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1. Choose the correct alternative that will continue the same pattern and replace the question mark in the given series.

3, 10, 101, ?

A. 10101

B. 10201

C. 10202

D. 11012

Ans: C

3, 10, 101, 10202

$$10 = 3^2 + 1$$

$$101 = 10^2 + 1$$

$$10202 = 101^2 + 1$$

2. In the series 2, 6, 18, 54, what will be the 8th term ?

A. 4370

B. 4374

C. 7443

D. 7434

Ans: B

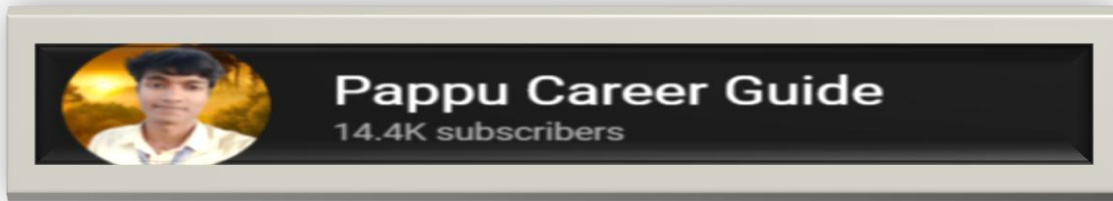
$$2 \times 3 = 6, 6 \times 3 = 18, 18 \times 3 = 54$$

$$\text{So } a = 2, r = 3$$

$$\text{nth term in G.P. is } ar^{n-1} = 2 \times 2187 = 4374$$

3. Choose the correct alternative that will continue the same pattern and replace the question mark in the given series.

125, 80, 45, 20, ?



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- A. 5
- B. 8
- C. 10
- D. 12

Ans: A

The pattern is -45, -35, -25, -15

The next number = $20 - 15 = 5$

4. Choose the correct alternative that will continue the same pattern and replace the question mark in the given series.

6, 13, 25, 51, 101, ?

- A. 201
- B. 202
- C. 203
- D. 205

Ans: C

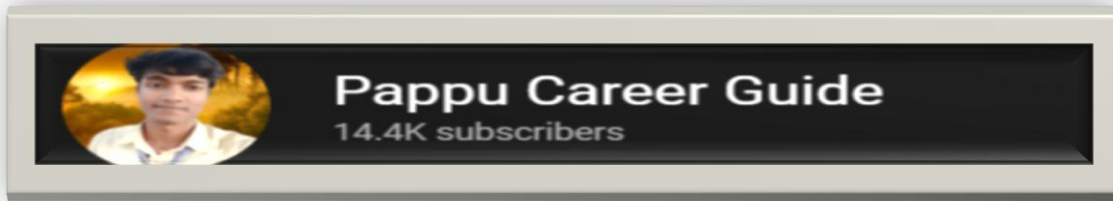
The pattern is $x^2 + 1, x^2 - 1, x^2 + 1, x^2 - 1, \dots$

So, missing term = $101 \times 2 + 1 = 203$

5. Choose the correct alternative that will continue the same pattern and replace the question mark in the given series.

1, 3, 4, 8, 15, 27, ?

- A. 37
- B. 44
- C. 50



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D. 55

Ans: C

$$1 + 3 + 4 = 8 ;$$

$$3 + 4 + 8 = 15 ;$$

$$4 + 8 + 15 = 27 \text{ and so on.}$$

$$\text{Missing number} = 8 + 15 + 27 = 50$$

IBM Quantitative Aptitude Questions

6. If $\log 27 = 1.431$, then the value of $\log 9$ is:

A. 0.934

B. 0.945

C. 0.954

D. 0.958

Ans: C

$$\log 27 = 1.431$$

$$\log 33$$

$$">(33)$$

$$= 1.431$$

$$3 \log 3 = 1.431$$

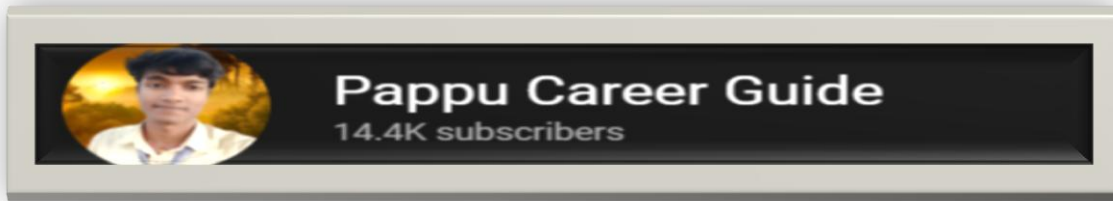
$$\log 3 = 0.477$$

$$\log 9 = \log(3^2) = 2 \log 3 = (2 \times 0.477) = 0.954$$

7. The average of 20 numbers is zero. Of them, at the most, how many may be greater than zero?

A. 0

B. 1



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C. 10

D. 19

Ans: D

Average of 20 numbers = 0.

Sum of 20 numbers = $(0 \times 20) = 0$.

It is quite possible that 19 of these numbers may be positive and if their sum is a, then the 20th number is $(-a)$.

8. A student has gotten the following grades on his tests: 87, 95, 76, and 88. He wants an 85 or better overall. What is the minimum grade he must get on the last test in order to achieve that average?

