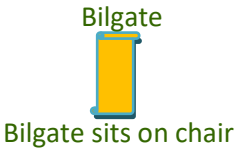
PERMUTATIONS

QUANTITATIVE APTITUDE

A small village, in that village, village people celebrates a function, for this function they invite giant persons.

First time arrange only one chair and invite Bilgate

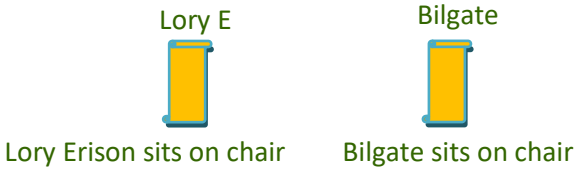
Watch, here is a chair, he sat on the chair.



Next time they arrange two chairs. They invite Bilgate and Lory Erison.

Watch above figure in that figure Bilgate sat left side, and Lory Erison sat right side.

OR

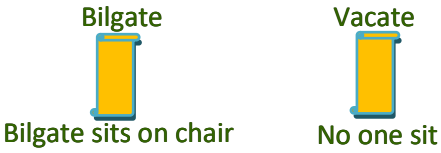


Here Lory Erison sat left side and Bilgate sat right side

What we understand?

First time, only one chair and one person (no options to select other chair)

Second time, two chairs and two persons (so, they can select any chair)



Suppose Bilgate select left chair, Lory Erison must sit on right chair

OR

Suppose Bilgate selected right chair, Lory Erison must sit in left chair

Therefore, the above story tells us way of arrangement.

Here, I am taking one chair and A

A can sit on the chair, this one way.

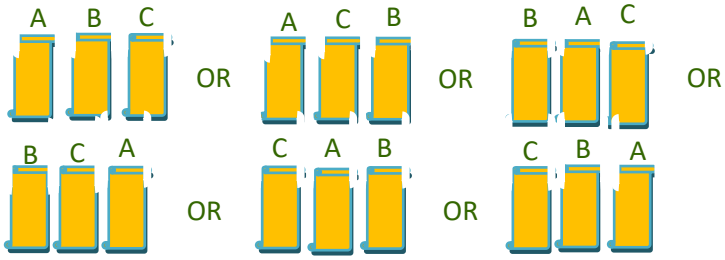
Here, I am taking two chairs and A, B

This is one way of arrange

This is another way of arrange

Here, two ways of arranges are there

Here, I am taking two chairs and A, B, C



Here, six ways of arranges are there

Clearly,

Persons	Arrange	Number of ways
A	A	1
AB	AB / BA	2
ABC	ABC/ACB/ BAC/ BCA/ CAB/CBA	6

PACTORIAL

Pactorial Simbel is '!'

0! = 1

1! = 1

2! = 2x1=2

3! = 3x2x1=6

4! = 4x3x2x1=24

5! = 5x4x3x2x1=120

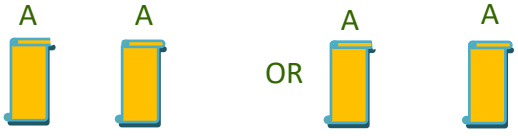
6! = 6x5x4x3x2x1=720

7! = 7x6x5x4x3x2x1=5040

Persons	Number of ways	
A	1!	1
AB	2!	2x1=2
ABC	3!	3x2x1=6
ABCD	4!	4x3x2x1=24
ABCDE	5!	5X4X3X2X1=120
ABCDEF	6!	6X5X4X3X2X1=720

Dupe: One person is similar to another

Person A, his dupe A^1 (A^1=A)



Here, we can't find out who is dupe, who is original.

Here how many persons are there?

Two persons

How many ways we can arrange?

2! Ways. 2x1=2 ways

Above two persons are similar

2! = 2x1 =2

$$\Rightarrow \frac{2!}{2!} = \frac{2x1}{2x1} = 1$$

So, we can arrange 1 way.

Arrange it AAB

Here how many persons are there?

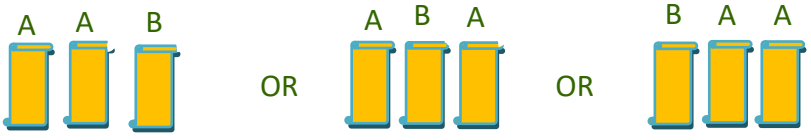
Three, so 3! = 3x2x1 =6 ways

How many persons are similar?

Two (AA)

- ⇨ 3! / 2!
- ⇨ 3x2x1 / 2x1
- ⇨ 3 ways, we can arrange.

Explain with Figures



Questions

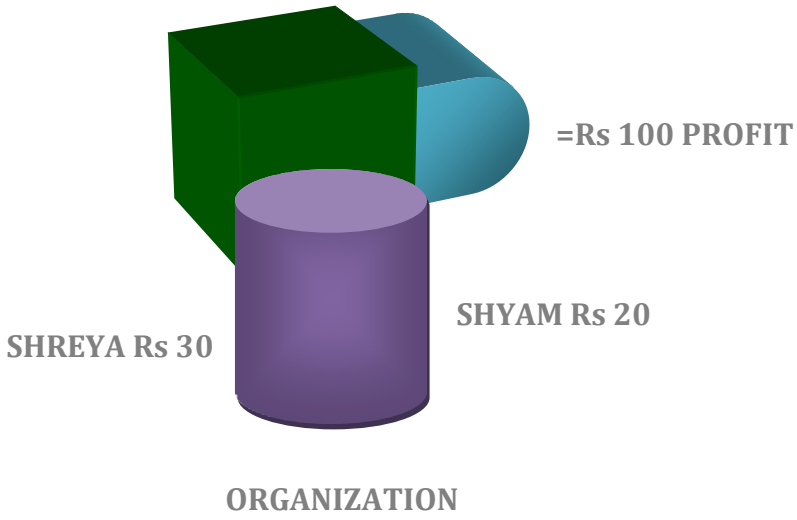
1. BLUE, how many ways can we arrange it?
   Here four letters are there
   So we can arrange 4! = 4x3x2x1 = 24 ways

