

# NIRJA SAHAY DAV PUBLIC SCHOOL KANKE, RANCHI

## Mathematics Holiday Homework

- Show that the relation R on the set R of all real numbers, defined as  $R = \{(a, b) : a \leq b^3\}$  is neither reflexive, nor symmetric nor transitive.
- Check whether the relation R on R defined by  $R = \{(a, b) : a \leq b^3\}$  is reflexive, symmetric or transitive.
- Show that the relation R on the set  $A = \{1, 2, 3, 4, 5\}$ , given by  $R = \{(a, b) : |a - b| \text{ is even}\}$ , is an equivalence relation. Show that all the elements of  $\{1, 3, 5\}$  are related to each other and all the elements of  $\{2, 4\}$  are related to each other. But, no element of  $\{1, 3, 5\}$  is related to any element of  $\{2, 4\}$ .
- Prove that the relation R on the set  $N \times N$  defined by  $(a, b)R(c, d) \Leftrightarrow a + d = b + c$  for all  $(a, b), (c, d) \in N \times N$  is an equivalence relation.
- Let  $A = R - \{2\}$  and  $B = R - \{1\}$ . If  $f : A \rightarrow B$  is a mapping defined by  $f(x) = \frac{x-1}{x-2}$ , show that f is bijective.

- Show that  $f : N \rightarrow N$  defined by  $f(x) = \begin{cases} \frac{n+1}{2}, & \text{if } n \text{ is odd} \\ \frac{n}{2}, & \text{if } n \text{ is even} \end{cases}$  is many-one onto function.

- Let  $f : N \cup \{0\} \rightarrow N \cup \{0\}$  be defined by  $f(n) = \begin{cases} n + 1, & \text{if } n \text{ is even} \\ n - 1, & \text{if } n \text{ is odd} \end{cases}$ . Show that f is bijective.

- Let  $f : N \rightarrow R$  be a function defined as  $f(x) = 4x^2 + 12x + 15$ . Show that  $f : N \rightarrow \text{Range}(f)$  is bijective.

- Consider  $f : R_+ \rightarrow [-5, \infty)$  given by  $f(x) = 9x^2 + 6x - 5$ . Show that f is Bijective.

- Find the Principal values of each of the following:

(i)  $\tan^{-1}(-\sqrt{3})$

(ii)  $\tan^{-1}(\sqrt{3}) - \sec^{-1}(-2)$

(iii)  $\tan^{-1}(1) + \cos^{-1}\left(-\frac{1}{2}\right) + \sin^{-1}\left(-\frac{1}{2}\right)$

(iv)  $\tan^{-1}(\sqrt{3}) - \sec^{-1}(-2) +$

$\operatorname{cosec}^{-1}\left(\frac{2}{\sqrt{3}}\right)$

(v)  $\cos^{-1}\left(\frac{1}{2}\right) + 2 \cdot \sin^{-1}\left(\frac{1}{2}\right)$

(vi)  $\operatorname{cosec} \{ \cos^{-1}a + \sin^{-1}a \}$

- Evaluate:

(i)  $\cos^{-1}\left(\cos \frac{7\pi}{6}\right)$

(ii)  $\cos \left\{ \cot^{-1}\left(\frac{15}{8}\right) \right\}$

(iii)  $\tan \frac{1}{2} \left\{ \cos^{-1}\left(\frac{\sqrt{5}}{3}\right) \right\}$

(iv)  $\tan^{-1}\left(\tan \frac{7\pi}{6}\right)$

(v)  $\sin^{-1}\left(\sin \frac{2\pi}{3}\right)$

(vi)  $\cos^{-1}\left(\cos \frac{13\pi}{6}\right)$

- If  $x, y, z \in [-1, 1]$  such that  $\sin^{-1} x + \sin^{-1} y + \sin^{-1} z = \frac{3\pi}{2}$ , find the value of

$$x^{2006} + y^{2007} + z^{2008} - \frac{9}{x^{2006} + y^{2007} + z^{2008}}$$

- Express each of the following in the simplest form :

(i)  $\tan^{-1}\left(\frac{\cos x - \sin x}{\cos x + \sin x}\right), -\frac{\pi}{4} < x < \frac{\pi}{4}$

(ii)  $\tan^{-1}\left\{\sqrt{\frac{a-x}{a+x}}\right\}, -a < x < a$

14. Prove that:

$$(i) \cot^{-1} \left\{ \frac{\sqrt{1+\sin x} + \sqrt{1-\sin x}}{\sqrt{1+\sin x} - \sqrt{1-\sin x}} \right\} = \frac{x}{2} \in \left( 0, \frac{\pi}{4} \right) \quad (ii)$$

$$\tan^{-1} \left( \frac{a \cos x - b \sin x}{b \cos x - a \sin x} \right) = \tan^{-1} \left( \frac{a}{b} \right) - x$$

$$(iii) \tan^{-1} \left\{ \frac{\sqrt{1+\cos x} + \sqrt{1-\cos x}}{\sqrt{1+\cos x} - \sqrt{1-\cos x}} \right\} = \frac{\pi}{4} - \frac{x}{2}, \text{ if } \pi < x < \frac{3\pi}{2} \quad (iv)$$

$$\tan^{-1} \left( \frac{\sqrt{1+x^2} + \sqrt{1-x^2}}{\sqrt{1+x^2} - \sqrt{1-x^2}} \right) = \frac{\pi}{4} + \frac{1}{2} \cos^{-1} x^2$$

