

Dwarka International School
Class XII
Holiday Homework
SECTION-SCIENCE
SUBJECT: ENGLISH

Dear Students

Summer holidays are the most awaited and when it finally arrives, it gives us the time to sit back and relax. Lazy mornings and breaking free from the shackles of a fixed schedule enable us to ponder, meditate and spend some time with ourselves. Have you ever talked to yourself? If yes, continue with the same but if no please do it. It will develop your self-esteem and confidence and most importantly help you to discover yourself.

Since it is the most significant year of your life, you need to brush up with your concepts, reinforce them and proceed further with your curriculum so that when you return back in July, you feel more confident. In order to be on the right academic track and devote required time to all the subjects a meticulous planning is required. We have planned a proper homework schedule which will assist you in your learning and help you to accomplish your goals.

Please adhere to the following schedule and undertake the given tasks with dedication and sincerity:

1. Though being lazy during summer vacation is not a sin, yet make it a habit to get up early latest by 7:30 in the morning. Meditate, read the newspaper, browse the news, have a healthy breakfast and start following your schedule. Be strict with yourself. Newspaper reading will enhance your general awareness as well as vocabulary, which is imperative for good writing skills.
2. Take 'Vistas' and read the lesson '**The Enemy**'. '**The Enemy**' is a tale of a Japanese doctor saving his enemy, an American prisoner of war. Keep yourself in Dr. Sadao's place and answer the following questions. Do write the answers in your note-book. Word limit is 100 to 120 words
 - (a) Do you take pride in saving your enemy from death? Describe your emotions when you took this decision?
 - (b) Is patriotism about killing enemies to safeguard one's motherland? If yes, then would you label yourself as a traitor who let go of his enemy? Explain yourself.
 - (c) General Takima was cruel and selfish. Throw light on this statement and tell us the truth behind the statement.
 - (d) Hana remained your true support and stood by your decisions. What motivated her to do so?
 - (e) What message would you like to convey to the readers through your act of saving the enemy?
3. Now it is Flamingo's turn. Read '**A Thing of Beauty**' by **John Keats**. Write a short summary of the poem and answer the textual questions given in your note-books.
4. **Read the passage carefully and answer the questions that follow:**

Whether work should be placed among the causes of happiness or among the causes of unhappiness may perhaps be regarded as a doubtful question. There is certainly much work which is exceedingly irksome, and an excess of work is always very painful. However, work is not, to most people, more painful than idleness. There are, in work, all grades; from more relief of tedium up to the profoundest delights, according to the nature of the work and the abilities of the worker. Most of the work that most people have to do is not interesting in itself, but even that work has certain great advantages. To begin with, it fills a good many hours of the day without the need of deciding what one shall do. Most people, when they are left free to fill their own time according to their own choice, are at a loss to think of anything sufficiently pleasant to be worth doing. And whatever they decide on, they are troubled by the feeling that something else would have been more pleasant here. To be able to fill leisure intelligently is the last product of civilization and

at present very few people have reached this level. Moreover, the exercise of choice is tiresome in itself. Except, to people with unusual initiative, it is positively agreeable to be told what to do at each hour of the day, provided the orders are not too unpleasant. Most of the idle rich suffer unspeakable boredom. At times they may find relief by hunting big game in Africa or by flying around the world, but the number of such sensations is limited, especially after youth is past. Accordingly, the more intelligent rich men work nearly as hard as if they were poor.

Work, therefore is desirable, first and foremost as a preventive of boredom, although uninteresting work is as boring as having nothing to do. With this advantage of work, another associated advantage is that it makes holidays much more delicious when they come. Provided that a man does not have to work so hard as to impair his vigour, he is likely to find far more zest than an idle man would possibly find.

The second advantage of most paid work and some of unpaid work is that it gives chances of success and opportunities for ambition. In most work, success is measured by income and while our capitalistic society continues, this is inevitable. However dull work too, becomes bearable, if it is a means of building up a reputation. Continuity of purpose is one of the most essential ingredients of happiness and that comes chiefly through work.

On the basis of your reading of the above passage make notes on it, using headings and sub – headings. Use recognizable abbreviations (wherever necessary – minimum 4)

and a format you consider suitable. Also supply an appropriate title to it.

