}}{\sqrt{11}+\sqrt{7}} = a - b\sqrt{77} \quad (v) \frac{4+3\sqrt{5}}{4-3\sqrt{5}} = a + b\sqrt{5}$$

$$(vi) \frac{3-\sqrt{5}}{3+2\sqrt{5}} = a\sqrt{5} + b$$

[NCERT EXEMPLAR]

7. Find the value of $\frac{6}{\sqrt{5}-\sqrt{3}}$, it being given that $\sqrt{3} = 1.732$ and $\sqrt{5} = 2.236$.

8. Find the values of each of the following correct to three places of decimals, it being given that $\sqrt{2} = 1.4142$, $\sqrt{3} = 1.732$, $\sqrt{5} = 2.2360$, $\sqrt{6} = 2.4495$ and $\sqrt{10} = 3.162$.

$$(i) \frac{3-\sqrt{5}}{3+2\sqrt{5}} \quad (ii) \frac{1+\sqrt{2}}{3-2\sqrt{2}} \quad (iii) \frac{4}{3\sqrt{3}-2\sqrt{2}} + \frac{3}{3\sqrt{3}+2\sqrt{2}} \quad \text{[NCERT EXEMPLAR]}$$

9. Simplify:

$$(i) \frac{3\sqrt{2}-2\sqrt{3}}{3\sqrt{2}+2\sqrt{3}} + \frac{\sqrt{12}}{\sqrt{3}-\sqrt{2}}$$

$$(ii) \frac{7+3\sqrt{5}}{3+\sqrt{5}} - \frac{7-3\sqrt{5}}{3-\sqrt{5}}$$

POLYNOMIALS

SECTION A

1. Evaluate each of the following using identities:

$$(i) \left(2x - \frac{1}{x}\right)^2$$

$$(ii) (2x + y)(2x - y)$$

$$(iii) (a^2b - b^2a)^2$$

$$(iv) (a - 0.1)(a + 0.1)$$

$$(v) (1.5x^2 - 0.3y^2)(1.5x^2 + 0.3y^2)$$

2. Evaluate each of the following using identities:

$$(i) (399)^2$$

$$(ii) (0.98)^2$$

$$(iii) 991 \times 1009$$

$$(iv) 117 \times 83$$

3. Simplify each of the following:

$$(i) 175 \times 175 + 2 \times 175 \times 25 + 25 \times 25$$

$$(ii) 322 \times 322 - 2 \times 322 \times 22 + 22 \times 22$$

$$(iii) 0.76 \times 0.76 + 2 \times 0.76 \times 0.24 + 0.24 \times 0.24$$

$$(iv) \frac{7.83 \times 7.83 - 1.17 \times 1.17}{6.66}$$

4. If $x + \frac{1}{x} = 11$, find the value of $x^2 + \frac{1}{x^2}$

5. If $x - \frac{1}{x} = -1$, find the value of $x^2 + \frac{1}{x^2}$

6. If $x + \frac{1}{x} = \sqrt{5}$, find the values of $x^2 + \frac{1}{x^2}$ and $x^4 + \frac{1}{x^4}$

7. If $9x^2 + 25y^2 = 181$ and $xy = -6$, find the value of $3x + 5y$

8. If $2x + 3y = 8$ and $xy = 2$, find the value of $4x^2 + 9y^2$

9. If $3x - 7y = 10$ and $xy = -1$, find the value of $9x^2 + 49y^2$

10. Simplify each of the following products:

$$(i) \left(\frac{1}{2}a - 3b\right)\left(3b + \frac{1}{2}a\right)\left(\frac{1}{4}a^2 + 9b^2\right)$$

