**Logical Cryptarithmetic I : 1**

1) Replace each letter by a digit. Each letter must be represented

by the same digit and no beginning letter of a word can be 0.

O N E

O N E

O N E

+O N E

-------

T E N

|  |
| --- |
|  |
| 1)7,2,9 |
| 2)4,2,8 |
| 3)7,2,8 |
|  |  |

4) 5,3,8

Answer: 3)7, 2,8

**Explanation:**

E=2

N=8

O=1

T=7182

182

182

+ 182

—–

728

2) Given:

If P O I N T

+ Z E R O

--------------

E N E R G Y

Find the value of E + N + E + R + G + Y.

A) 11

B) 14

C) 13

D) 17

Answer: 17

**Explanation:**

firstly assume E=1,then it will look like this-Z1RO+POINT=1N1RGY

so obviously P=9 because 9+1=10 and

here we get N=0, Z1RO+9OI0T=101RGY

Z+O=1,Z=3,O=8,3+8=11,31R8+98I0T=101RGY,

8+T=Y,8+4=12 carry=1,31R8+98I04=101RG2

so its obvious R=6, 3168+98I04=1018G2

its obvious I=5,3168+98504=101672

so E+N+R+G+Y=1+0+1+6+7+2=17

3) T O M

+ N A G

----------

G O A T

----------

If M=6, what is the value of G + O + N + T?

A)11

B)13

C)16

D)17

Answer: A)11

**Explanation:**

T=8, O=0, M=7,N=2,A=5,G=1

G+O+N+T = 11

4) If HOW + MUCH = POWER, then what is the value of P + O + W + E + R?

1)10

2)11

3)12

4)13

Answer:3) 12

**Explanation**:

HOW+MUCH=Power

o=0,p=1,r=2,c=3,e=4,w=5,h=7,u=8,m=9

so 1+0+5+4+2=12

5)If USA + USSR = PEACE, then what is the value of P + E + A + C + E =?

1)8

2)10

3)11

4)15

Answer:2)10

**Explanation**:

E=0,P=1,A=2,S=3,C=7,R=8,U=9

USA=932

USSR=9338

PEACE=10270

1+0+2+7+0=10

6)If RIDE + DRIVE = NEVER. What is the value of R + I + D + E?

(Given that value of E is 3)

A)23

B)24

C)22

D)25

Answer:B)24

7) YOUR+YOU=HEART,

The value of O=4. Find the value of Y+U+R+E?

A)15

B)16

C)17

D)19

Answer:c)17

**Explanation:**

y=9,E=0,H=1,O=4,A=3,R=6,U=2, T=8y+u+r+e=17

8)HERE = COMES – SHE, (Assume s = 8)

Find value of R + H + O

A)15

B)14

C)10

D)11

Answer:B)14

**Explanation:**

HERE=COMES-SHE\*HERE

+ SHE

————

COMES

————

E+E=S=8 => E=4

3digit no. + 4digit no. = 5 digit no.

=> C = 1 ,O = 0, H = 9 etc9454 + 894 = 1034810348

– 894

——–

9454

——-

R+H+O = 5+9+0 = 14

9) HOW + MUCH = POWER Then P + O + W + E + R =?

A)10

B)11

C)13

D)12

Answer:D)12

**Explanation:**

705

+9837

——

10542

so P+O+W+E+R =1+0+5+4+2=12

10)GOOD is coded as 164 then BAD coded as if ugly coded as 260 then JUMP?

A)230

B)240

C)235

D)236

Answer:B)240

**Explanation:**

GOOD=(7+15+15+4)\*4=164

BAD= (2+1+4)\*3=21

UGLY= (21+7+12+25)\*4=260

coding follows

(sum of position of alphabets)\*(no. of letters in

the given word)

so,

JUMP=(10+21+13+16)\*4= 240

11)If AA + BB = ABC, then what is the value of A+B+C= ?

A)15

B)18

C)21

D)12

Answer:B)18

**Explanation:**

A AB B +C C———–A B C————The digits are distinct and positive.

Let’s first focus on the value A,

when we add three 2 digit numbers

the most you get is in the 200’s

(ex: AA + BB + CC = ABC à 99 + 88 + 77 = 264).