2. SKY, how many ways can we arrange it?
   Here SKY has three letters
   So, we can arrange 3! = 3x2x1 6 ways

PARTNERSHIP

QUANTITATIVE APTITUDE

Two business persons their names are namely Shyam and Shreya. They invest money Rs 20(Shyam) and Rs 30 (Shreya) in Organization. And they earn money as profit Rs 100 in the end of year.



1. What is the share of Shyam and Shreya's in the Profit?

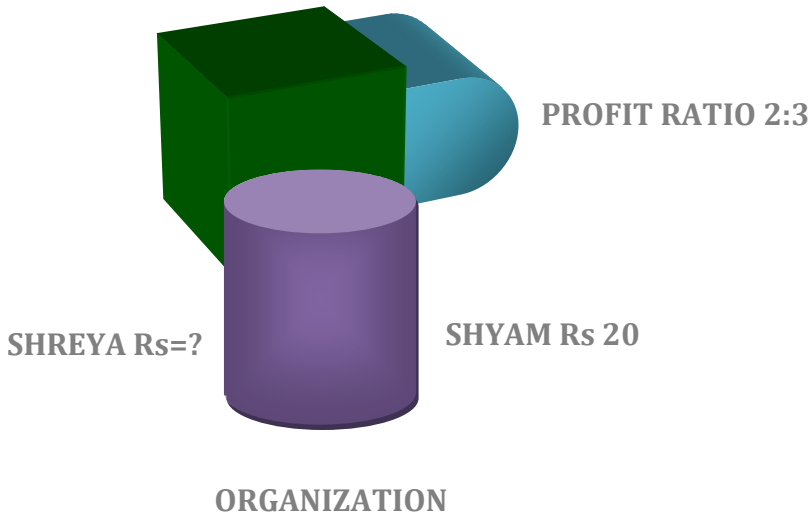
Shyam Invest		Shreya Invest
20	:	30
2	:	3

$$\text{Shyam Share} = \frac{\text{Profit}}{\text{Total Share Parts}} \times \text{Shyam Investment Part}$$

Shyam Share = (100/5) x 2
Shyam Share = 20 x 2
Shyam Share = 40

$$\text{Shreya Share} = \frac{\text{Profit}}{\text{Total Share Parts}} \times \text{Shreya Investment Part}$$

Shreya Share = (100/5) x 3
Shreya Share = 20 x 3
Shreya Share = 60



2. Shyam's Investment is Rs 20
   Shreya's Investment = Rs? (we find out)
   Their Profit Ratio is 2:3.

Shyam Invest : Shreya Invest :: ShyamPR : ShreyaPR

20 : ? :: 2 : 3

20 x 3 = ? x 2

60 = ? x 2

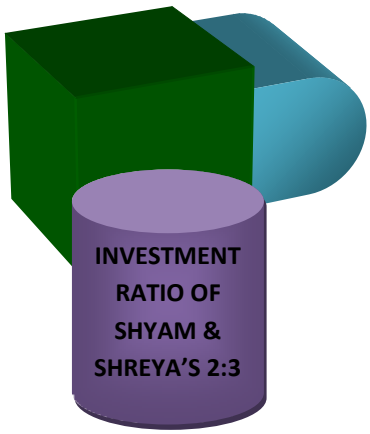
60/2 = ?

30 = ?

Shreya Investment is Rs 30

Home Work

3. Shyam's Investment = Rs ? (we find out)
   Shreya's Investment is Rs 30
   Their Profit Ratio is 2:3.



SHYAM'S PROFIT Rs 40

SHREYA'S PROFIT =Rs?

ORGANIZATION

1. Shyam's Investment Ratio is 2
   Shreya's Investment Ratio is 3
   Shyam's Profit Rs 40
   Find out Shreya's Profit.

Shyam Inv R	: Shreya Inv Ra		ShyamP	ShreyaProfit
2	: 3	::	40 :	?

x

2 x ? = 3 x 40

2 x ? = 120

? = 120/2

? = 60

Home Work

2. Shyam's Investment Ratio is 2
   Shreya's Investment Ratio is 3
   Shreya's Profit Rs 60
   Find out Shyam's Profit.

Shyam establish one Organization with Rs 20. After four months Shreya join with investment of Rs 30. After one year they got the profit Rs 480

3. Find out their shares?

Shyam Invest his money 12 months

Shyam Invest her money => total months – not Invest months

⇨ 12 – 4 = 8

Shyam	:	Shreya
20 x 12	:	30 x 8
240	:	240
1	:	1

$$\text{Shyam Share} = \frac{\text{Profit}}{\text{Total Share Parts}} \times \text{Shyam Investment Part}$$

Shyam Share = (480/2) x 1
Shyam Share = 240

$$\text{Shreya Share} = \frac{\text{Profit}}{\text{Total Share Parts}} \times \text{Shreya Investment Part}$$

Shreya Share = (480/2) x 1
Shreya Share = 240 x 1
Shreya Share = 240

Home Work

4. Shyam's Investment is 30
   Shreya's Investment is 40 (she joins after 4 months)
   Their Profit is Rs 340
   Find out their shares?