5. Public demonstration causes a lot of disturbance in daily routine of common man. You almost missed your important entrance examination as people blocked the highway. As Tarun / Taruna, a student aspiring to be a doctor, write a letter to the Editor of ‘**The Times of India**’ highlighting the need to discourage such demonstrations and disturbance by public on highways which cause a great loss of time and opportunity for many. (100-125 words)
6. By 2050, India will be amongst the countries which will face acute water shortage. You are highly alarmed and terrified of the future world without water. So, write an article on “Save water- are we doing enough? “ for the local daily in 150-200 words.
7. You have been asked to participate in a debate competition on the topic “Community service once a week should be introduced in all schools and should be graded”. Write the speech in about 200 words either for or against the motion.
8. Contribute any article/poem/story/experience/narrative on (A-4 sized sheet) for Gokul Days.

SUBJECT-PHYSICS

1. Assignment Work

- a) Do Unit 1 Questions [ch-1 & ch-2]
- b) Do Practice of the following Derivations:

- Electric Field due to electric dipole.
- Electric dipole in uniform electric field.
- Electric field due to uniform line charge distribution.
- Electric field due to uniform charge shell.
- Electric potential due to electric dipole.

2. Project Work

Make project report on any one of the following topics.

- Full Wave Rectifier.
- Effect of distance on intensity of light.
- Study the Transistor characteristics under C.B and C.E configuration.
- Construction of Amplifier using Transistor.
- Self induction of coil.
- Force on current carrying conductor placed in magnetic field.
- To study the phenomenon of electro- magnetic induction.
- To study dispersion of light through glass prism.
- Applications of LASER.
- Transformer.
- Voltage Regulation using ZENER diode.
- Role of series L.C.R circuit in tuning.

3. Activities-

Write the following activities in activity file.

- To assemble a household circuit comprising three bulbs, three (ON/OFF) switches, a fuse and power source.
- To assemble the components of a given electric circuit.

- To study the variation in potential drop with length of a wire for a steady current.
- To draw the diagram of a given open circuit mark the components that are not connected in proper order and correct the circuit.
- To identify a diode, an LED, a transistor, an IC, a resistor and capacitor from mixed collection of such items.

To observe refraction and lateral deviation of a beam of light incident on a glass slab.

CLASS XII

CHEMISTRY

Make your annual projects that includes introduction, requirements, procedure, observation, conclusion and bibliography

Complete your practical's forwarded to you in practical's file.

Complete your worksheet.

CLASS XII

BIOLOGY

Make your annual projects that includes introduction, requirements, procedure, observation, conclusion and bibliography

COMPUTER SCIENCE

CH – 1 Revision Tour of Class XI

Short Answer Type Questions (2-Marks)

1. Define Macro with suitable example.
2. Explain in brief the purpose of function prototype with the help of a suitable example.
3. What is the difference between Global Variable and Local Variable?
4. What is the difference between Object Oriented Programming and Procedural Programming?
5. What is the difference between Global Variable and Local Variable? Also, give a suitable C++ code to illustrate both.
6. Differentiate between ordinary function and member functions in C++. Explain with an example.
7. What is the difference between call by reference and call by value with respect to memory allocation? Give a suitable example to illustrate using C++ code.
8. What is the difference between actual and formal parameter ? Give a suitable example to illustrate using a C++ code.
9. Differentiate between a Logical Error and Syntax Error. Also give suitable examples of each in C++.
10. Find the correct identifiers out of the following, which can be used for naming variable, constants or functions in a C++ program :

While, for, Float, new, 2ndName, A%B, Amount2, _Counter

11. Out of the following, find those identifiers, which cannot be used for naming Variable, Constants or Functions in a C++ program :

_Cost, Price*Qty, float, Switch, Address One, Delete, Number12, do

12. Find the correct identifiers out of the following, which can be used for naming Variable, Constants or Functions in a C++ program :

For, while, INT, NeW, delete, 1stName, Add+Subtract, name1

Very Short Answer Type Questions (1-Mark Based on Header Files)

1. Which C++ header file (s) will be included to run /execute the following C++ code?

```
void main( )
```

```
{ int Last =26.5698742658;  
cout<<setw(5)<<setprecision(9)<<Last; }
```

2. Name the header files that shall be needed for successful compilation of the following C++ code :

```

void main()

{ char str[20],str1[20];
  gets(str);
  strcpy(str1,str);
  strrev(str);

  puts(str);

  puts(str1);    }

```

3. Write the names of the header files to which the following belong:

(i) strcmp()	(ii) fabs()
--------------	-------------
4. Write the names of the header files to which the following belong:

(i) frexp()	(ii) isalnum()
-------------	----------------

Short Answer Type Questions (2-Marks Error Finding)

1. Rewrite the following program after removing any syntactical errors. Underline each correction made.

```

#include<iostream.h>

void main( )

int A[10];

A=[3,2,5,4,7,9,10];

for( p = 0; p<=6; p++)

{ if(A[p]%2=0)

int S = S+A[p]; }

cout<<S;

}