From this, we can tell that the largest value of A

can be 2. So Either A = 1 or A = 2.Now focus on value B, let’s take the

unit digit of the given question:

A + B +C = C (units).

This can happen only

if A + B = 0 (in the units) a A and B add up to 10.Two possibilities: 11 + 99 + CC = 19C a (1)

or 22 + 88 + CC = 28C a (2)Take equation (2), 110 + CC = 28CFocus on ten’s place, 1 + C = 8,

here C = 7. Then 22 + 88 + 77 = 187Thus, Equation (2) is not possible.From Equation (1),

11+99+CC = 19C a 110 + CC =19C a 1 + C = 9,

then C = 8.11 + 99 + 88 = 198 à hence solved

A = 1, B = 9 and C = 8A + B + C = 18

12)N O + G U N + N O = H U N T, find the value of HUNT.

A)1082

B)1802

C)1208

D)1280

Answers:A)1082

**Explanation:**

N O

+ G U NN O

————-

H U N T

————-Here H = 1, from the NUNN column

we must have “carry 1,” so G = 9, U = zero.

Since we have “carry” zero or 1 or 2

from the ONOT column, correspondingly

we have N + U = 10 or 9 or 8.

But duplication is not allowed,

so N = 8 with “carry 2” from ONOT.

Hence, O + O = T + 20 – 8 = T + 12.

Testing for T = 2, 4 or 6,

we find only T = 2 acceptable, O = 7.

So we have 87 + 908 + 87 = 1082.

13)MAC + MAAR = JOCKO, find the value of 3A + 2M + 2C.

A)31

B)36

C)38

D)33

Answers:A)31

**Explanation:**

M A C

+ M A A R

——————

J O C K O

——————Here J is carry, J=1 when J=1, O=0

with carry 1 and M=9 C+R=O a 0 with carry 1.

So, C=2 and R=8 M+A=C a 2 with carry 1,

A=3, A+A+1= K, 3+3+1=K=7,

932+9338=10270 so,

finally A = 3, M = 9, C = 2,

= 3A + 2M + 2C = 9 + 18 + 4 = 31

14)If “EAT + THAT = APPLE”, what is the sum of A+P+P+L+E?

A)13

B)14

C)15

D)12

Answers:D)12

**Explanation:**

E A T

+ T H A T

——————

A P P L E

——————From the given data,

the value of A will be 1 because

it is the only carry-over possible from

the sum of 2 single digit number.

T maximum it can take only 9 and

there should a carryover for T to give sum as 2 digit number. So T =9, P = 0, A = 1.

T + T = 18,

the value of E is 8 and 1

will be a carry over to the next column.

That is 1 + A + A= L = 3. And finally H = 2.

Hence, 819 + 9219 = 10038.

A+P+P+L=E = 1+0+0+3+8 = 12.

15)FORTY + TEN + TEN = SIXTY, find the value of T+E+N.

A)11

B)22

C)31

D)24

Answer:B)22

**Explanation:**

F O R T YT E N+ T E N—————————-S I X T YFrom the rightmost column i.e. Y + N + N = Y,

which means N =0.

And the next column T + E + E = T

here T cannot be zero but E + E if it gives

the sum of ten then 10 + T will give

the unit digit as T. So 2E = 10, E = 5.The letter O should have

a carry to give the value I i.e. O + carry = I,

and in turn the I value should be

a two-digit number because

the left most column needs a carry

(F + carry = S) to get the value S.The sum of O + carry = I,

where I should be a two digit number.

In order to get I as 2 digit number

O has to take the maximum value 9,

and let the carry be 1 (9 + 1 = 10)

here the unit digit is I,

but I cannot take the value 0

because zero is already assigned to N.

So, let’s keep the carry as 2, 9 + 2 = 11

then unit digit 1 is the value of I,

and one’s digit will be a carry for

the next column i.e. F (F + 1 = S).Next, R + T + T + carry = X

(here the sum of these three numbers

should give you the value in

the range of twenty’s because 2

has been taken as a carry to the next column).

So R and T should be taken

the maximum value in order to get

a number in the range of twenty’s.Let R = 7 and T = 8, R + T + T + carry = = 7 + 8 + 8 +1 = 24. Then, T + E + E = T (two digit number) –> 8 + 5 + 5= 18.The values: O=9, T=8, R =7, E=5, X=4, I=1 and the left out numbers are 6, 3, 2. We know F + 1 = S i.e. F and S will take 2 and 3, and at last, the Y will take 6.The value of S +I +X +T + Y = 3 + 1 + 4 + 8 + 6 = 22

16)If Ever + Since = Darwin then D + a + r + w + i + n is ?