5. Shyam's Investment is 30
   Shreya's Investment is 40 (she joins after some months)
   Their Profit Ratio's is 9:8, then how many months after she join?

Shyam		Shreya		Shyam Share		Shreya Share
30 x 12	:	40 x ?	::	9	:	8

x
x

Shyam	:	Shreya
30 x 12 x8	:	40 x ? x 9
8	:	?

She invest her money 8 months, so 12 – 8 = 4 (she joined after these months)

MULTIPLICATION

QUANTITATIVE APTITUDE

Multiplied by 11

1. 12 x 11 =?

   12 x 11

   Step 1

   12

   --2 (here I write last digit (2) same)

   Step 2

   12 (2+1=3)

   -32 (here I add last digit (2) plus, which before digit (1))

   Step 3

   12

   132 (here I take first digit same)

Try in single step the following

13 x 11

54 x 11

45 x 11

2. 123 x 11 =?

123 x 11

Step 1

123

---3 (here I write last digit (3) same)

Step 2

123 (3+2=5)

--53 (here I add last digit (3) plus, which before digit (2))

Step 3

123 (2+1=3)

-353 (here tenth place digit (2) plus, which before digit (1))

Step 4

123

1353 (here I take first digit same)

Try in single step the following

135 x 11

543 x 11

452 x 11

3. 987 x 11 =?

987 x 11

Step 1

987

----7 (here I write last digit (7) same)

Step 2

987 (7+8=15)

---57 (here 1 added to next addition)

Step 3

987 (8+9+1=18)

--857 (here 1 added to next addition)

Step 4

987 (9+1 = 10)

10353

Try in single step the following

876 x 11

786 x 11

679 x 11

Multiplied by 25

1. 32 x 25

Step 1

32
We divided 32 by 4

32/4 = 8

Here we get 8

Step 2

If reminder is	0	1	2	3
Take	00	25	50	75

Here reminder is 0, so we take two zeros (00)

Step 3

8 00

32 x 25 = 800

Why we divided by 4

32 x 25

Now I am multiply by 4 and divided by 4

$$\frac{(32 \times 25) \times 4}{4}$$

$$\frac{32 \times (25 \times 4)}{4}$$

$$\frac{32 \times (100)}{4}$$

$$\frac{\cancel{32}^{8} \times (100)}{\cancel{4}}$$

8 x 100 = 800

2. 33 x 25

Step 1

33
We divided 33 by 4

33/4 = (8x4 = 32 + 1)

Here we get 8 and reminder 1

Step 2

If reminder is	0	1	2	3
Take	00	25	50	75

Here reminder is 1, so we take 25

Step 3

8 25

33 x 25 = 825

3. 34 x 25

Step 1

34
We divided 34 by 4

34/4 = (8x4 = 32 + 2)

Here we get 8 and reminder 2

Step 2

If reminder is	0	1	2	3
Take	00	25	50	75

Here reminder is 2, so we take 50

Step 3

8 50

34 x 25 = 850

4. 35 x 25

Step 1

35
We divided 35 by 4

35/4 = (8x4 = 32 + 3)

Here we get 8 and reminder 3

Step 2

If reminder is	0	1	2	3
Take	00	25	50	75

Here reminder is 3, so we take 50

Step 3

8 75

35 x 25 = 875

Try in single step the following

76 x 25

786 x 25

679 x 25

Multiplied by 50

1. 32 x 50

Step 1

32
We divided 32 by 2

32/2 = 16

Here we get 16

Step 2

If reminder is 0 1
Take 00 50

Here reminder is 0, so we take two zeros (00)

Step 3

16 00

32 x 50 = 800

Why we divided by 2 and take 00

32 x 50

Now I am multiply by 2 and divided by 2

$$\frac{(32 \times 50) \times 2}{2}$$

$$\frac{32 \times (50 \times 2)}{2}$$

$$\frac{32 \times (100)}{2}$$

$$\frac{\overset{16}{\cancel{32}} \times (100)}{\cancel{2}}$$

16 x 100 = 1600

5. 33 x 50

Step 1

33
We divided 33 by 2

33/2 = (16x2 = 32 + 1)

Here we get 16 and reminder 1

Step 2

If reminder is 0 1
Take 00 50

Here reminder is 1, so we take 50

Step 3

16 50

33 x 50 = 1650

Try in single step the following

76 x 50

787 x 50

32 x 5

33 x 5

679 x 5

Multiplied by 125

1. 32 x 125

Step 1

32
We divided 32 by 8

32/8 = 4

Here we get 4

Step 2

If reminder is	0	1	2	3	4	5	6	7
Take	00	125	250	375	500	625	750	875

Here reminder is 0, so we take three zeros (000)

Step 3

4 000

32 x 125 = 4000

Why we divided by 8

32 x 125

Now I am multiply by 8 and divided by 8

$$\frac{(32 \times 125) \times 8}{8}$$

$$\frac{32 \times (125 \times 8)}{8}$$

$$\frac{32 \times (1000)}{8}$$

$$\frac{\cancel{32}^{4} \times (1000)}{\cancel{8}}$$

4 x 100 = 4000

1. 33 x 125

Step 1

33
We divided 33 by 8

32/8 = 4 (4 x8 = 32 +1)