```

2. Deepa has just started working as a programmer in STAR SOFTWARE company. In the company she has got her first assignment to be done using a C++ function to find the smallest number out of a given set of numbers stored in a one-dimensional array. But she has committed some logical mistakes while writing the code and is not getting the desired result. Rewrite the correct code underlining the corrections done. Do not add any additional statements in the corrected code

```

int find(int a[],int n)

{ int s=a[0];

  for(int x=1;x<n;x++)

  if(a[x]>s)

  a[x]=s;

  return(s); }

```

3. Rewrite the following program after removing the syntactical errors (if any). Underline each correction.

```
#include [iostream.h]
class PAYITNOW
{int Charge;
PUBLIC:
void Raise(){cin>>Charge;}
void Show{cout<<Charge;}
};
void main()
{
PAYITNOW P;
P.Raise();
Show();
}
```

4. Rewrite the following program after removing the syntactical errors (if any). Underline each correction.

```
#include <iostream.h>
struct Pixels
{ int Color,Style;} void
ShowPoint(Pixels P)
{ cout<<P.Color,P.Style<<endl;} void
main()
{
Pixels Point1=(5,3);
ShowPoint(Point1);
Pixels Point2=Point1;
Color.Point1+=2;
ShowPoint(Point2);
}
```

Application Based Questions (2 Marks Based on random function)

1. Observe the following C++ code and find out , which out of the given options i) to iv) are the expected correct output. Also assign the maximum and minimum value that can be assigned to the variable 'Go'.

```
void main()
```

```
{ int X [4] = {100,75,10,125}; int Go = random(2)+2;
```

```
for (int i = Go; i < 4; i++) cout << X[i] << " $";
```

```
}
```

(i) 100\$75

(ii) 75\$10\$125\$

(iii) 75\$10\$

(iv) 10\$125\$

2. Write a user defined function DIVT() which takes an integer as parameter and returns whether it is divisible by 13 or not. The function should return 1 if it is divisible by 13, otherwise it should return 0.

3. In the following program, if the value of N given by the user is 15, what maximum and minimum values the program could possibly display?

```
#include <iostream.h>
#include <stdlib.h>
void main()
{
    int N,Guessme;
    randomize();
    cin >> N;
    Guessme = random(N)+10;
    cout << Guessme << endl;
}
```

4. In the following program, if the value of N given by the user is 20, what maximum and minimum values the program could possibly display?

```
#include <iostream.h>
#include <stdlib.h>
void main()
{
    int N,Guessnum;
    randomize();
    cin >> N;
    Guessnum = random(N-10)+10;
    cout << Guessnum << endl;
}
```

5. Read the following C++ code carefully and find out, which out of the given options (i) to (iv) are the expected correct output(s) of it. Also, write the maximum and minimum value that can be assigned to the variable Taker used in the code :

```
void main()

{ int GuessMe[4] = { 100,50,200,20}; int Taker = random(2)+2;

for (int Chance = 0; Chance < Taker; Chance++)
    cout << GuessMe[Chance] << "#"; }
```

(i) 100#

(ii) 50#200#

(iii) 100#50#200#

(iv) 100#50

CH -4 CLASSES AND OBJECT

Long Answer Type Questions (4 Marks)

Q1. Define a class train with following members.

Private members

Trainno - type int

Destination -type String

Distance - type float

Fuel - type float

A member function calfuel() to calculate and assign value of fuel as per the following criteria:

Distance	Fuel
<=1500	250
>1500 and <=3000	1000
>3000	2500

Public member:

1. feedinfo(): to input train no, destination, distance and invoke calfuel() function to assign value of fuel.
2. showinfo(): to display all the details for a train.

Q2. Define a class employee with following specifications:

Private members:

empno integer type.

ename 20 characters long String.

basic,hra,da float type.

netpay float type.

ctotal() A function to calculate the total basic.

Public member:

read_data() A function to read empno, ename, basic, hra, da and call ctotal ()to calculate total.

display_data() A function to display all the data members on the screen.

CH – 5 CONSTRUCTOR AND DESTRUCTOR

Short Answer Type Questions (2 Marks)

Q1. What do you understand by constructor and destructor?

Q2. What are different types of constructors?

Q3. What do you understand by Default constructor? What is its role?

Q4. Answer the questions (i) and (ii) after going through the following class-
class Race

```
{ int CarNo,Track;

public:
    Race(); //function 1
    Race(int CN); //function 2
    Race(Race &R) //function 3
    void Register(); //function 4
    void Drive(); //function 5

};

void main()
{ Race R; }
```

- (i) Out of the following, which of the options is correct for calling function 2? Option 1 - Race T(30); Option 2 - Race U(R);.
- (ii) Name the feature of object oriented programming, which is illustrated by function1, function2 and function 3 combined together.