A)20

B)21

C)22

D)23

Answer: D)23

**Explanation:**

……5 6 5 3

……E V E R

…9 7 8 2 5

+ S I N C E

———————-

D A R W I N

1 0 3 4 7 8Hence D+A+R+W+I+N = 1+0+3+4+7+8 =23

17)USA + USSR = PEACE ; P + E + A + C + E = ?

A)10

B)11

C)12

D)13

Answers: A)10

Explanation:

usa=>932

ussr=>9338

peace=>10270

p+e+a+c+e=10

18)If POINT + ZERO = ENERGY, then E + N + E + R + G + Y = ?

A)15

B)16

C)17

D)18

Answers: C)17

**Explanation:**

zero+point=energy

3168+98504=101672ie e+n+e+r+g+y= 17

19) SEND + MORE = Then what is the value of M + O + N + E+ Y ?

A)13

B)14

C)15

D)16

Answers: B)14

**Explanation:**

SEND 9567

MORE 1085

—– —–

MONEY 10652

SO M+O+N+E+Y =1+0+6+5+2=14

20)COCA + COTA = OASIS each letter consist uniqe digit(0-9)

then find S+O+T+I+C+A

A)27

B)28

C)26

D)29

Answer: C)26

**Explanation:**

0 C O C A

+0 C O T A

\_\_\_\_\_\_\_\_\_\_\_\_\_\_

O A S I S

Write down and after assigning values to

the letters, cross it

for your convenience 0 1 2 3 4 5 6 7 8 9ALWAYS start from the LEFT side.

1. Since 0 + 0 + carry 1 gives O, so O is 1.

2. O + O = 1 + 1 = 2 (with no carry) which is S.

So, S =2.

3. C + C should give A plus 1 carry

forward to get O =1.

But we know that A + A = S = 2.

That means, A = 6. ( 6 + 6 = 12

(2 plus 1 carry forward to C + T) )

4. As we have got A = 6,

so now C + C = A = 16.

That means, C = 8.

5. C + T should be such

that NO CARRY will be there. C = 8,

and from immediate right column

we got a carry 1. So 8 + 1 + T = I with no carry.

Thus, we can say max limit is 9 which

makes T =0 and I = 9.Thus, 8 1 8 6

+ 8 1 0 6

\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1 6 2 9 2 Ans: S + O + T + I + C + A = 2 + 1 + 0 + 9 + 8 + 6 = 26

21) no+no+too=late if e=2 value of o+l+e

A)6

B)5

C)7

D)8

Answer:C)7

**Explanation:**

no

no

too

\_\_\_\_

late here e=2 so o+o+o=12 on satisfying e=2 by taking o=4 ,if we take n=7

then

n+n+o(add carry also)=19 .

by this we get t=9 then t+(add carry)=10,so a=0,l=1

o+l+e=4+1+2=7i.e;

n final ans is n(i.e;=7)Alter Explanation –

n o

n o

t o o

————

l a t ehere they give e=2.

o+o+o=2 so the number which will give 2 as a unit digit when add it 3 times is 4.so here carry 1 will come. The carry is l for a 3 digit number carry maybe 2 or 1 but here before t only one digit is there.so carry might be 1 i.e l=1,t=9 and a=0.

then for 2 nd column 1+4+n+n=9 and carry one. so n must be 7.7 4

7 4

9 4 4

——————–

1 0 9 2

22)GO+TO=OUT, O+U+T=?

A)5

B)3

C)2

D)4

Answers: B)3

**Explanation**:

Basically you start with a few assumptions:

1. Each letter is a number from 0 to 9.

2. Each number can only be assigned to one of the letters.

We know that O+O=T and T has to be less than 10, therefore O can be a number from 0 to 4.

G+T cannot be over 20 (as the max. number possible in an addition is 9+9=18 plus any carry over from a previous sum (which at the most can be 1) and therefore O can only be 0 and 1.

If O is 0 then T is also 0 and one of our assumptions is broken so O equals 1 and T equals double that (2).