Here we get 4

Step 2

If reminder is	0	1	2	3	4	5	6	7
Take	00	125	250	375	500	625	750	875

Here reminder is 1, so we take (125)

Step 3

4 125

33 x 125 = 4125

2. 37 x 125

Step 1

37
We divided 37 by 8

37/8 = 4 (4 x8 = 32 +5)

Here we get 4

Step 2

If reminder is	0	1	2	3	4	5	6	7
Take	00	125	250	375	500	625	750	875

Here reminder is 5, so we take (625)

Step 3

4 625

37 x 125 = 4625

3. 39 x 125

Step 1

39
We divided 39 by 8

39/8 = 4 (4 x8 = 32 +7)

Here we get 4

Step 2

If reminder is	0	1	2	3	4	5	6	7
Take	00	125	250	375	500	625	750	875

Here reminder is 7, so we take (8755)

Step 3

4 875

39 x 125 = 4875

Try in single step the following

34 x125

35 x125

36 x125

38 x125

76 x 125

787 x 125

2, 2 digit Multiplication

56 x 43 =?

56

X 43

Step 1

5 6

x 4 3

3 x 6 = 18

Here 8 is one's place digit and 1 added to tenth place digit

1

---8

Step 2

5 6

x 4 3

3 x 5 + 4 x 6 = 39 + 1 = 40

Here 0 is tenth place digit and 4 added to hundred place digit value

4

--08

Step 3

5 6

x 4 3

4 x 5 + 4 = 24

2408

47 x 36 =?

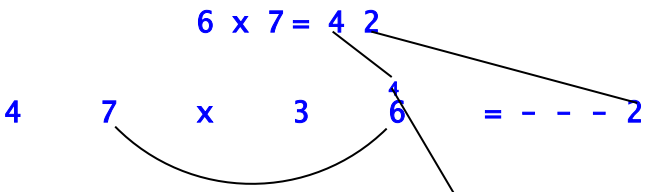
4 7

X 3 6

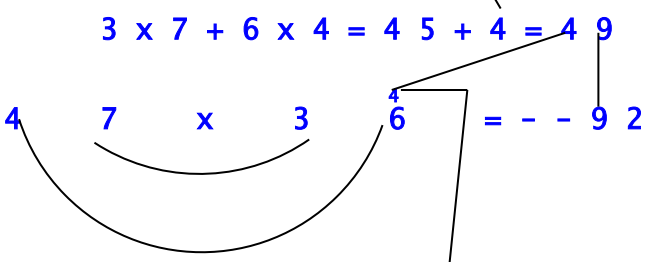
In any exam, they do not ask column vise and it take much time.

So we have to complete single line.

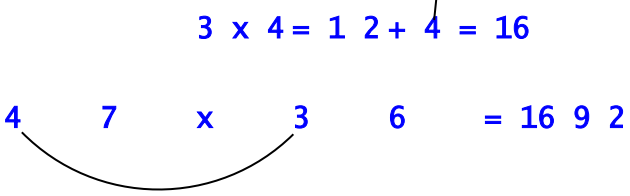
Step 1



Step 2



Step 3



47 x 36 = 1692

Try in single line the following

4. 45 x 56 =?
5. 24 x 67 =?
6. 78 x 89 =?

3, 2 digit Multiplication

567 x 43 =?

Step 1

3 x 7 = 2 1

5 6 7 x 4 3 = - - - - - 1

Step 2

3 x 6 + 4 x 7 = 4 6 + 2 = 4 8

5 6 7 x 4 3 = - - - 8 1

Step 3

3 x 5 + 4 x 6 = 39 +4 = 4 3

5 6 7 x 4 3 = -- 3 8 1

Step 4

4 x 5 = 20 + 4 = 2 4

5 6 7 x 4 3 = 24 3 8 1

567 x 43 = 24381

Try in single line the following

1. 456 x 56 =? , 2. 543 x 76 =? 3.987 x78 =?

2, 2 digit numbers ending with 1

31 x 41

Step 1

We take end digit 1

3 1 x 4 1 = - - - 1

Step 2

We add like this,

3 1 x 4 1 = - - 7 1

4 + 3 = 7

Step 3

4 x 3 = 1 2

3 1 x 4 1 = 12 7 1

31 x 41 = 1271

91 x 81

Step 1

We take end digit 1

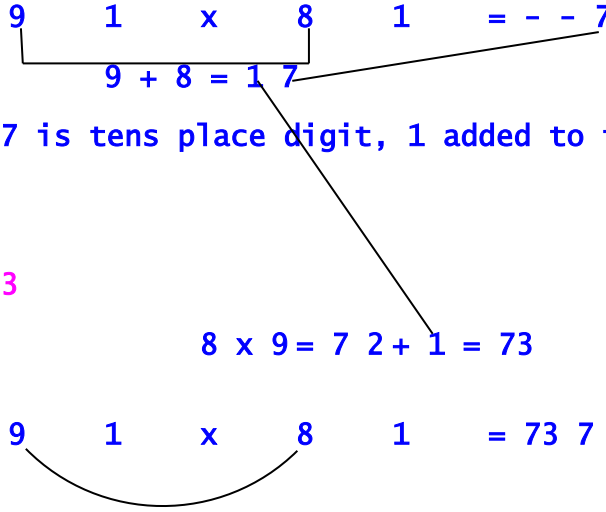
9 1 x 8 1 = - - - 1

Step 2

We add like this,

9 1 x 8 1 = - - 7 1

9 + 8 = 1 7



Here 7 is tens place digit, 1 added to the thousand digit place value.