A. 78

B. 79

C. 80

D. 81

E. 82

Solution:

Use a variable to stand for this unknown value: x. Then computation to find the desired average is:

$$(87 + 95 + 76 + 88 + x) / 5 = 85$$

Multiplying through by 5 and simplifying, I get:

$$87 + 95 + 76 + 88 + x = 425$$

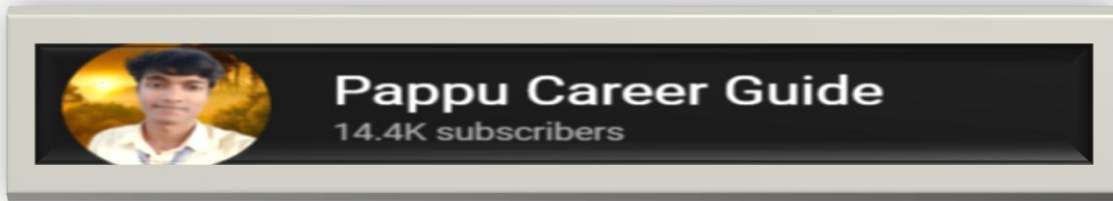
$$346 + x = 425$$

$$x = 79$$

He needs to get at least a 79 on the last test.

IBM Verbal Section Questions

Find the active voice sentence below.



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1. Who is creating this mess?

- A. Who has been created this mess?**
- B. By whom has this mess been created?**
- C. By whom this mess is being created?**
- D. By whom is this mess being created?**

Ans: D

2. Darjeeling grows tea.

- A. Tea is being grown in Darjeeling**
- B. Let the tea be grown in Darjeeling.**
- C. Tea is grown in Darjeeling.**
- D. Tea grows in Darjeeling**

Ans: C

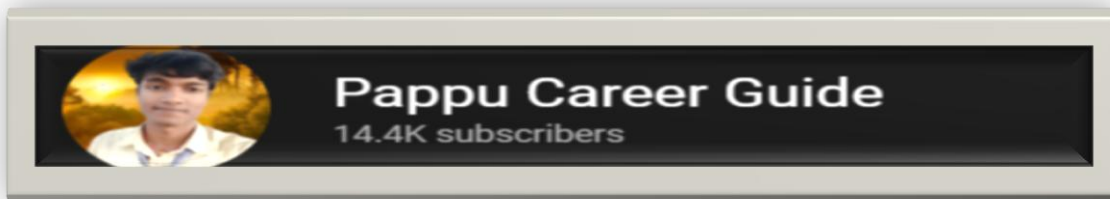
3. The name is Roger Smith, who is also the president. What is the proper salutation?

- A. Dear Mr. Roger Smith**
- B. Dear Mr. Roger**
- C. Dear Mr. Smith**
- D. Dear President Smith**

Ans: C

Types of Number Series

Perfect Square



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A series based on perfect squares is mostly based on perfect squares of numbers in a specific order and usually one of the numbers is missing in this type of series.

Example: 512, 729, 1000, ?

Sol: 83, 93, 103, 113

Arithmetic Series

This is a series in which the following term is obtained by adding / subtracting a constant number from its previous term

Example: 1, 2, 3, 4, ?

Ans. 5

Geometric Series

It is based on either descending or ascending order of numbers and each successive number is obtained by dividing or multiplying the previous number by a specific number.

Example: 4, 36, 324, 2916?

Sol: $4 \times 9 = 36$, $36 \times 9 = 324$, $324 \times 9 = 2916$, $2916 \times 9 = 26244$.

Two-Step Arithmetic Series

In a two-step arithmetic series, the differences in consecutive numbers themselves form an arithmetic series.

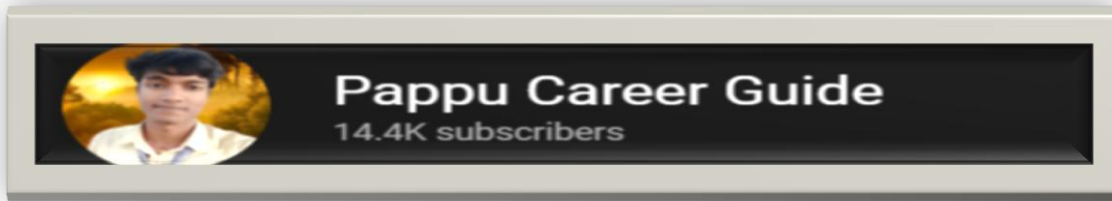
Example: 1, 3, 6, 10, 15.....

Sol: $3 - 1 = 2$, $6 - 3 = 3$, $10 - 6 = 4$, $15 - 10 = 5$

Now, we get an arithmetic sequence 2, 3, 4, 5

Arithmetic-Geometric Series

As the name suggests, the Arithmetic-Geometric series is formed of a particular combination of Arithmetic and Geometric series. An important property of the Arithmetic-Geometric series is that the differences between the consecutive terms are expressed in a geometric sequence.



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Example: 1, 4, 8, 11, 22, 25, ?

Sol: Series Type +3, X2 (i.e Arithmetic and Geometric Mixing)

$1 + 3 = 4$, $4 \times 2 = 8$, $8 + 3 = 11$, $11 \times 2 = 22$, $22 + 3 = 25$, $25 \times 2 = 50$

Twin/Alternate Series

As the name of the series indicates, this type of series can consist of two series combined into a single series. Alternate terms in this series may constitute an independent series in itself.