$$(ii) \left(m + \frac{n}{7}\right)^3 \left(m - \frac{n}{7}\right)$$

SECTION B

- If $f(x) = 2x^3 - 13x^2 + 17x + 12$, find (i) $f(2)$ (ii) $f(-3)$ (iii) $f(0)$
- Verify whether the indicated numbers are zeros of the polynomials corresponding to them in the following cases: [NCERT]
 - $f(x) = 3x + 1, x = -\frac{1}{3}$
 - $f(x) = x^2 - 1, x = 1, -1$
 - $g(x) = 3x^2 - 2, x = \frac{2}{\sqrt{3}}, -\frac{2}{\sqrt{3}}$
 - $p(x) = x^3 - 6x^2 + 11x - 6, x = 1, 2, 3$
 - $f(x) = 5x - \pi, x = \frac{4}{5}$
 - $f(x) = x^2, x = 0$
 - $f(x) = lx + m, x = -\frac{m}{l}$
 - $f(x) = 2x + 1, x = \frac{1}{2}$
- If $x = 2$ is a root of the polynomial $f(x) = 2x^2 - 3x + 7a$, find the value of a .
- If $x = -\frac{1}{2}$ is a zero of the polynomial $p(x) = 8x^3 - ax^2 - x + 2$, find the value of a .
- If $x = 0$ and $x = -1$ are the roots of the polynomial $f(x) = 2x^3 - 3x^2 + ax + b$, find the value of a and b .

SECTION C

In each of the following, using the remainder theorem, find the remainder when $f(x)$ is divided by $g(x)$

- $f(x) = x^3 + 4x^2 - 3x + 10, g(x) = x + 4$
- $f(x) = 4x^4 - 3x^3 - 2x^2 + x - 7, g(x) = x - 1$
- $f(x) = 2x^4 - 6x^3 + 2x^2 - x + 2, g(x) = x + 2$
- $f(x) = 4x^3 - 12x^2 + 14x - 3, g(x) = 2x - 1$
- $f(x) = x^3 - 6x^2 + 2x - 4, g(x) = 1 - 2x$
- $f(x) = x^4 - 3x^2 + 4, g(x) = x - 2$
- $f(x) = 9x^3 - 3x^2 + x - 5, g(x) = x - \frac{2}{3}$

SECTION D

In each of the following, use factor theorem to find whether polynomial $g(x)$ is a factor of polynomial $f(x)$ or, not :
(1-7)

1. $f(x) = x^3 - 6x^2 + 11x - 6; g(x) = x - 3$

2. $f(x) = 3x^4 + 17x^3 + 9x^2 - 7x - 10; g(x) = x + 5$

3. $f(x) = x^5 + 3x^4 - x^3 - 3x^2 + 5x + 15, g(x) = x + 3$

4. $f(x) = x^3 - 6x^2 - 19x + 84, g(x) = x - 7$

5. $f(x) = 3x^3 + x^2 - 20x + 12, g(x) = 3x - 2$

6. $f(x) = 2x^3 - 9x^2 + x + 12, g(x) = 3 - 2x$

7. $f(x) = x^3 - 6x^2 + 11x - 6, g(x) = x^2 - 3x + 2$

8. Show that $(x - 2), (x + 3)$ and $(x - 4)$ are factors of $x^3 - 3x^2 - 10x + 24$.

9. Show that $(x + 4), (x - 3)$ and $(x - 7)$ are factors of $x^3 - 6x^2 - 19x + 84$.

10. For what value of a is $(x - 5)$ a factor of $x^3 - 3x^2 + ax - 10$?

COORDINATE GEOMETRY

1. Plot the following points on the graph paper:

- (i) (2, 5) (ii) (4, -3) (iii) (-5, -7) (iv) (7, -4) (v) (-3, 2)
(vi) (7, 0) (vii) (-4, 0) (viii) (0, 7) (ix) (0, -4) (x) (0, 0)