15. Construct a  $3 \times 4$  matrix whose elements are given by  $a_{ij} = \frac{1}{2} | -3i + j |$ .

16. Simplify:  $\cos \theta \begin{bmatrix} \cos \theta & \sin \theta \\ -\sin \theta & \cos \theta \end{bmatrix} + \sin \theta \begin{bmatrix} \sin \theta & -\cos \theta \\ \cos \theta & \sin \theta \end{bmatrix}$ .

17. Find matrices A and B, if  $2A - B = \begin{bmatrix} 6 & -6 & 0 \\ -4 & 2 & 1 \end{bmatrix}$  and  $2B + A = \begin{bmatrix} 3 & 2 & 5 \\ -2 & 1 & -7 \end{bmatrix}$ .

18. If  $A = \begin{bmatrix} \cos^2 \theta & \cos \theta \sin \theta \\ \cos \theta \sin \theta & \sin^2 \theta \end{bmatrix}$  and  $B = \begin{bmatrix} \cos^2 \phi & \cos \phi \sin \phi \\ \cos \phi \sin \phi & \sin^2 \phi \end{bmatrix}$ . Show that AB is a zero matrix if  $\theta$  and  $\phi$  differ by an odd multiple of  $\frac{\pi}{2}$ .

19. Let  $A = \begin{bmatrix} 0 & -\tan \frac{\alpha}{2} \\ \tan \frac{\alpha}{2} & 0 \end{bmatrix}$  and I is the identity matrix of order 2. Show that

$$(I + A) = (I - A) \cdot \begin{bmatrix} \cos \alpha & -\sin \alpha \\ \sin \alpha & \cos \alpha \end{bmatrix}.$$

20. Find the value of x, if  $\begin{bmatrix} 1 & x & 1 \\ 2 & 5 & 1 \\ 15 & 3 & 2 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \\ x \end{bmatrix} = O$ .

21. If  $A = \begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix}$ , prove that for all  $n \in \mathbb{N}$ ,  $(aI + bA)^n = a^n I + na^{n-1}bA$ , Where I is the identity matrix of order 2.

22. If  $F(x) = \begin{bmatrix} \cos x & -\sin x & 0 \\ \sin x & \cos x & 0 \\ 0 & 0 & 1 \end{bmatrix}$ , show that  $F(x) \cdot F(y) = F(x + y)$ .

23. Express  $A = \begin{bmatrix} 3 & 2 & 5 \\ 4 & 1 & 3 \\ 0 & 6 & 7 \end{bmatrix}$  as sum of two matrices such that one is symmetric and the other is skew-symmetric.

24. Find the value of k for which the points A(1,-1), B(2,k) and C(4,5) are collinear.

25. Find the value of  $k$  for which the area of  $\Delta ABC$  having vertices  $A(2, -6)$ ,  $B(5, 4)$  and  $C(k, 4)$  is 35 sq units.
26. If  $A(-2, 0)$ ,  $B(0, 4)$  and  $C(0, k)$  be three points such that area of  $\Delta ABC$  is 4 sq units, find the value of  $k$ .
27. If the points  $A(a, 0)$ ,  $B(0, b)$  and  $C(1, 1)$  are collinear, prove that  $\frac{1}{a} + \frac{1}{b} = 1$ .
28. Show that the matrix  $A = \begin{bmatrix} -8 & 5 \\ 2 & 4 \end{bmatrix}$  satisfies the equation  $x^2 + 4x - 42 = 0$  and hence find  $A^{-1}$ .
29. Using matrices, solve the following system of equations :  $\frac{2}{x} + \frac{3}{y} + \frac{10}{z} = 4$ ;  $\frac{4}{x} - \frac{6}{y} + \frac{5}{z} = 1$ ;  
 $\frac{6}{x} + \frac{9}{y} - \frac{20}{z} = 2$ .
30. Given that:  $A = \begin{bmatrix} -4 & 4 & 4 \\ -7 & 1 & 3 \\ 5 & -3 & -1 \end{bmatrix}$  and  $B = \begin{bmatrix} 1 & -1 & 1 \\ 1 & -2 & -2 \\ 2 & 1 & 3 \end{bmatrix}$ , find  $A.B$ . Use this to solve the following system of linear equations:  
 $x - y + z = 4$ ;  $x - 2y - 2z = 9$ ;  $2x + y + 3z = 1$ .