So GO+TO=G1+21=OUT=1U2, G+T=OU so G has to be 8 or 9, if G=9 then U would be 1 and that breaks our second assumptions so G=8 and U=0.

At the O+U+T=1+0+2=3Alter Explanation –a algorithm in artificial intelligence for such questions. in such questions we have to assign a number btw 0-9 to character in given equation.and once the number is assigned to any character then it can not be assigned to any other character. for example , we are given :-

G O

+ T O

=O U T

if we consisder this as simple addition then we can see that O+O gives T. lets assign 1 to O. this means value of T will be O(1)+O(1)=T(2). now value of T is 2. now if we move further then we see that G +T = U. now we know value of T is 2. so, we have to assign a number to G such that adding value of T and G gives us carry as 1 so that value of O remains 1. so if we assign 8 to G then G(8)+T(2)=U(10) which means we get value of U as 0 and 1 goes over O as carry and value of is balanced.basicallly, we have to maintain the value of character once assigned and should assign the value to other characters such that values of previously assigned charcter is not changed.

so, ans of this ques is 1+0+2= 3.Alter Explanation –Clearly, O = 1., as it is the carry generated by G + T. a number cannot start from 0 in cryptarithmetic addition.2) Since O = 1, O + O = 1 + 1 =2. So, T = 2.3) G + 2 = 10 + U.If G = 9, U = 1. Which is not valid since O = 1.So, G = 8 and U = 0.Hence, O + U + T = 1 + 0 + 2 = 3

23)If E A T + T H A T = A P P L E, what is the value of A+T+L?

A)12

B)13

C)14

D)15

Answers: B)13

**Explanation:**

A+T+L =13.While preparing for Campus recruitment for Infosys, i encountered similar problems. So i think, i have solved ample questions like this and can solve it.

THAT +EAT = APPLEHow i approach to solve this problem:

A by all means HAVE TO HAVE 1.(because only 1 can be a carry-over in addition of two single digit numbers). [A = 1]Now the Sum is like:

TH1T +E1T = 1PPLET + 1 (carry-over of H+E) = 10 (So, 1 goes as the carry-over to A and 0 is the value of P). [T=9 & P=0]Now the Sum is like:

9H19 +E19 = 100LENow, the last sum makes: [E=8 and L=3 (as E=18 and 1 is carried-over)]Now the Sum is like:

9H19 +819 = 10038Now, the last sum makes: [H=2 (you don’t have any choice)]

All values are like: A=1, E=8, H=2, L=3, P=0, T=9

So, A+T+L = 1+9+3 = 13.Alter Explanation –EAT+THAT=APPLEHERE 3DIGIT+4DIGIT=5DIGITA IS ASSUMED AS 1T IS ASSUMED TO BE GREATEST SINGLE DIGIT NUMBER THAT IS 9step 1:E A T E 1 9

T H A T 9 H 1 9A P P L E =1 P P L Estep 2:after adding known values that is adding 9+9 gives 18 that is e=8 and 1 as carrynow 1 carry+1+1=3 which is the value of LE A T E 1 9T H A T 9 H 1 9A P P L E =1 P P 3 8now we know

A=1

T=9

L = 3SO, A + T + L = 13

24)tin+tin+tin=pipe+pipe where i=4

find the value of tin.

A)940

B)942

C)946

D)944

Answers: B)942

**Explanation:**

The question is what is tin value,from question we get 3n =2e, possibility of (n,e)=(2,3) then 3i=12 which should be equal to 2p assuming p=1…then solving the above equation we gett=9,p=1,n=2,e=3Please comment detailed and better solution, we will pay 100Rs on Paytm. Text us on our Facebook page after commenting down the solution in the comment section to claim your paytm reward.

25)LETS + WAVE = LATER. Let S = 7. Find the value of V\*S\*E.