Q5. Find the output of following-

<pre>#include<iostream.h> class METRO { int Mno, TripNo, PassengerCount; public: METRO(int Tmno=1) { Mno= Tmno; TripNo =0; PassengerCount=0; } void Trip(int PC=20) { TripNo++; PassengerCount +=PC; } void StatusShow() { cout<<Mno<<":"<<TripNo<<":"<<PassengerCount<<endl; } };</pre>	<pre>void main() { METRO M(5),T; M.Trip(); T.Trip(50); M.StatusShow(); M.Trip(30); T.StatusShow(); M.StatusShow(); }</pre>
--	--

CH- 11 & 12 - MYSQL 6 – Marks Questions

Q1. Consider the following tables GAMES and PLAYER. Write SQL commands for the statements

(i) to (iv) and give outputs for SQL queries (v) to (viii). Table:

GAMES

GCode	GameName	Number	PrizeMoney	ScheduleDate
101	Carom Board	2	5000	23-Jan-2004
102	Badminton	2	12000	12-Dec-2003
103	Table Tennis	4	8000	14-Feb-2004
105	Chess	2	9000	01-Jan-2004
108	Lawn Tennis	4	25000	19-Mar-2004

Table: PLAYER

PCode	Name	Gcode
-------	------	-------

1	Nabi Ahmad	101
2	Ravi Sahai	108
3	Jatin	101
4	Nazneen	103

- (i) To display the name of all Games with their Gcodes.
- (ii) To display details of those games which are having PrizeMoney more than 7000.
- (iii) To display the content of the GAMES table in ascending order of ScheduleDate.
- (iv) To display sum of PrizeMoney for each of the Number of participation groupings (as shown in column Number 2 or 4).
- (v) SELECT COUNT(DISTINCT Number) FROM GAMES;
- (vi) SELECT MAX(ScheduleDate),MIN(ScheduleDate) FROM GAMES;
- (vii) SELECT SUM(PrizeMoney) FROM GAMES;
- (viii) SELECT DISTINCT Gcode FROM PLAYER;

Q2. Consider the following tables FACULTY and COURSES. Write SQL commands for the statements (i) to (v) and give outputs for SQL queries (vi) to (vii).

FACULTY

F_ID	Fname	Lname	Hire_date	Salary
102	Amit	Mishra	12-10-1998	12000
103	Nitin	Vyas	24-12-1994	8000
104	Rakshit	Soni	18-5-2001	14000
105	Rashmi	Malhotra	11-9-2004	11000
106	Sulekha	Srivastava	5-6-2006	10000

COURSES

C_ID	F_ID	Cname	Fees
C21	102	Grid Computing	40000
C22	106	System Design	16000
C23	104	Computer Security	8000
C24	106	Human Biology	15000
C25	102	Computer Network	20000
C26	105	Visual Basic	6000

- i) To display details of those Faculties whose salary is greater than 12000.
- ii) To display the details of courses whose fees is in the range of 15000 to 50000 (both values included).

iii) To increase the fees of all courses by 500 of “System Design” Course.

iv) To display details of those courses which are taught by ‘Sulekha’ in descending order of courses.

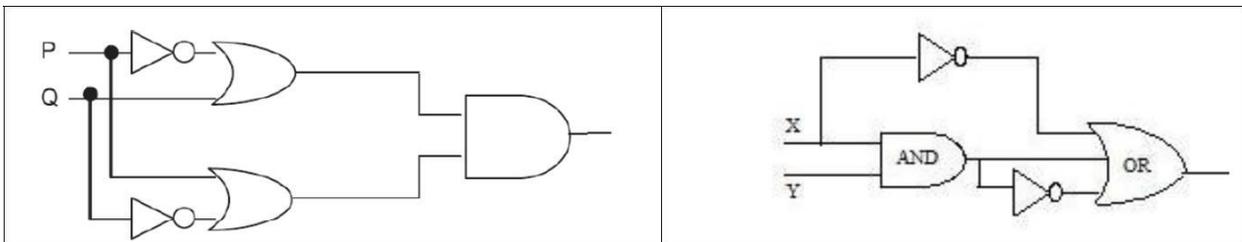
v) Select COUNT(DISTINCT F_ID) from COURSES;

vi) Select Fname,Cname from FACULTY,COURSES where COURSES.F_ID =FACULTY.F_ID;