Step 3

8 x 9 = 7 2 + 1 = 73

9 1 x 8 1 = 73 7 1

91 x 81 = 7371

DIVISION

QUANTITATIVE APTITUDE

2, 2 digit Number Division

Odd Number Division

21 x ? = 609

2 1 x ? = 6 0 9

Step 1

2 1 x ? = 6 0 9

=

1 x 1 = 1

1 x 2 = 2

1 x 3 = 3

1 x 4 = 4

1 x 5 = 5

1 x 6 = 6

1 x 7 = 7

1 x 8 = 8

1 x 9 = 9

So we take 9 as one place digit.

Why we take 9 as one's place digit

In 1 table 9 (in 609, one's place digit (9)) when will come?

1x9 =9

2 1 x - 9 = 6 0 9

Step 2

In step 2 it must follow (Exist) two conditions

Condition A

2 1 x ? = 6 0 9

≤

2 x 1 = 2 condition A is satisfied (≤)

2 x 2 = 4 condition B must be satisfied (≤).

2 x 3 = 6 if B not satisfied both are not satisfied.

Here 3 is second digit of our temporary answer

In Condition B, we must multiply by 3

Remaining value = 6 – 6 = 0

Condition B

00

2 1 x ? = 6 0 9

≤

Condition B is not satisfied (3≤0)

≤ so, our assumption is rang

now I am going to Second step

1 x 3 = 3

Step 2

In step 2 it must follow (Exist) two conditions

Condition A

2 1 x ? = 6 0 9

≤

2 x 1 = 2 condition A is satisfied (≤)

2 x 2 = 4 condition B must be satisfied (≤).

2 x 3 = 6 if B not satisfied both are not satisfied.

Here 2 is second digit of our temporary answer

In Condition B, we must multiply by 2

Remaining value = 6 – 4 = 2

Condition B

20

2 1 x ? = 6 0 9

≤

Condition B is satisfied (2≤20)

≤ so, our assumption is Right

1 x 2 = 2

2 1 x 2 9 = 6 0 9

37 x ? = 1443

3 7 x ? = 1443

Step 1

3 7 x ? = 1 4 4 3

=

7 x 1 = 7

7 x 2 = -4

7 x 3 = -1

7 x 4 = -8

7 x 5 = -5

7 x 6 = -2

7 x 7 = -9

7 x 8 = -6

7 x 9 = -3

"-"means any digit

So we take 9 as one place digit.

Why we take 9 as one's place digit

In 1 table 9 (in 1443, one's place digit (3)) when will come?

7x9 =-3

3 7 x - 9 = 1443

Step 2

In step 2 it must follow (Exist) two conditions

Condition A

3 7 x ? = 14 4 3

≤

3 x 1 = 3 condition A is satisfied (≤)

3 x 2 = 6 condition B must be satisfied (≤).

3 x 3 = 9 if B not satisfied both are not satisfied.

3 x 4 = 12

3 x 5 = 15 (15≤14) not satisfied

Here 4 is second digit of our temporary answer

In Condition B, we must multiply by 4

Remaining value = 14 – 12 = 2

Condition B

24

3 7 x ? = 1 4 4 3

≤

Condition B is not satisfied (28≤24)

≤ so, our assumption is rang

now I am going to Second step

7 x 4 = 28

Step 2

In step 2 it must follow (Exist) two conditions

Condition A

3 7 x ? = 14 4 3

≤

3 x 1 = 3 condition A is satisfied (≤)

3 x 2 = 6 condition B must be satisfied (≤).

3 x 3 = 9 if B not satisfied both are not satisfied.

3 x 4 = 12

Here 3 is second digit of our temporary answer

In Condition B, we must multiply by 3

Remaining value = 14 – 09 = 5

Condition B

54

3 7 x ? = 1 4 4 3

≤

Condition B is satisfied (21≤54)

≤ so, our assumption is right

7 x 3 = 21

37 x 39 = 14 4 3

57 x ? = 3591

5 7 x ? = 3591

Step 1

5 7 x ? = 3 5 9 1

=

7 x 1 = 7

7 x 2 = -4

7 x 3 = -1

"-"means any digit from 1 to 9

So we take 3 as one place digit.

Why we take 3 as one's place digit

In 7 table 3 (in 3591, one's place digit (1)) when will come?

7x3 =-1

5 7 x - 3 = 3591

Step 2

In step 2 it must follow two conditions

Condition A

5 7 x ? = 35 9 1

≤

5 x 1 = 5 condition A is satisfied (≤)

5 x 2 = 10 condition B must be satisfied (≤).

5 x 3 = 15 if B not satisfied both are not satisfied.

5 x 4 = 20

5 x 5 = 25

5 x 6 = 30

5 x 7 = 35

Here 7 is second digit of our temporary answer

In Condition B, we must multiply by 7

Remaining value = 35 – 35 = 0

Condition B

09

3 7 x ? = 3 5 9 1

≤

Condition B is not satisfied (49≤09)

≤ so, our assumption is rang

7 x 7 = 49 now I am going to Second step

Step 2

In step 2 it must follow two conditions

Condition A

5 7 x ? = 35 9 1

≤

5 x 1 = 5 condition A is satisfied (≤)

5 x 2 = 10 condition B must be satisfied (≤).