Example: 3, 4, 8, 10, 13, 16 ? ?

Sol: As we can see, there are two series formed

Series 1: 3, 8, 13 with a common difference of 5

Series 2: 4, 10, 16 with a common difference of 6

So, the next two terms of the series should be 18 & 22 respectively.

IBM Number Series Questions

Try IBM's free Number Series Questions. The questions will be based on the logic building, general aptitude and mind puzzles. IBM Number Series Questions should be attempted laying emphasis on getting shortlisted by IBM

(1) 1, 3, 4, 5, 13, 2, 3, 4, 22, 1, 2, 3, ?

Solution - $\rightarrow 1 + 3 + 4 + 5 = 13$, $13 + 2 + 3 + 4 = 22$, $22 + 1 + 2 + 3 = 28$

(2) 48, 24, 35, 7, 16, 8, 75, 15, 80, ?

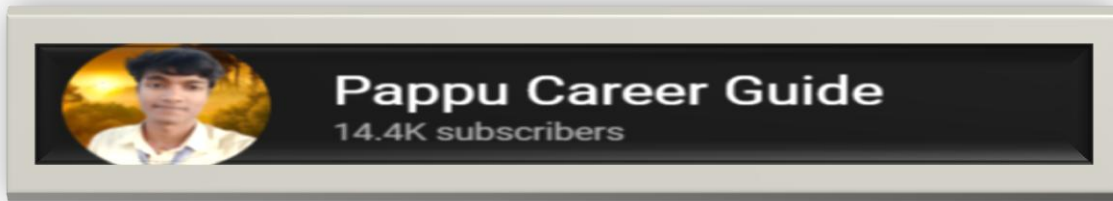
Solution - $\rightarrow 48/2 = 24$ $35/5 = 7$

$16/2 = 8$ $75/5 = 15$

$80/2 = 40$

(3) 5, 10, 9, 3, 6, 5, 4, 8, 7, 7, ?

Solution - $\rightarrow 5 \times 2 = 10$ $10 - 1 = 9$



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$$3 \times 2 = 6 \quad 6 - 1 = 5$$

$$4 \times 2 = 8 \quad 8 - 1 = 7$$

$$7 \times 2 = 14$$

(4) 7, 4, 6, 3, 4.5, 1.5, 2.25, - 0.75, ?

Solution - $\rightarrow 7 - 3 = 4; 4 \times (3/2) = 6;$

$$6 - 3 = 3; 3 \times (3/2) = 4.5;$$

$$4.5 - 3 = 1.5; 1.5 \times (3/2) = 2.25;$$

$$2.25 - 3 = - 0.75; - 0.75 \times (3/2) = - 1.125$$

(5) 1/4, 1/4, 1/2, 3/2, 6, ?

Solution - $\rightarrow 1/4 \times 1 = 1/4, 1/4 \times 2 = 1/2, 1/2 \times 3 = 3/2, 3/2 \times 4 = 6, 6 \times 5 = 30$ Ans

(6) 49, 7, 98, 16, 4, 48, 9, 3, 36, 25, 5, ?

Solution - $\rightarrow 7^2, 7, 49 \times 2$

$$4^2, 4, 16 \times 3$$

$$3^2, 3, 9 \times 4$$

$$5^2, 5, 25 \times 5 = 125$$

(7) 507, 169, 248, 62, 36, 12, 168, 42, 168, ?

Solution - $\rightarrow 169 \times 3, 169, 62 \times 4, 62,$

$$12 \times 3, 12 \quad 42 \times 4, 42$$

$$56 \times 3 = 168 \text{ So } 56 \text{ is Ans}$$

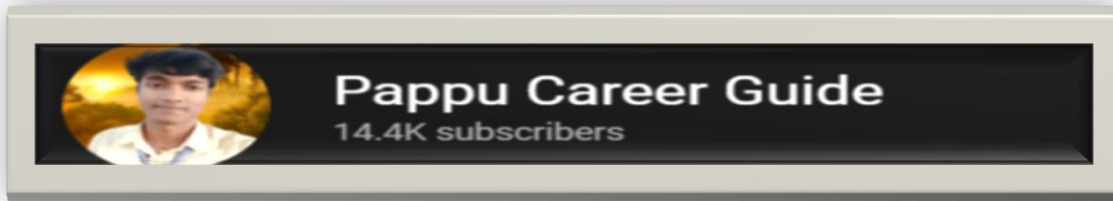
(8) 1, 3, 1, 2.5, 5, 1, 4, 5, 4, 8, 7, ?

Solution - $\rightarrow 1 + 3 + 1 = 5 \quad 5/2 = 2.5$

$$5 + 1 + 4 = 10 \quad 10/2 = 5$$

$$4 + 8 + 7 = 19 \quad 19/2 = 9.5$$

(9) 13, 24, 36, 23, 34, 56, ?



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Solution - $> 13, 23, 33, 24, 34, 36, 56$

(10) 7, 0, 1, 8, 5, 12, 9, 26, 3, 23, 2, ?

Solution - > 28

(11) 2, 3, 10, 15, 26, ?