CH – 13 -Boolean Algebra

2 Marks Questions

1. Write the equivalent Boolean Expression for the following Logic Circuit



2. Draw a Logical Circuit Diagram for the following Boolean expression:

$$A.(B+C')$$

3. Prove $x'.y'+y.z = x'yz+x'yz'+xyz+x'yz$ algebraically.

3 Marks Questions

1. If $F(a,b,c,d)=\sum(0,2,4,5,7,8,10,12,13,15)$, obtain the simplified form using K-Map.

2. Obtain a simplified form for a boolean expression

$$F(U,V,W,Z)=\pi(0,1,3,5,6,7,10,14,15)$$

**HOLIDAY HOMEWORK
ASSIGNMENT 2019-20
SUBJECT- MATHEMATICS (041)
CLASS -XII**

RELATION AND FUNCTIONS

- If $f(x) = (5-x^2)^{1/2}$, then find $f \circ f(x)$.
- If a function $f : A \rightarrow [-6, \infty)$ given by $f(x) = 9x^2 + 6x - 5$ is invertible, find $f^{-1}(x)$.
- Show that the relation S in the Set $A = \{5,6,7,8,9\}$ given by $S = \{(a, b) : |a - b| \text{ is divisible by } 2\}$ is an equivalence relation. Find the set of all elements related to 6.
- Let $A = \{1, 2, 3, 4\}$ and $R = \{(1, 1), (2, 2), (3, 3), (4, 4), (1, 2), (1, 3), (3, 2)\}$. Show that R is reflexive and transitive but not symmetric
- Let $f(x) = x + 7$ and $g(x) = x - 7, x \in R$. Find $(f \circ g)(7)$
- Let R_+ be the set of all positive real numbers. Let $f : R_+ \rightarrow [4, \infty[: f(x) = x^2 + 4$. Show that f is invertible and find f^{-1} (CBSE 2013)
- Prove that the function $f: N \rightarrow N$ defined by $f(x) = x^2 + x + 1$ is one-one but not onto.
- If $f(x) = \sqrt{x^2 + 1}$; $g(x) = \frac{x+1}{x^2+1}$ and $h(x) = 2x-3$, then find $f' [h' \{g'(x)\}]$ (CBSE 2015)
- Consider $f: R_+ \rightarrow [-9, \infty]$ given by $f(x) = 5x^2 + 6x - 9$. Prove that f is invertible with $f^{-1}(y) = \left(\frac{\sqrt{54+5y}-3}{5}\right)$ (CBSE 2015)
- If the function $f: R \rightarrow R$ be defined by $f(x) = x^2 + 5x + 9$ Find $f^{-1}(9)$.
- Show that $f: R \rightarrow R$, defined by $f(x) = \sin x$, is neither one - one nor onto.
- Show that the function $f: R \rightarrow R$ defined by $f(x) = \frac{x}{x^2+1} \forall x \in R$, is neither one - one nor onto.
- If $f : R \rightarrow (0,2)$ defined by $f(x) = \frac{e^x - e^{-x}}{e^x + e^{-x}} + 1$ is invertible, find f^{-1} .
- If function f and g are given by $f = \{(1, 2), (3, 5), (4, 1), (2,6)\}$, $g = \{(2, 6), (5,4), (1, 3), (6, 1)\}$, find the range of f and g and write down the function $f \circ g$ and $g \circ f$.