5 x 3 = 15 if B not satisfied both are not satisfied.

5 x 4 = 20

5 x 5 = 25

5 x 6 = 30

Here 6 is second digit of our temporary answer

In Condition B, we must multiply by 6

Remaining value = 35 – 30 = 5

Condition B

59

3 7 x ? = 3 5 9 1

≤

Condition B is satisfied (42≤59)

≤ so, our assumption is right

7 x 6 = 42

57 x 63 = 3591

Home Work

Try in single step (30 – 45 seconds) the following

i. 23 x ? =621
ii. 23 x ? = 506
iii. 23 x ? = 552
iv. 23 x ? = 644
v. 31 x ? = 1178
vi. 31 x ? = 1209
vii. 31 x ? = 1184
viii. 43 x ? = 1118
ix. 57x ? = 1596
x. 61 x ? = 1952
xi. 79 x ? = 2686
xii. 81 x ? = 2916
xiii. 87 x ? = 3306
xiv. 83 x ? = 3486
xv. 93 x ? = 4464
xvi. 91 x ? = 4186

Take 100 problems and solve each one within 30 to 45 seconds

---A over---

Even Number Division

24 x ? = 624

2 4 x ? = 6 2 4

Step 1

2 4 x ? = 6 2 4

=

4 x 1 = 4

4 x 2 = 8

4 x 3 = -2

4 x 4 = -6

4 x 5 = -0

4 x 6 = -4

"-"means any digit from 1 to 9

4 → 1, 6

here 4 has two values 1, 6 as once place digit, in either digit we take one digit as once place digit, we decide after step 2

Step 2

In step 2 it must follow two conditions

Condition A

2 4 x ? = 6 2 4

≤

2 x 1 = 2 condition A is satisfied (≤)

2 x 2 = 4 condition B must be satisfied (≤).

2 x 3 = 6 if B not satisfied both are not satisfied.

Here 3 is second digit of our temporary answer

In Condition B, we must multiply by 3

Remaining value = 6 – 6 = 0

Condition B

02

2 4 x ? = 6 2 4

≤

Condition B is not satisfied (12≤02)

≤ so, our assumption is rang

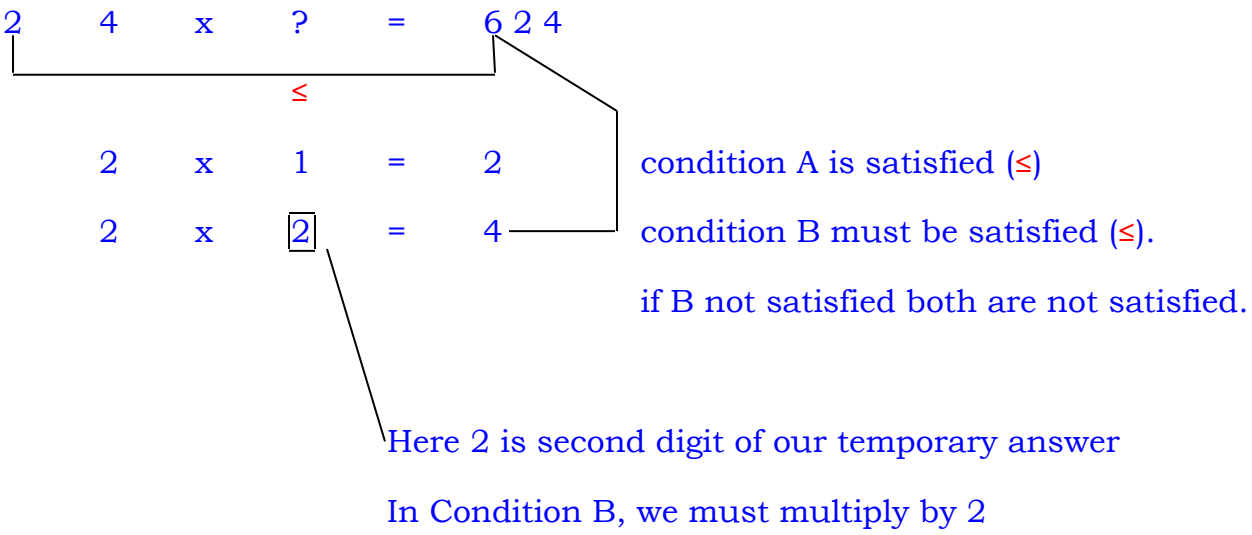
now I am going to Second step

4 x 3 = 12

Step 2

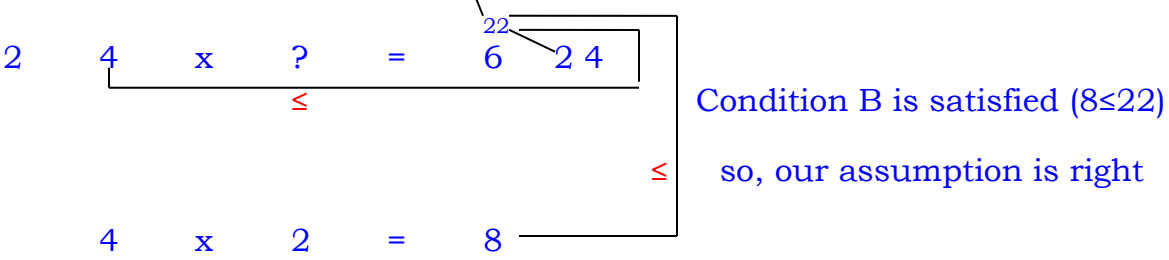
In step 2 it must follow two conditions

Condition A



Remaining value = 6 – 4 = 2

Condition B



Step 3

In step 3, we consider answer through practice.