2. Write the coordinates of each of the following points marked in the graph paper:

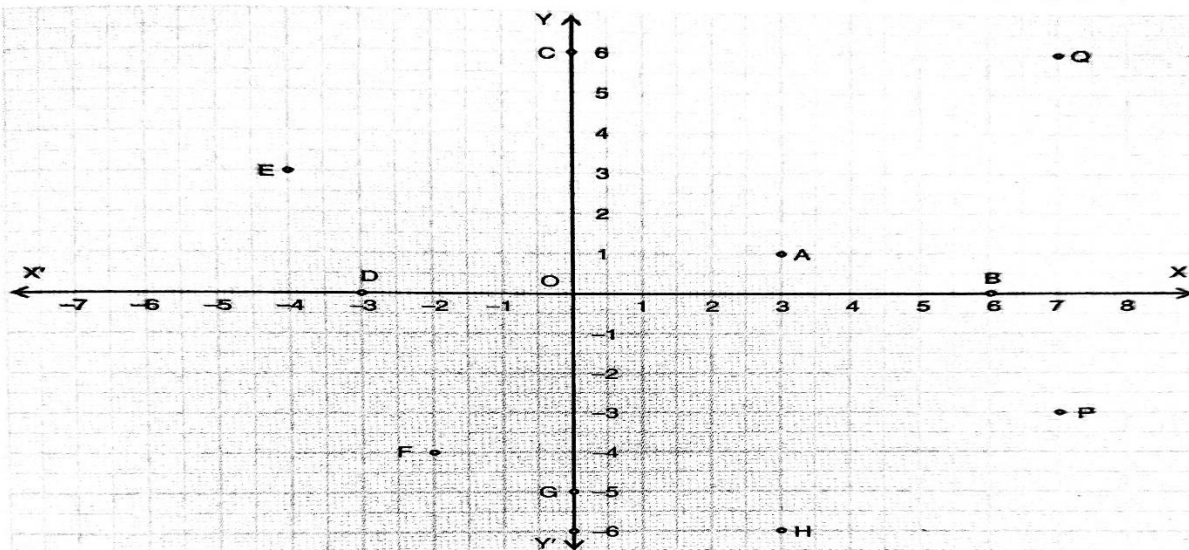


Fig. 8.8

3. Plot the following points and write the name of the figure obtained by joining them in order: $P(-3, 2), Q(-7, -3), R(6, -3), S(2, 2)$.

4. Plot the following points and check whether they are collinear or not:

- (i) (1, 3), (-1, -1), (-2, -3) (ii) (1, 1), (2, -3), (-1, -2) (iii) (0, 0), (2, 2), (5, 5)

5. Without plotting the points indicate the quadrant in which they will lie, if

- (i) ordinate is 5 and abscissa is -3 (ii) abscissa is -5 and ordinate is -3
(iii) abscissa is -5 and ordinate is 3 (iv) ordinate is 5 and abscissa is 3

6. In which quadrant or on which axis each of the following points lie?

- $(-3, 5), (4, -1), (2, 0), (2, 2), (-3, -6)$

7. Which of the following points lie on y -axis?

- $A(1, 1), B(1, 0), C(0, 1), D(0, 0), E(0, -1), F(-1, 0), G(0, 5), H(-7, 0), I(3, 3)$

LINEAR EQUATIONS IN TWO VARIABLES

SECTION A

- Write two solutions for each of the following equations:
(i) $3x + 4y = 7$ (ii) $x = 6y$ (iii) $x + \pi y = 4$ (iv) $\frac{2}{3}x - y = 4$
- Check which of the following are solutions of the equation $2x - y = 6$ and which are not:
(i) $(3, 0)$ (ii) $(0, 6)$ (iii) $(2, -2)$ (iv) $(\sqrt{3}, 0)$ (v) $\left(\frac{1}{2}, -5\right)$
- If $x = -1, y = 2$ is a solution of the equation $3x + 4y = k$, find the value of k .
- Find the value of λ , if $x = -\lambda$ and $y = \frac{5}{2}$ is a solution of the equation $x + 4y - 7 = 0$.
- If $x = 2\alpha + 1$ and $y = \alpha - 1$ is a solution of the equation $2x - 3y + 5 = 0$, find the value of α .
- If $x = 1$ and $y = 6$ is a solution of the equation $8x - ay + a^2 = 0$, find the values of a .
- Write two solutions of the form $x = 0, y = a$ and $x = b, y = 0$ for each of the following equations:
(i) $5x - 2y = 10$ (ii) $-4x + 3y = 12$ (iii) $2x + 3y = 24$
- For what value of c , the linear equation $2x + cy = 8$ has equal values of x and y for its solution.
[NCERT EXEMPLAR]
- Let y varies directly as x . If $y = 12$ when $x = 4$, then write a linear equation. What is the value of y when $x = 5$?
[NCERT EXEMPLAR]
- Write the linear equation such that each point on its graph has an ordinate 3 times its abscissa.
[NCERT EXEMPLAR]
- If the temperature of a liquid can be measured in Kelvin units as $x^\circ \text{K}$ or in Fahrenheit units as $y^\circ \text{F}$, the relation between the two systems of measurement of temperature is given by the linear equation $y = \frac{9}{5}(x - 273) + 32$.
 - Find the temperature of the liquid in Fahrenheit, if the temperature of the liquid is 313°K .
 - If the temperature is 158°F , then find the temperature in Kelvin.