INVERSE TRIGONOMETRIC FUNCTIONS

- Show that $\tan\left(\frac{1}{2} \sin^{-1} \frac{3}{4}\right) = \frac{4-\sqrt{7}}{3}$ (EXAMPLER)
- Solve $\cos(\tan^{-1} x) = \sin(\cot^{-1} \frac{3}{4})$ (CBSE 2013)
- Prove that $\tan^{-1} \frac{63}{16} = \sin^{-1} \frac{5}{13} + \cos^{-1} \frac{3}{5}$
- Prove that $\cos[\tan^{-1}(\sin(\cot^{-1} x))] = \sqrt{\frac{1+x^2}{2+x^2}}$
- Prove that $\tan^{-1}\left(\frac{1}{3}\right) + \tan^{-1}\left(\frac{1}{5}\right) + \tan^{-1}\left(\frac{1}{7}\right) + \tan^{-1}\left(\frac{1}{8}\right) = \frac{\pi}{4}$ (CBSE 2010, 2008)
- Prove that $\cot^{-1} \left[\frac{\sqrt{1+\sin x} + \sqrt{1-\sin x}}{\sqrt{1+\sin x} - \sqrt{1-\sin x}} \right] = \frac{x}{2}, x \in (0, \frac{\pi}{4})$ (CBSE 2011, 2014)
- Prove that $\frac{9\pi}{8} - \frac{9}{4} \sin^{-1}\left(\frac{1}{3}\right) = \frac{9}{4} \sin^{-1}\left(\frac{2\sqrt{2}}{3}\right)$ (CBSE 2011)
- Prove that $\tan^{-1} x + \tan^{-1} \frac{2x}{1-x^2} = \tan^{-1} \left(\frac{3x-x^3}{1-3x^2} \right), x^2 < \frac{1}{3}$ (CBSE 2010)
- Prove that $\tan^{-1} 1 + \tan^{-1} 2 + \tan^{-1} 3 = \pi$ (DELHI CBSE 2010)
- If $y = \cot^{-1}(\sqrt{\cos x}) - \tan^{-1}(\sqrt{\cos x})$ prove that $\sin y = \tan^{2x}$ (FOREIGN 2013)
- Solve for $x : \tan^{-1}(x+1) + \tan^{-1}(x-1) = \tan^{-1} \frac{8}{31}$ (CBSE 2015)
- Prove the following : $\cot^{-1}\left(\frac{xy+1}{x-y}\right) + \cot^{-1}\left(\frac{yz+1}{y-z}\right) + \cot^{-1}\left(\frac{zx+1}{z-x}\right) = 0$ (CBSE 2015)

13. Solve for x: $\sin^{-1}6x + \sin^{-1}6\sqrt{3}x = -\frac{\pi}{2}$ (CBSE Sample Paper 2015)
14. Solve the equation for x: $\sin^{-1}x + \sin^{-1}(1-x) = \cos^{-1}x$ (CBSE 2016)
15. If $\cos^{-1}\frac{x}{a} + \cos^{-1}\frac{y}{b} = \alpha$, prove that $\frac{x^2}{a^2} - 2\frac{xy}{ab}\cos\alpha + \frac{y^2}{b^2} = \sin^2\alpha$ (CBSE 2016)
16. Find the greatest and least value of $(\sin^{-1}x)^2 + (\cos^{-1}x)^2$ (Exampler)
17. Prove that $\cot\left(\frac{\pi}{4} - 2\cot^{-1}3\right) = 7$
18. If $\tan^{-1}x + \tan^{-1}y = \frac{4\pi}{5}$, then find the value of $\cot^{-1}x + \cot^{-1}y$
19. Solve : $\cos^{-1}(\sin(\cos^{-1}x)) = \frac{\pi}{3}$

MATRICES AND DETERMINANTS

1. Use elementary column operation $C_2 \rightarrow C_2 + 2C_1$ in the following matrix equation :

$$\begin{pmatrix} 2 & 1 \\ 2 & 0 \end{pmatrix} = \begin{pmatrix} 3 & 1 \\ 2 & 0 \end{pmatrix} \begin{pmatrix} 1 & 0 \\ -1 & 1 \end{pmatrix}$$
 (CBSE 2016)
2. Construct a 2x2 matrix whose element a_{ij} are given by $\frac{(2i+j)^2}{2}$.
3. If A is a square matrix of order 3 such that $|adjA| = 289$ find $|A|$
4. If $A^2 = A$ find value of $(I + A)^2 - 3A$ (CBSE 2012)
5. If $A = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$ then prove that $A^n = \begin{bmatrix} \cos n\theta & \sin n\theta \\ -\sin n\theta & \cos n\theta \end{bmatrix}$, $n \in N$
6. Using E_R - transformation find the inverse of $A = \begin{bmatrix} 3 & 0 & -1 \\ 2 & 3 & 0 \\ 0 & 4 & 1 \end{bmatrix}$ (CBSE 2009)
7. If $A = \begin{bmatrix} 1 & 2 & -3 \\ 2 & 3 & 2 \\ 3 & -3 & -4 \end{bmatrix}$, find A^{-1} and hence solve the system of linear equations:
 $x + 2y - 3z = -4$; $2x + 3y + 2z = 2$; $3x - 3y - 4z = 11$.
8. If $A = \begin{bmatrix} 1 & 2 & 0 \\ -2 & -1 & -2 \\ 0 & -1 & 1 \end{bmatrix}$, find A^{-1} . Using A^{-1} , solve the system of linear equations : $x - 2y = 10$,
 $2x - y - z = 8$, $-2y + z = 7$
9. Use the product $\begin{bmatrix} 1 & -1 & 2 \\ 0 & 2 & -3 \\ 3 & -2 & 4 \end{bmatrix} \begin{bmatrix} -2 & 0 & 1 \\ 9 & 2 & -3 \\ 6 & 1 & -2 \end{bmatrix}$ to solve the following system of equations:
 $x - y + 2z = 1$; $2y - 3z = 1$; $3x - 2y + 4z = 2$. (CBSE 2011)
10. Find the adjoint of the matrix $A = \begin{bmatrix} -1 & -2 & -2 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$ and hence show that $A.(adj A) = |A| I_3$ (CBSE 2015)
11. Prove that $\begin{vmatrix} a^2 + 1 & ab & ac \\ ab & b^2 + 1 & bc \\ ca & cb & c^2 + 1 \end{vmatrix} = (1 + a^2 + b^2 + c^2)$ (CBSE 2014,2009,2013)
12. Evaluate using properties of determinant