Our competitive answers are 21 and 26

From step 2, we just miss 3 as second place digit.

So nearest value to 30, is 26.

24 x 26 = 624

24 x ? = 552

2 4 x ? = 5 5 2

Step 1

2 4 x ? = 5 5 2

=

4 x 3 = -2

+5

4 x 8 = -2

"-"means any digit from 1 to 9

4 → 3, 8

here 4 has two values 3, 8 as once place digit,

in either digit

we take one digit as once place digit, we decide after step 2

Step 2

In step 2 it must follow two conditions

Condition A

2 4 x ? = 5 5 2

≤

2 x 1 = 2 condition A is satisfied (≤)

2 x 2 = 4 condition B must be satisfied (≤).

if B not satisfied both are not satisfied.

Here 2 is second digit of our temporary answer

In Condition B, we must multiply by 2

Remaining value = 5 – 4 = 1

Condition B

15

2 4 x ? = 5 5 2

≤

Condition B is satisfied (8≤15)

≤ so, our assumption is right

4 x 2 = 8

Step 3

In step 3, we consider answer through practice.

Our competitive answers are 23 and 28

From step 2, remaining value is 15 – 8 = 7

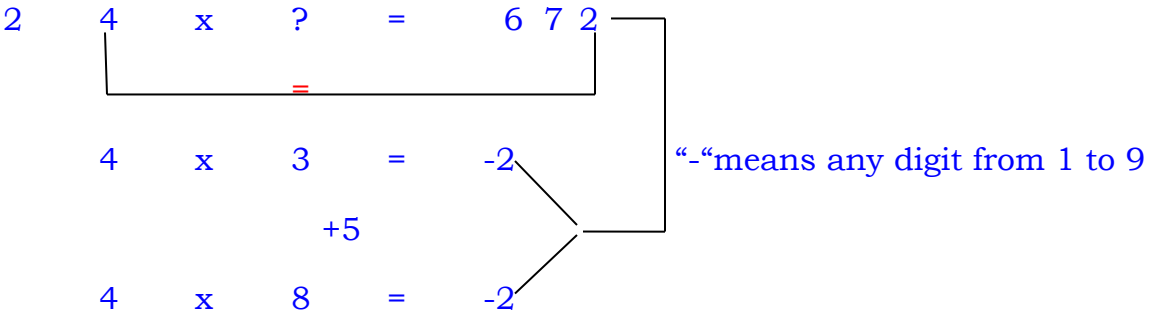
It less value, so we take 23 as our answer

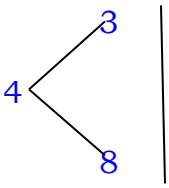
24 x 23 = 552

24 x ? = 672

2 4 x ? = 6 7 2

Step 1





here 4 has two values 3, 8 as once place digit,

in either digit

we take one digit as once place digit, we decide after step 2

Step 2

In step 2 it must follow two conditions

Condition A

2 4 x ? = 6 7 2

≤

2 x 1 = 2 condition A is satisfied (≤)

2 x 2 = 4 condition B must be satisfied (≤).

2 x 3 = 6 if B not satisfied both are not satisfied.

Here 3 is second digit of our temporary answer

In Condition B, we must multiply by 3

Remaining value = 6 – 6 = 0

Condition B

07

2 4 x ? = 6 7 2

≤

Condition B is not satisfied (12≤07)