SECTION B

- Draw the graph of each of the following linear equations in two variables:
 - $x + y = 4$
 - $x - y = 2$
 - $-x + y = 6$
 - $y = 2x$
 - $3x + 5y = 15$
 - $\frac{x}{2} - \frac{y}{3} = 2$
 - $\frac{x-2}{3} = y - 3$
 - $2y = -x + 1$
- Give the equations of two lines passing through (3, 12). How many more such lines are there, and why?
- A three-wheeler scooter charges ₹ 15 for first kilometer and ₹ 8 each for every subsequent kilometer. For a distance of x km, an amount of ₹ y is paid. Write the linear equation representing the above information.
- Plot the points (3, 5) and (-1, 3) on a graph paper and verify that the straight line passing through these points also passes through the point (1, 4).
- From the choices given below, choose the equation whose graph is given in Fig. 7.13.
 - $y = x$
 - $x + y = 0$
 - $y = 2x$
 - $2 + 3y = 7x$

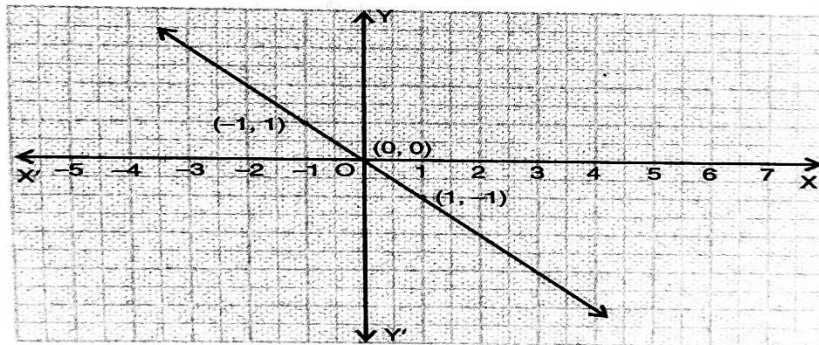


Fig. 7.13

[Hint: Clearly, (-1, 1) and (1, -1) satisfy the equation $x + y = 0$]

- From the choices given below, choose the equation whose graph is given in Fig. 7.14.
 - $y = x + 2$
 - $y = x - 2$
 - $y = -x + 2$
 - $x + 2y = 6$

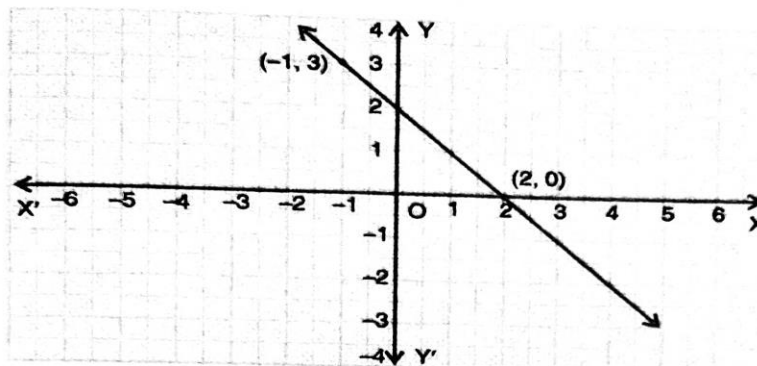


Fig. 7.14

[Hint: Clearly, (2, 0) and (-1, 3) satisfy the equation $y = -x + 2$]

- If the point (2, -2) lies on the graph of the linear equation $5x + ky = 4$, find the value of k .
- Draw the graph of the equation $2x + 3y = 12$. From the graph, find the coordinates of the point:
 - whose y -coordinate is 3.
 - whose x -coordinate is -3.
- Draw the graph of each of the equations given below. Also, find the coordinates of the points where the graph cuts the coordinate axes:
 - $6x - 3y = 12$
 - $-x + 4y = 8$
 - $2x + y = 6$
 - $3x + 2y + 6 = 0$

• DO THE WORK IN SEPARATE NOTEBOOK.