$$\begin{vmatrix} 1 + a^2 - b^2 & 2ab & -2b \\ 2ab & 1 - a^2 + b^2 & 2a \\ 2b & -2a & 1 - a^2 - b^2 \end{vmatrix} = (1 + a^2 + b^2)^3$$
 (CBSE 2013, CBSE 2008,2009)
13. Using properties of determinants, prove the following $\begin{vmatrix} a^2 & bc & ac + c^2 \\ a^2 + ab & b^2 & ac \\ ab & b^2 + bc & c^2 \end{vmatrix} = 4a^2b^2c^2$ (CBSE 2015)

14. Using the properties of determinants, show that ΔABC is isosceles if:

$$\begin{vmatrix} 1 & 1 & 1 \\ 1 + \cos A & 1 + \cos B & 1 + \cos C \\ \cos^2 A + \cos A & \cos^2 B + \cos B & \cos^2 C + \cos C \end{vmatrix} = 0 \quad (\text{CBSE 2016})$$

15. If x, y, z are in GP than using properties of determinants where $x \neq y \neq z$ and P is any real number.

Show that
$$\begin{vmatrix} px + y & x & y \\ py + z & y & z \\ 0 & px + y & py + z \end{vmatrix} = 0 \quad (\text{CBSE Sample Paper 2015})$$

16. Without expanding, show that

$$\begin{vmatrix} \operatorname{cosec}^2 \theta & \cot^2 \theta & 1 \\ \cot^2 \theta & \operatorname{cosec}^2 \theta & -1 \\ 42 & 40 & 2 \end{vmatrix} = 0 \quad (\text{Exampler})$$

17. Show that if the determinant of $\begin{vmatrix} 3 & -2 & \sin 3\theta \\ -7 & 8 & \cos 2\theta \\ 11 & 14 & 2 \end{vmatrix} = 0$, $\sin \theta = 0$ or $\frac{1}{2}$ (Exampler)

18. Find the number of distinct real roots of $\begin{vmatrix} \sin x & \cos x & \cos x \\ \cos x & \sin x & \cos x \\ \cos x & \cos x & \sin x \end{vmatrix} = 0$ on the interval $-\frac{\pi}{4} \leq x \leq \frac{\pi}{4}$

19. If $x = -4$ is a root of $\begin{vmatrix} x & 2 & 3 \\ 1 & x & 1 \\ 3 & 2 & x \end{vmatrix} = 0$, then find the two other roots. (Exampler)

20. To promote the making of toilets for women, an organization tried to generate awareness through (i) house calls (ii) letters, and (iii) announcements. The cost for each mode per attempt is given as : (i) Rs. 50 (ii) Rs. 20 (iii) Rs. 40

The numbers of attempts made in three villages X, Y and Z are given below :

	(i)	(ii)	(iii)
X	400	300	100
Y	300	250	75
Z	500	400	150

Find the total cost incurred by the organisation for the three villages separately, using matrices. Write one value generated by the organisation in the society. (CBSE 2015)

21. The management committee of a residential colony decided to award some of its members (say x) for honesty, some (say y) for helping others (say z) for supervising the workers to keep the colony neat and clean. The sum of all the awardees is 12. Three times the sum of awardees for cooperation and supervision added to two times the number of awardees for honesty is 33. If the sum of the number of awardees for honesty and supervision is twice the number of awardees for helping others, using matrix method, find the number of awardees of each category. Apart from these values, namely, honesty, cooperation and supervision, suggest one more value which the management of the colony must include for awards. (CBSE 2013)

22. Using properties of determinants, prove that

$$\begin{vmatrix} 1 & 1 & 1 + 3x \\ 1 + 3y & 1 & 1 \\ 1 & 1 + 3z & 1 \end{vmatrix} = 9(3xyz + xy + yz + zx) \quad (\text{CBSE 2017})$$

23. Using elementary row transformations, find the inverse of the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 5 & 7 \\ -2 & -4 & -5 \end{bmatrix}$ (CBSE 2017)