Solution - $> 1 \times 1 + 1 = 2, 2 \times 2 - 1 = 3, 3 \times 3 + 1 = 10, 4 \times 4 - 1 = 15, 5 \times 5 + 1 = 26, 6 \times 6 - 1 = 35$
Ans

(12) 0.03, 0.0018, 0.00108, 0.00648, 0.3888, ?

Solution - $>$ Multiply by 0.06, 0.6, 6, 60, 600

Ans 233.28

(13) 4, 11, 66, 74, 370, 379, ?

Solution - $> 4, 11, 11 \times 6, 74, 74 \times 5, 379, 379 \times 4 = 1516$ Ans

(14) 7, 9, 11, 6, 11, 8, 5, 13, 5, 4, 15, ?

Solution - > 3 series 7, 6, 5, 4

9, 11, 13, 15, 11, 8, 5, 2 (Ans)

(15) 2, 1, 2, 3, 2, 9, 9, 0, 1, 1, 9, ?

Solution - $> 2^1 = 2, 3^2 = 9, 9^0 = 1, 1^9 = 1$

(16) 2, 7, 36, 4, 14, 225, 6, 21, ?

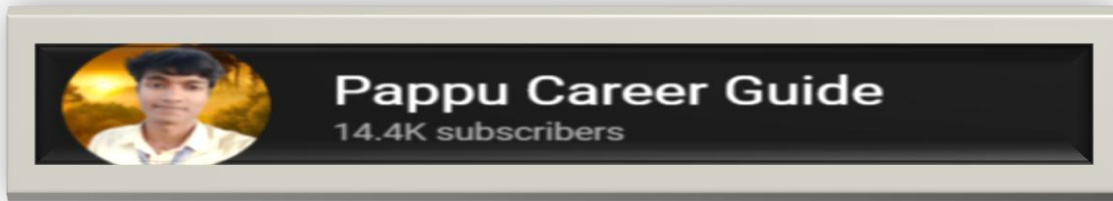
Solution - $> 2 + 7 = 9, (9 - 3)^2 = 36$

$4 + 14 = 18, (18 - 3)^2 = 225$

$6 + 21 = 27, (27 - 3)^2 = 576$

(17) 7, 4, 6, 3, 4.5, 1.5, 2.25, - 0.75, ?

Sol. - 1.125



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$$7 - 4 = 3$$

$$4 \times 3/2 = 6$$

$$6 - 3 = 3$$

$$3 \times 3/2 = 4.5$$

$$4.5 - 1.5 = 3$$

$$1.5 \times 3/2 = 2.25$$

$$2.25 - (-0.75) = 3$$

$$-0.75 \times 3/2 = -1.125$$

(18) 11, 15, 23, , 29, 71, ?

Sol. one solution may be like :

$$11 \times 2 + 1 = 23$$

$$15 \times 2 - 1 = 29$$

$$23 \times 3 + 2 = 71$$

$$29 \times 3 - 2 = 85 \text{ (ans)}$$

(19) 22, 99, 34, 21, 10, 31, 18, 104, 28, 13 ?

Sol. There should be 101 in place of 10 in the given series.

Hence the series is like 22, 99, 34, 21, 101, 31, 18, 104, 28, 13, ?

On dividing into three sub series: we will get three types of series which are described below,

(22, 21, 18, 13), (99, 101, 104), (34, 31, 28)

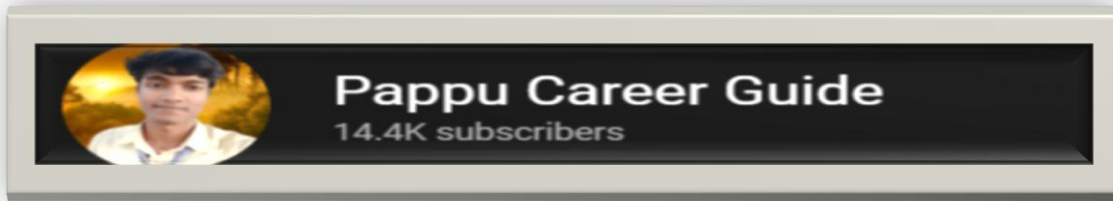
$$22 - 1 = 21, 99 + 2 = 101, 34 - 3 = 31$$

$$21 - 3 = 18, 101 + 3 = 104, 31 - 3 = 28$$

$$18 - 5 = 13, 104 + 4 = 108 \text{ (Ans)}$$

IBM Aptitude Questions

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1. If Rs 20/- is available to pay for typing a research report & typist A produces 42 pages and typist B produces 28 pages. How much should typist A receive?

- A) 12
- B) 15
- C) 20
- D) 16

Ans: Rs 12

Exp:

Ratio of A & B is $42:28 = 3:2$

Then A receive = $20 \times \frac{3}{5} = 12$

2. A man reaches his office two hours late travelling at 50 km/hr. if he increases his speed to 60km/hr, he is late by 1 hour. find the distance he has to travel to reach his office and speed required to reach the office in time