A)219

B)280

C)358

D)225

Answers: B)280

**Explanation:**

This represents an addition problem. Different letters stand for different digits (chosen from 0, 1, 2, …, 9). Two occurrences of the same letter, such as A, stand for the same digit. The problem is to identify all of the digits.L E T S

+ W A V E

———–

L A T E R1 5 6 7

+ 9 0 8 5

\_\_\_\_\_\_\_\_\_\_

1 0 6 5 2L = 1, A= 0, T = 6, E =5, R =2, S = 7, V = 8, W = 9+ 9085

= 10652\*EDIT\*

cssmith below used the 9 for two letters, S and W. If you could repeat digits, then any solution would work.Steps:

1) The max sum of 2 4-digit nos is 19998

So L = 12) If L = 1, W = 8 or 93) Now the max sum = 1999 + 9999 = 11998

or 1999 + 8999 = 10998

So A = 0 or 1, but since 1 is taken, A = 04) Now if W = 8, the max sum = 1999 + 8099 = 10098

This makes T = 0, but 0 is already taken

So W = 95) Now we have

1ETS +

90VE =

10TER

Clearly T = E + 1, with 1 being the carry over from T+V

T+V = 10 + E

or T+V+1 = 10 + E

Substituting T = E+1

V = 8 or 9

But since 9 is taken, V = 86) This means there is a carry over of 1 from S + E

ie S+E > 10

Looking at the remaining numbers, 7 and 5 is the only combination that gives a new value for R ( = 2)

And since T > E

S = 7, E = 5, T = 6This is the only solution involving distinct digits for each letter.

26) DONALD+GERALD=ROBERT

Given 'D=5' (If not given assume D=5 at initial stage)

What is T\*B

A)16

B)12

C)0

D)8

Answers: C)0

**Explanation:**

6 5 4 3 2 1

D O N A L D

+ G E R A L D

c1 c2 c3 c4 c5

—————————–

R O B E R T1. ‘D=5’ is assumed, so ‘D+D=T’ therefore ‘T=0’ & ‘c5=1’.2. In column 5 ‘O+E=O’ as ‘T=0’ so E cannot be 0, therefore ‘E=9’.

‘O+9=O’ is possible if ‘c2=1’. Therefore ‘c2=1’.

3. In column 3 ‘A+A=9’, but addition of any 2 same number is

always even, given that addition is 9 which is possible when

there is carry. Therefore ‘c4=1’, so ‘A=4’.

4. Remaining numbers to be assigned are {1,2,3,6,7,8} to {O,N,R,B,L,G}.5. We have ‘E=9’ & ‘c2=1’ so from column 5 we get ‘c1=1’. Also from

column2 we have ‘L+L+c5=R’ where ‘c5=1’ therefore R is odd so R can

be 1or3or7. As ‘D+G’ does not generate carry shown in column 6 so R

cannot be 1or3. Therefore ‘R=7’ & ‘G=1’.

6. We have ‘R=7’ so from column 2 we have ‘L+L+1=17’, therefore ‘L=8’.7. From column 3 we get that ‘A+A+c4=E’ and so there is no carry,

therefore ‘c3=0’.

8. From column 4 we get ‘N+R+c3=B’ we have R=7 & ‘c3=0’,

so ‘N+7=10+B’, therefore ‘N=B+3’. {2,3,6} are remaining to be

assigned so to satisfy the constraint ‘N=B+3’ we get ‘B=3’ & ‘N=6’.

9. And remaining ‘O=2’.SOLUTION:5 2 6 4 8 5

+ 1 9 7 4 8 5

————————

7 2 3 9 7 0VALUES:

D=5

O=2

N=6

A=4

L=8

G=1

E=9

R=7

B=3

T=0

27) APPLE+GRAPE = CHERRY. Find the value of C+H+E+R+R+Y.

A)18

B)14

C)16

D)22

Answers: A)18

**Explanation:**

A P P L E

G R A P E

\_\_\_\_\_\_\_\_\_\_\_\_\_\_

C H E R R Y

From column 6, C = 1 since it is the only carry-over possible from the sum of two single digit numbers in column 5.now let A=6,G=9 then H=5In column 1 let E=4, then Y=8 then it becomes:(6) (4)

A P P L E

(9) (6) (4)

G R A P E

\_\_\_\_\_\_\_\_\_\_\_\_\_\_

C H E R R Y

1 5 4 8add P+A….

but let us assume that a carry generates from column 2 so P+6+1=R let us assume P such that R generates a carry because E has to be 4 in column 4 so let P=3…. then the math becomes(6)(3)(3)(4)

A P P L E

(9)(0)(6) (3) (4)

G R A P E

\_\_\_\_\_\_\_\_\_\_\_\_\_\_

C H E R R Y 1 5 4 0 0 8now add L+P such that R=O and generates carry1 P=3 we know… so I=7

(6) (3)(3)(7) (4)

A P P L E

(9)(0)(6) (3) (4)

G R A P E \_\_\_\_\_\_\_\_\_\_\_\_\_\_

C H E R R Y

1 5 4 0 0 8

C + H + E R + R + Y =18

28) TEN + TEN + FORTY = SIXTY. Find the value of S\*I\*X.