CONTINUITY & DIFFERENTIABILITY

1. Find the constants a and b so that the function

$$\text{If } f(x) = \begin{cases} 3ax + b & , x > 1 \\ 11 & , x = 1 \\ 5ax - 2b & , x < 1 \end{cases} \text{ is continuous at } x = 1.$$

(DELHI CBSE 2011)

2. Find the value of k if the function

$$\text{If } f(x) = \begin{cases} \frac{1-\sin x}{(\pi-2x)^2} & x \neq \pi/2 \\ k & x = \pi/2 \end{cases} \text{ is continuous at } x = \pi/2$$

3. If $y = \sqrt{\frac{1-\sin 2x}{1+\sin 2x}}$, show that $\frac{dy}{dx} + \sec^2\left(\frac{\pi}{4} - x\right) = 0$

4. If the function f(x) defined below is continuous at x = 0. Find the value of k.

(CBSE 2010)

$$f(x) = \begin{cases} \frac{1-\cos 2x}{2x^2} & \text{if } x < 0 \\ k & \text{if } x = 0 \\ \frac{x}{|x|} & \text{if } x > 0 \end{cases}$$

5. Find the value of k so that the function $f(x) = \begin{cases} \frac{2^{x+2}-16}{4^x-16} & , x \neq 2 \\ k & , x = 2 \end{cases}$ is continuous at x = 2

6. Find values of p and q, for which $f(x) = \begin{cases} \frac{1-\sin^3 x}{3\cos^2 x} & \text{if } x < \frac{\pi}{2} \\ p & \text{if } x = \frac{\pi}{2} \\ \frac{q(1-\sin x)}{(\pi-2x)^2} & \text{if } x > \frac{\pi}{2} \end{cases}$ is continuous at $x = \frac{\pi}{2}$

7. If $f(x) = \begin{cases} \frac{\sin(a+1)x+2\sin x}{x} & \text{if } x < 0 \\ 2 & \text{if } x = 0 \\ \frac{\sqrt{1+bx}-1}{x} & \text{if } x > 0 \end{cases}$ is continuous at x = 0, then find the values of a and b.

8. If $f(x) = \frac{\sqrt{2}\cos x - 1}{\cot x - 1}$, $x \neq \frac{\pi}{4}$ find the value of $f\left(\frac{\pi}{4}\right)$ so that f(x) becomes continuous at $x = \frac{\pi}{4}$

9. If $\sin y = x \sin(a+y)$, prove that $\frac{dy}{dx} = \frac{\sin^2(a+y)}{\sin a}$ (DELHI CBSE 2012, CBSE 2009, 2013)

10. If $x^y = e^{x-y}$, prove that $\frac{dy}{dx} = \frac{\log x}{(1+\log x)^2}$ (CBSE 2013)

11. If $x = \sqrt{a^{\sin^{-1} t}}$, $y = \sqrt{a^{\cos^{-1} t}}$, show that $\frac{dy}{dx} = \frac{-y}{x}$ (CBSE 2012)

12. If $y = 3e^{2x} + 2e^{3x}$, prove that $\frac{d^2y}{dx^2} - 5\frac{dy}{dx} + 6y = 0$. (CBSE 2009)

13. If $y = \log [x + \sqrt{x^2 + a^2}]$. Prove that $(x^2 + a^2) \frac{d^2y}{dx^2} + x \frac{dy}{dx} = 0$ (DELHI CBSE 2013)

14. Differentiate w.r.t. x : $\sin^{-1}\left(\frac{2^{x+1} \cdot 3^x}{1+(36)^x}\right)$

15. Show that the function $f(x) = |x-1| + |x+1|$, for all $x \in \mathbb{R}$, is not differentiable at the points $x = -1$ and $x = 1$. (CBSE 2015)
16. Find $\frac{dy}{dx}$ if $x = \frac{1+\log t}{t^2}$, $y = \frac{3+2\log t}{t}$ (Exampler)
17. Find $\frac{dy}{dx} : \cos^{-1}\left(\frac{\sin x + \cos x}{\sqrt{2}}\right)$, $-\frac{\pi}{4} < x < \frac{\pi}{4}$ (Exampler)
18. If $\cos x^{\cos x^{\cos x}}$, show that $\frac{dy}{dx} = \frac{y^2 \tan x}{y \log \cos x - 1}$ (Exampler)
19. If $x = a(2\theta - \sin 2\theta)$ and $y = (1 - \cos 2\theta)$, find $\frac{dy}{dx}$ when $\theta = \frac{\pi}{3}$ (CBSE 2017)