## NIRJA SAHAY DAV PUBLIC SCHOOL

KANKE, RANCHI - 06

**SUMMER HOLIDAY HOMEWORK, 2023-24**

**Class: XII**

**SUB: ACCOUNTANCY**

### CHAPTER: FUNDAMENTAL OF PARTENERSHIPS

1. Partnerships deed
2. Intrest on loan by the partner,
3. Intrest on loan to the firm.
4. Partners capital accountance.
5. Intrest on drawing.
6. Profit and loss appropriation account.
7. Past adjustments

EXERCISE-Q.NO.-1,2,3,6,10,11, 12,21,22,23,45,47,48,52,54,56,60,61,62,63.

### CHAPTER : GOODWILL

1. Average profit methoed
2. Super profit methoed
3. Captilization methoed

EXERCISE-Q.NO.-1,2,3,4,13,14, 15,24,25,26,27,32,33,34

# नीरजा सहाय डी.ए.वी. पब्लिक स्कूल, काँके, राँची

ग्रीष्मावकाश गृहकार्य, सत्र (2023-24)

कक्षा: बारहवीं विषय: हिंदी

1. आरोह भाग 2 (गद्य भाग से) पाठ 'भक्तिन' के प्रश्नोत्तर अपनी गृह कार्य कॉपी में लिखिए।
  2. कला एकीकृत योजना के अंतर्गत हरिवंश राय बच्चन की जीवनी, रचनाएँ व विशेषताओं की सचित्र बिंदुवार प्रस्तुतीकरण(PPT) के रूप में उल्लेख कीजिए।
  3. प्लास्टिक के विरुद्ध लोगों में जागरूकता लाने के लिए कपड़े के थैले बनाने की तीन दिवसीय\*  
\*कार्यशाला के बारे में 25 से 30 शब्दों में विज्ञापन तैयार कीजिए।\*
  - \*4. आपके आस-पास की दुकानों में मिलावटी सामान बेचा जा रहा है। इसकी सूचना देते हुए जिला स्वास्थ्य अधिकारी को शिकायती ई-मेल लिखिए।\*
  - 5-'ट्वेल्थ फ़ेल' और 'कितने चौराहें' पुस्तक पढ़ें और उसकी समीक्षा लिखें।
  - 6-'राष्ट्रीय शिक्षा-नीति-2020' विषय के पक्ष/विपक्ष में अपने विचार तैयार करें।
  - 7-'वर्ग-पत्रिका' हेतु सामग्री एकत्रित करें और सम्पूर्णता प्रदान करें।
  - 8-क्रियाकलाप-अपने नजदीकी अखबार के कार्यालय में जाकर उनकी कार्यशैली का निरीक्षण करें और एक रिपोर्ट, चित्र सहित तैयार करें।
- \*सभी कार्य एक फाइल में संग्रहित करें।

## BUSINESS STUDIES (2023-24)

NCERT

CHAPTER 1- Long ans questions from the exercise.

CHAPTER 2-Long and short ans questions from the exercises.

CHAPTER 3-Short ans questions from exercises.

CHAPTER 4-Long ans questions from the exercises

CHAPTER 5-Long ans questions from the exercises.

\*Prepare a chart on the basis of the principles of management given by HENRY FAYOL AND F.W.TAYLOR.

and

Chart showing the different types of plan and their differences.

Practice the case studies from all the first five chapters concerned.

## STD XII

## SUBJECT - ENGLISH

### Section 1 - READING SKILL

1. Read the editorial of an English Newspaper of your choice and express your views on the same.
2. Read any two novels and write book review in your book review copy.  
Suggested Readings:
  - a) The Power of Subconscious Mind - Joseph Murphy
  - b) Rich Dad Poor Dad - Robert Kiyosaki
3. Prepare and practice for Periodic Test I

### Section 2 - SPEAKING SKILL

1. Prepare speech on the following topics:
  - a) Women Empowerment
2. Research Project:  
Stress – A common Problem of Modern Life
3. Community outreach programme:
  - a) Visit to Blind School
  - b) Visit to Old Age Home

## CLASS – XII A3

## SUB – ECONOMICS

### SUMMER VACATION HOME WORK

1. a) Prepare short notes, after reading and understanding chapters with help of any suitable Online learning platform, of first 2 chapters of INDIAN ECONOMIC DEVELOPMENT.  
b) Make minimum 10 MCQs from each chapter of first five chapters of INDIAN ECONOMIC DEVELOPMENT.  
c) Write and learn glossary of INDIAN ECONOMIC DEVELOPMENT Text book for class XII Economics.
2. On the political map of India label the States, Capitals and the Union Territories.
3. Make a small project on the topic " Effects of Corona Lockdown-2020 on indian economy".
4. Solve Economics Board exam question paper of ( 2021-22).

Submission Date – 16/4/2023