A)36

B)10

C)12

D)26

Answers: C)12

**Explanation**:

FORTY

TEN

TEN

—–

SIXTY Then N=5 or 0.If N=5 then T+1+2\*E=T+10\*p, being p=0,1 or 2. 1+2\*E=10\*p, impossible.Then N=0FORTY

TE0

TE0

—–

SIXTY Second column, E=5FORTY

T50

T50

—–

SIXTY S=F+1 ; I=O+1 or I=O+2 and R+2\*T+1=X+10\*p (p=1 or 2)If p=1 then O=9 and I=0, impossible because 0=N.If p=2:

O=9 and I=1. 1+R+2\*T=X+20; R+2\*T=X+19. If T=8,R=6,X=3,not possible.If T=8,R=7,X=4.After F=2 and S=329786

850

850

—–

31486alter solution –A) Y + 2N = Y, –> N = 0

B) T + 2E = 10 + T, –> E = 5

C) 1 + R + 2T must be > 20 becauseW + 2 has to be > 10 in order for their to be a remainder of 1 to add to F in order to get S. After making that observation it is just a matter of trial and error substituting large enough values for T and R to satisfy condition C while making sure that S = F + 1.S\*I\*X = 3\*1\*4 = 12

29)In a cryptarithm, numbers are represented by replacing their

digits by letters; a given letter consistently represents

the same digit and different letters represent different digits.

Leading zeroes are not permitted. Solve the following cryptarithm

with the additional restriction that IDEA is even.

S A M S

I D E A

M A D E

\_\_\_\_\_\_\_\_\_\_\_

S E N S E

A)Check solution

B)Check solution

C)Check solution

D)Check solution

Answers: C)Check solution

**Explanation:**

S A M S

I D E A

M A D E

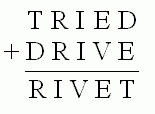
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S E N S E1. The units column shows that S + A = 10. Since S is the leading digit of SENSE and the largest the sum of three digits can be is 27, S must be 1 or 2. But since A must be even, we must have S = 2 and hence A = 8. The smallest SE can be is 20. If there is no “carry digit” from the thousands column, this would force I = M = 9, violating the requirement that distinct letters represent distinct digits. If the carry digit is 1, then {I,M} = {8,9}, but we already know that A = 8 and distinctness is violated again. Therefore our carry digit must be 2, {I,M} = {7,9} and E = 0. Looking at the tens column, there is a carry digit of 1 from the units column which forces M + D = 11. If M = 9, D = 2 and distinctness is violated, so we must have M = 7 (hence I = 9) and D = 4. This is enough to conclude that N = 1. Our solution is therefore2 8 7 2

9 4 0 8

7 8 4 0

30)



Clearly V = 0 (if there is no "carry" from the units' place)

or V = 9 (if there is).

Case 1 (V = 0): We must then have I = 5 and therefore R = 2 or 7.

However if R = 2, then R, T, and E cannot be distinct, so we must

have R = 7. Therefore T + D = 6. But 1 + 5 = 6 results in a duplicated

5, and 3 + 3 = 6 gives a duplicated 3, so the only possibility is 2 + 4 = 6.

If T = 2 and D = 4, we would a carry in the units column, contrary

to our initial assumption. If T = 4 and D = 2, then E = 2 and we

have a repeated 2. Thus this case is impossible.

Case 1 (V = 9): We must have I = 4 and therefor R = 2 or 7.

As in the previous case, R = 2 is excluded, so we must have

R = 7 and T + D = 6. In this case, 1 + 5 = 6 is the only

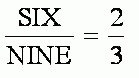
instance in which duplicate digits do not result. We must have

a carry in the first column, hence T = 1, D = 5 and E = 6.

Therefore the solution to the cryptarithm is

Answer:17465 + 57496 = 74961

31)



Answers: SIX = 942 and NINE = 1413.