1. ENGLISH

UNSEEN PASSAGE -(Page 4 Ex. 1) (Page 6 Ex.2)

WRITING DIARY -Page 93 (Diary Entry 4)

OR

Page 94 (Diary Entry 5)

STORY WRITING -Page 113 (Question 3)

GRAMMAR - Page No. 195,196 (Exercise 9,10, 11, 12)

LITERATURE - (PROJECT WORK)

Question -Paste or draw the pictures of any 5 (five) renowned Indian musicians and write about their struggles, achievements and contributions in the field of music.

Project Work will be done in the Comment Sheets.

2. HINDI

1 कला समेकित परियोजना कार्य-

विषय- अरुणाचल प्रदेश और उत्तर प्रदेश

का तुलनात्मक प्रस्तुतीकरण।

उपविषय-पर्यटन

खानपान

वेशभूषा

त्योहार

(उपर्युक्त रचनात्मक क्रियाकलाप की अभिव्यक्ति चित्रात्मक रूप में करें, प्रत्येक उप विषय को लगभग 100 शब्दों में लिखें।)

2 कबीर दास जी के महान व्यक्तित्व और कृतित्व को निबंधात्मक शैली में विभिन्न दोहों का उदाहरण देते हुए लिखें। यथासंभव उनका एक आकर्षक चित्र भी बनाए।

3 अनुच्छेद लेखन

विषय -1 परहित सरिस धर्म नहीं भाई

(विचारात्मक निबंध)

2 मोबाइल:फोन सुविधा या असुविधा

(संचार से संबंधित)

4 आवधिक परीक्षा(P.T.1) में दिए गए पाठ्यक्रम को परीक्षा हेतु ठीक से तैयार करें।

4. SCIENCE

Art Integrated Project: Compare the flora of Uttar Pradesh with Arunachal Pradesh under the following headings:

- a. Location
- b. Climate
- c. Topography
- d. Adaptation
- e. Major crops/Trees
- f. Benefits of trees

Note: The project will be assessed on the basis of creativity, pictorial presentation & neatness

Revise PA-1 syllabus

Chapter1. Matter in our surroundings

Chapter5. The fundamental unit of life

Chapter7. Motion

5.SOCIAL STUDIES

DISASTER MANAGEMENT

Natural Disasters

- Earthquake _ Roll no1 to 10
- Cyclones_ Roll no 11 to 20
- Forest fires_ Roll no 21to 30
- Landslide/ Avalanche_ Roll no 31to 40
- Floods_ 41 onwards

Page 1. DISASTER MANAGEMENT
NATURAL DISASTERS
Topic- EARTHQUAKE

Page 2. ACKNOWLEDGEMENT

Page 3. CONTENT

Page 4. What is DISASTER
Types of DISASTER
Types of Natural Disasters

Page 5. To 10. SAMPLE
Earthquake (Define)
Causes
Effects
Prevention (before like Earthquake resistant structures)
Do's and Donts (during)
Precautions after
Case study of Nepal Earthquake

Page 11. Conclusion

Page 12 Bibliography

NOTE-

- Use interleaved sheets(one side line)
- Don't use colourful sheets
- Cover page can be decorated or painted depicting glimpse of Natural Disasters
- Name ,class ,Roll no must be written on the cover page itself
- No use of stickers and glitters
- No extra drawing apart from the topic

- CREATIVITY COUNTS(depicting information by various forms like use of graphs,maps,colourful pics,diagrams etc)
- DO'S AND DO'NTS must be in self explanatory diagrams
- HEADINGS WILL BE Almost THE SAME ONLY CONTENT WILL BE CHANGED according to topic

6.COMPUTER

1.Design an Algorithm and a Flowchart to create a calculator that perform addition, subtraction, multiplication and division.

2.Write the codes in python that will follow the algorithm and flowchart designed in Question no- 1.

Try to make your program user interactive and present the information in attractive way on final screen.