- A) 310
- B) 300
- C) 200
- D) 205

Ans. let distance be d km & time reqd be t hour then

$$d/50 = (t + 2)$$

$$d/60 = (t + 1)$$

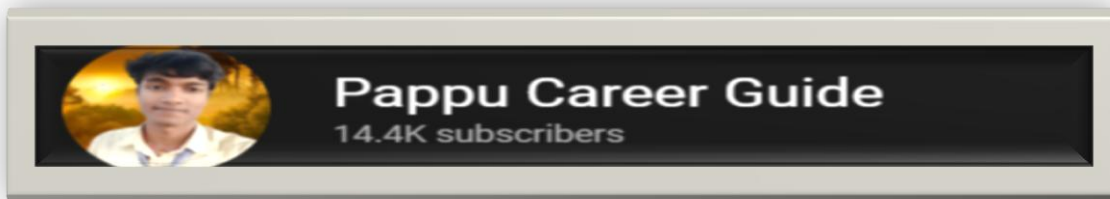
$$\Rightarrow 50(t + 2) = 60(t + 1)$$

$$\Rightarrow 5t + 10 = 6t + 6$$

$$\Rightarrow t = 4$$

$$\text{put } t = 4 \text{ in eqn } d/50 = (t + 2) \Rightarrow d = 50(4 + 2) = 300$$

$$d = 300 \text{ km \& } t = 4 \text{ hour}$$



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3. In a simultaneous throw of two dice, what is the probability of getting a total of 10 or 11?

- A. $1/4$
- B. $1/6$
- C. $7/12$
- D. $5/36$

Ans. two dice are thrown the outcomes are $6^2 = 36$ ways
getting of a total 10 or 11 are (4,6), (5,5), (5,6) (6,4), (6,5)
i.e., 5 ways
so the probability of getting a total of 10 or 11 is $= 5/36$
option 4 is the answer

4. The printed price on a book is 400, a bookseller offers a 10% discount on it. If he still earns a profit of 12%, the CP of the book is

- a) 280
- b) 352
- c) 360
- d) 300

Ans. S.P = 360 Rs.

If Profit = 12% then $1.12 \times \text{C.P} = \text{S.P}$

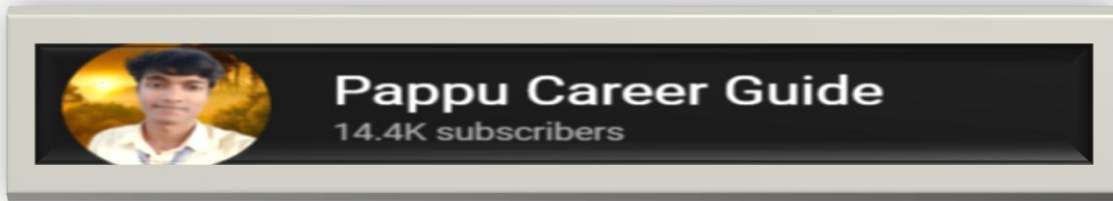
$1.12 \times \text{C.P} = 360$

C.P = 321.43 Rs.

And If Profit = 12 Rs. then C.P = 348 Rs.

As there is ambiguity in the question.

5. Printer A prints 8192 characters per min and printer B prints 13862 characters per min four characters are equal to one word. Printer A starts at 7:15 am while Printer B starts at 7:29 am then at what time both will have same no of words printed.



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- A) 7:43 AM
- B) 7:47 AM
- C) 7:48 AM
- D) 7:49 AM

Ans. four character are equal to one word"

$$8192/4 \times (t+14) = 13862/4 \times t$$

$8192 \times (t+14) = 13862 \times t$ yields the same result

$$t = 20.2272 \text{ minutes} = \text{about } 20 \text{ min } 14 \text{ sec}$$

7:49:14 am

6. 10 men and 15 women together can complete a work in 6 days. It takes 100 days for one man alone to complete the same work. How many days will be required for one woman alone to complete the same work?

- A. 90
- B. 145
- C. 150
- D. 225

Ans. 1 man's 1-day work = $1/100$

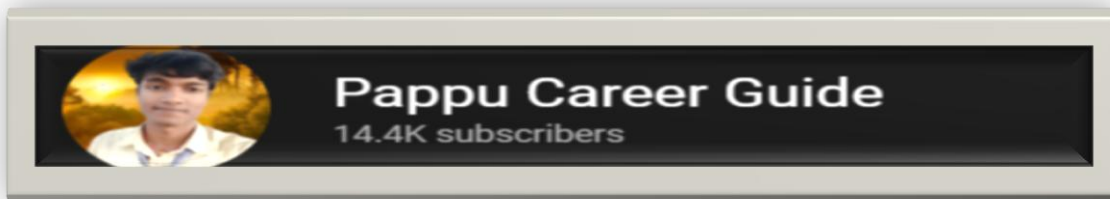
let 1 woman's 1-day work = $1/x$

so

$$(1/10) + (15/x) = (1/6)$$

$$x = 225$$

7. If a salesman's average is a new order every other week, he will break the office record of the year. However, after 28 weeks, he is six orders behind schedule. In what proportion of the remaining weeks does he have to obtain a new order to break the record?



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- A. $1/2$
- B. $1/4$
- C. $3/2$
- D. $3/4$

Ans. Number of weeks in a year = 52

Total orders in a year = $52/2 = 26$ (Because every other weeks means, alternate)

so after 28 weeks no. of orders should be $28/2 = 14$

Originally completed orders in 28 weeks = $14 - 6 = 8$ orders (Because 6 orders behind)

next 24 (52- 28) weeks, orders needed to collect = $26 - 8 = 18$

So, required proportion for remaining weeks = $18/24 = 3/4$

8. If 19 and 1140 are the respective HCF and LCM of two numbers, which are greater than 19 then what will be the possible number of such pair?

- A. 90
- B. 60
- C. 30
- D. 10

Ans. Product of HCF and LCM = product of the numbers

Then, product of the numbers = 19×1140

Let $19a$ and $19b$ be the numbers.

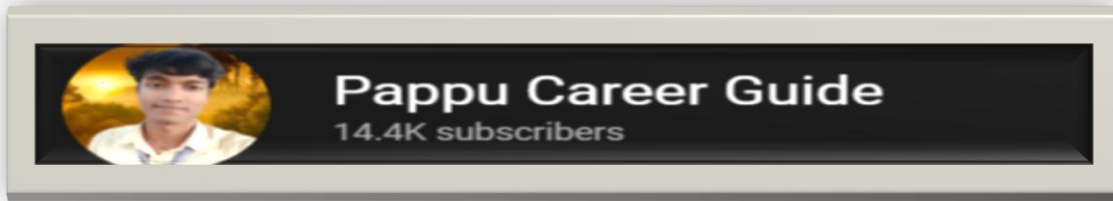
$$19a \times 19b = 19 \times 1140$$

$$ab = 19 \times 1140 / 19 \times 19 = 60$$

If $ab = 60$ then $(a,b) = (1,60), (2,30), (3,20), (4,15), (5,12)$ and $(6,10)$.

Since a and b are co-primes then $(a,b) = (1,60), (4,15)$ and $(5,12)$

Hence the number of such pairs = 3



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9. Foreign language broadcast records last 90Mins on each of two sides if it takes 5hrs to translate one hour of broadcast how long will it take to translate 16 full records?

- a)256
- b)26
- c)48
- d)144
- e)188

Ans. Foreign language broadcast records last 90 Mins on each of two sides.

so total 3 hr recording in 1 full record.

so 48 hr recording in 16 full records.

it takes 5 hrs to translate one hour of the broadcast

so it will take $48 \times 5 = 240$ hrs to translate 16 full records.

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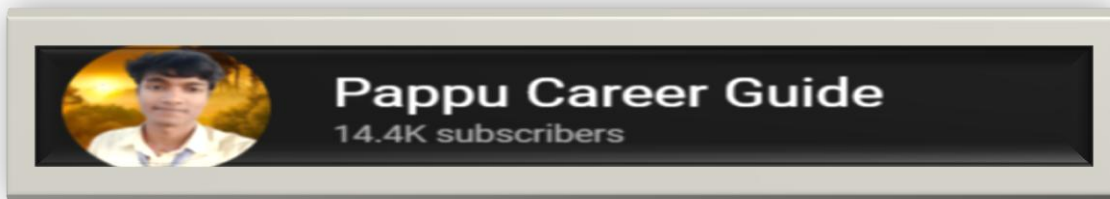
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Ans. let distance be d km & time reqd be t hour then

$$d/50 = (t + 2)$$

$$d/60 = (t + 1)$$

$$\Rightarrow 50(t + 2) = 60(t + 1)$$

$$\Rightarrow 5t + 10 = 6t + 6$$

$$\Rightarrow t = 4$$

$$\text{put } t = 4 \text{ in eqn } d/50 = (t + 2) \Rightarrow d = 50(4 + 2) = 300$$

$$d = 300 \text{ km \& } t = 4 \text{ hour}$$

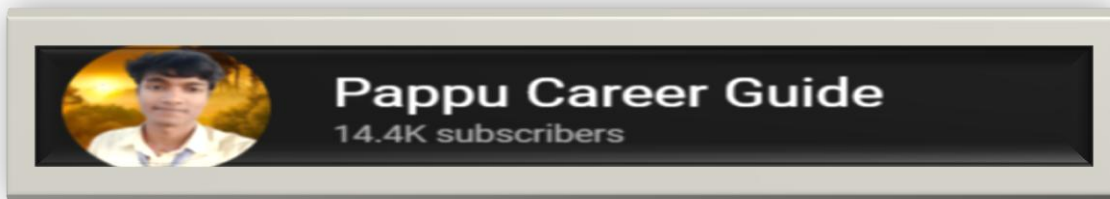
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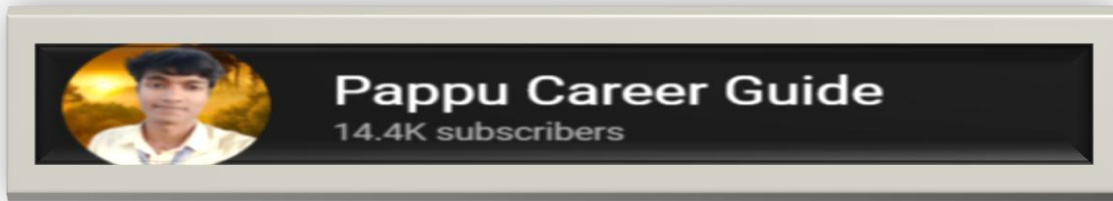
D) 7:49 AM

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so

$$(1/10) + (15/x) = (1/6)$$

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- D. $3/4$**

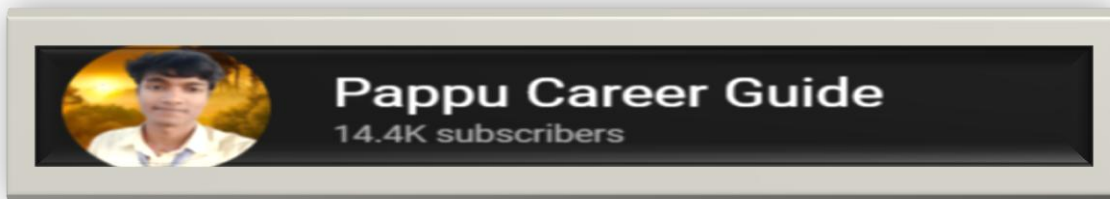
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- B. 60
- C. 30
- D. 10

Ans. Product of HCF and LCM = product of the numbers

Then, product of the numbers = 19×1140

Let $19a$ and $19b$ be the numbers.

$$19a \times 19b = 19 \times 1140$$

$$ab = 19 \times 1140 / 19 \times 19 = 60$$

If $ab = 60$ then $(a,b) = (1,60), (2,30), (3,20), (4,15), (5,12)$ and $(6,10)$.

Since a and b are co-primes then $(a,b) = (1,60), (4,15)$ and $(5,12)$

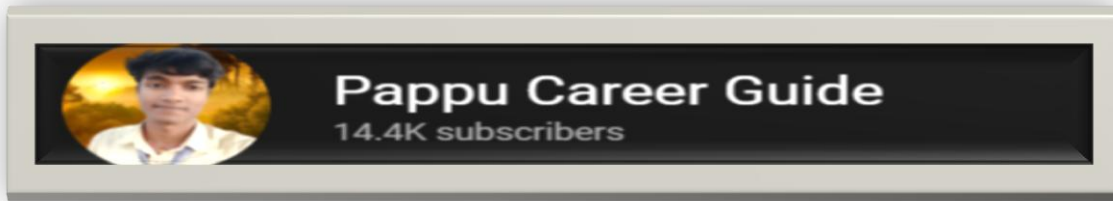
Hence the number of such pairs = 3

9. Foreign language broadcast records last 90Mins on each of two sides if it takes 5hrs to translate one hour of broadcast how long will it take to translate 16 full records?

- a)256
- b)26
- c)48
- d)144
- e)188

Ans. Foreign language broadcast records last 90 Mins on each of two sides.

so total 3 hr recording in 1 full record.



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so 48 hr recording in 16 full records.

it takes 5 hrs to translate one hour of the broadcast

so it will take $48 \times 5 = 240$ hrs to translate 16 full records.

IBM Coding Questions and Answers

1. Write a program to find HCF of two numbers by without using recursion.

Input format:

The first line contains any 2 positive numbers separated by space.

Output format:

Print the HCF of given two numbers.

Sample Input:

70 15

Sample Output:

5



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```
#include<stdio.h>
int gcd(int,int);
int main()
{
    int m,n,ans;
    scanf("%d",&m);
    scanf("%d",&n);
    while(m!=n)
    {
        if(m>n)
        {
            m=m-n;
        }
        else
        {
            n=n-m;
        }
    }
    printf("%d",m);
    return 0;
}
```

Q2. Write a C++ Program to Change Decimal Number to Binary?

```
#include <iostream>
namespace std;

int main()
{
    int a[10], n, i;
    cout<<"Enter the number to convert: ";
    cin>>n;
    for(i=0; n>0; i++)
    {
        a[i]=n%2;
        n= n/2;
    }
    cout<<"Binary of the given number= ";
    for(i=i-1 ;i>=0 ;i--)
    {
        cout<<a[i];
    }
}
```

Q 3.C++ Program to generate Fibonacci Triangle

```
#include
using namespace std;
```



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```
int main()
{
    int a=0,b=1,i,c,n,j;
    cout<<"Enter the limit: ";
    cin>>n;
    for(i=1; i<=n; i++)
    {
        a=0;
        b=1;
        cout<<b<<"\t";
        for(j=1; j<i; j++)
        {
            c=a+b;
            cout<<c<<"\t";
            a=b;
            b=c;
        }
        cout<<"\n";
    }
    return 0;
}
```

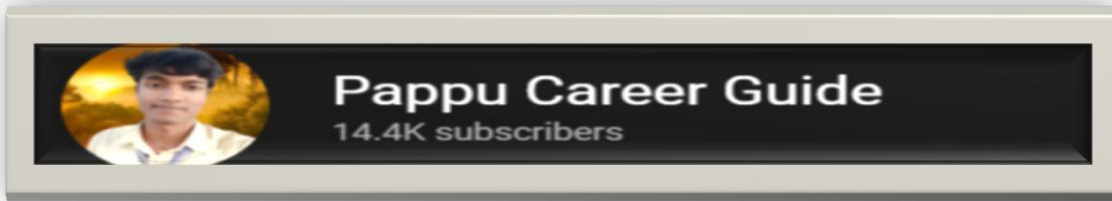
Q 4. What is the Output of the program

```
include
Using namespace std;
int main()
{
    int a=5,b=10,c=15;
    int*arr[]={&a,&b,&c};
    cout<<arr[1];
    return 0;
}
```

- 5
- 10
- 15
- It will print their address of variable b.

Indexing always start from 0 so arr[1] will print second element in the list therefore & stores the addresss of that particular variable so arr[i] will print the address of variable b.

Ans-d



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Q 5. What is the Output of the program

```
include
Using namespace std;
int main()
{
    Char arr[20];
    int i;
    for(i=0;i<10;i++)
        *(arr+i)=65 +1;
        *(arr+i)=0;
    cout<<arr;
    return(o);
}
```

- ABCDEFGHIJ
- AAAAAAAAAA
- JJJJJJJJ
- None of the above

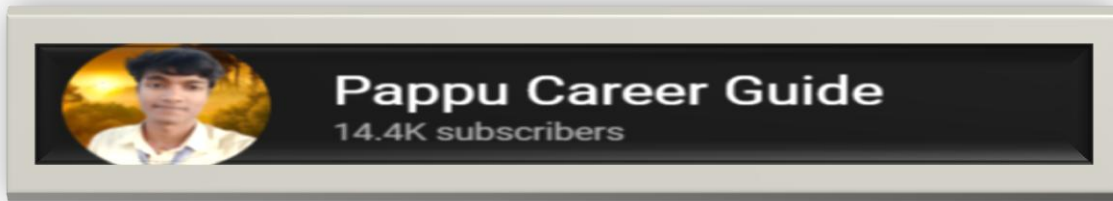
Solution: -A

Q 6. What is the Output of the program

```
#include
Using namespace std;
int main()
{
    char*ptr;
    Char Str[]="abcdefg";
    ptr=Str;
    ptr+=5;
    cout<<ptr;
    return 0;
}
```

- fg
- cdef
- defg
- abcd

Solution: -B



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Most FAQ in IBM Programming Question for Freshers

1. Write a program to find HCF of two numbers by without using recursion.

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Output format:

Print the HCF of given two numbers.

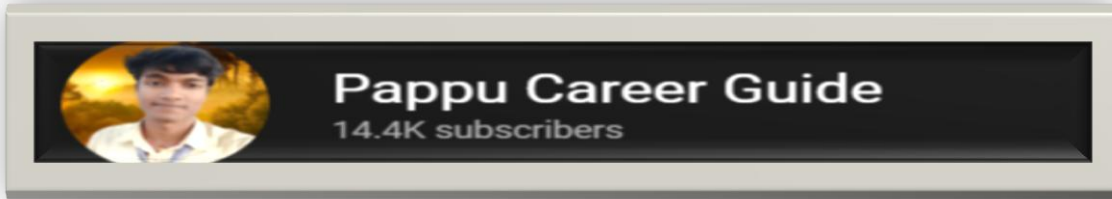
Sample Input:

70 15

Sample Output:

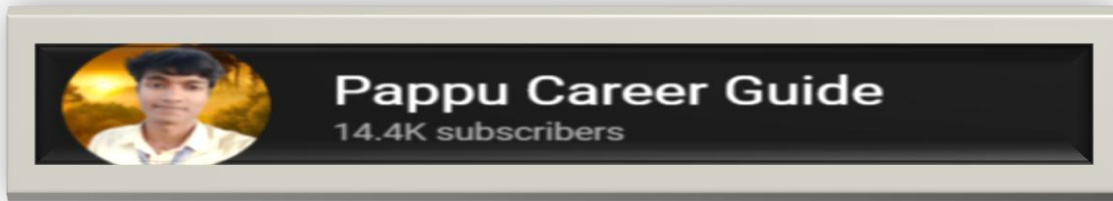
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Sample Questions	Answer
Solution code	<pre>#include<stdio.h> int gcd(int,int); int main() { int m,n,ans; scanf("%d",&m); scanf("%d",&n); while(m!=n) { if(m>n)</pre>



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	<pre>{ m=m-n; } else { n=n-m; } } printf("%d",m); return 0; }</pre>
Solution Explanation	<pre>int m,n; //declare required variables scanf("%d",&m); //scan the inputs scanf("%d",&n); while(m!=n) //check the condition { if(m>n) //if it is satisfied { m=m-n; //update m value</pre>



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	<pre>} else { n=n-m; //otherwise n value } } printf("%d",m); //print it</pre>
--	---

2. Write a C program to find the sum of A.P(Arithmetic Progression) series

Input Format:

- The first line contains the first term of the A.P series.
- The second line contains a total number of terms in A.P series
- The third line contains the common difference of A.P series.

Output Format:

- Sum of the A.P series.

Sample Input:

1

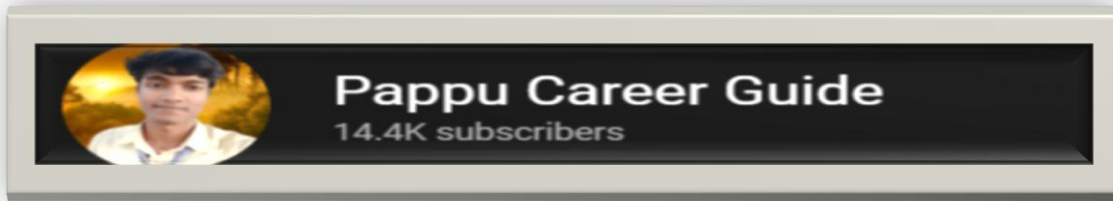
5

2

Sample Output:

25

3. Write a program to calculate the standard deviation.



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Input format:

N(Number of Integers)

N Integers

Output format:

The standard deviation of the given integer.

sample input:

10

1 2 3 4 5 6 7 8 9 10

Sample output:

2.87

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