≤ so, our assumption is rang

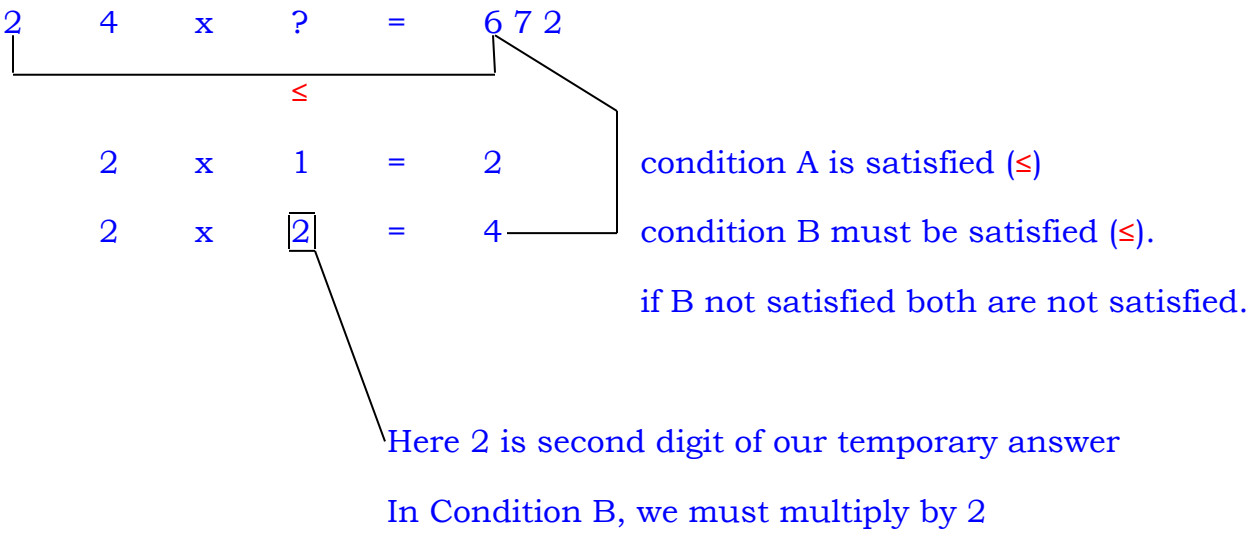
now I am going to Second step

4 x 3 = 12

Step 2

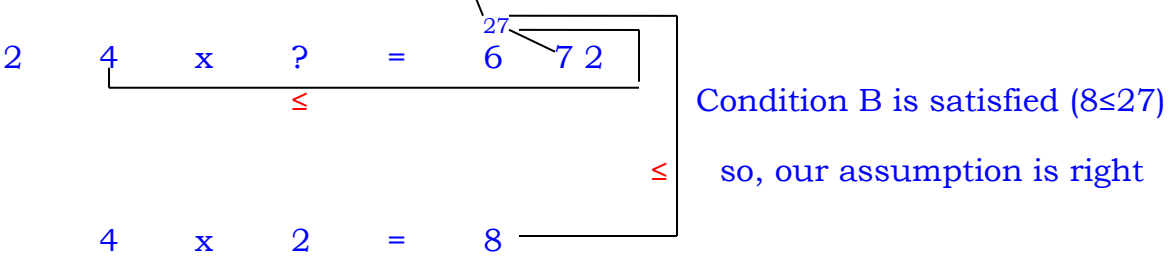
In step 2 it must follow two conditions

Condition A



Remaining value = 6 – 4 = 2

Condition B



Step 3

In step 3, we consider answer through practice.

Our competitive answers are 23 and 28

From step 2, we just miss 3 as second place digit.

So nearest value to 30, is 28.

24 x 28 = 672

---B OVER---

56 x ? = 4872

5 6 x ? = 4 8 7 2

Step 1

5 6 x ? = 48 7 2

=

6 x 2 = -2

+5

6 x 7 = -2

"-"means any digit from 1 to 9

6 — 2 — here 6 has two values 2, 7 as once place digit,

in either digit

7 — we take one digit as once place digit, we decide after step 2

Step 2

In step 2 it must follow two conditions

Condition A

5 6 x ? = 48 7 2

≤

5 x 1 = 5 condition A is satisfied (≤)

5 x 8 = 40 condition B must be satisfied (≤).

5 x 9 = 45 if B not satisfied both are not satisfied.

5 x 10 = 50 (not satisfied, it over comes 48)

Here 9 is second digit of our temporary answer

In Condition B, we must multiply by 9

Remaining value = 48 – 45 = 3

Condition B

37

5 6 x ? = 48 7 2

≤

Condition B is not satisfied (54≤37)

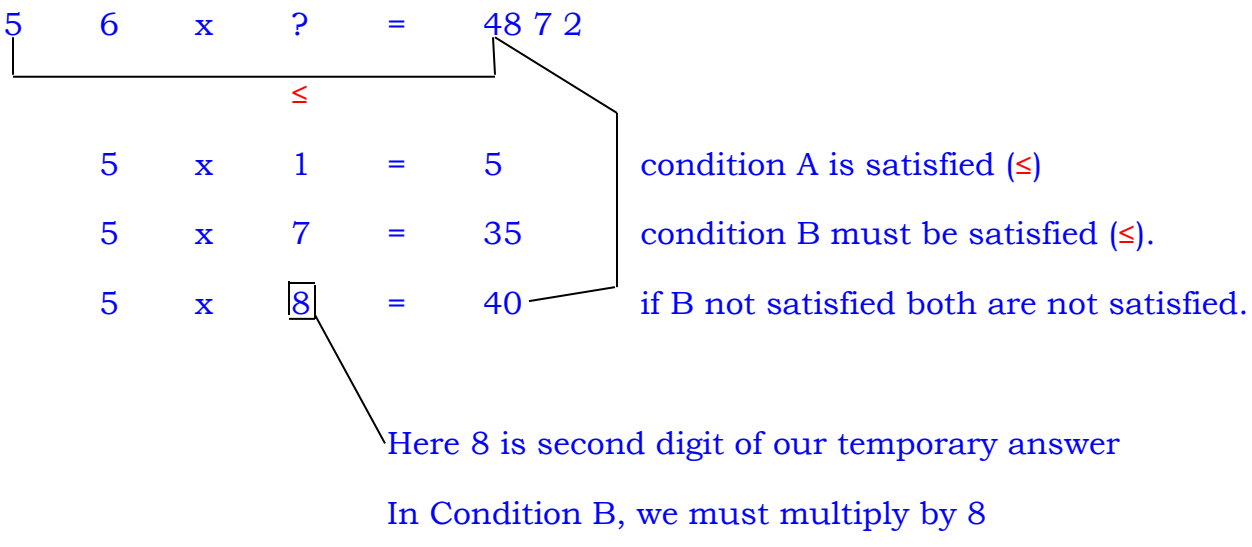
≤ so, our assumption is rang

6 x 9 = 54 now I am going to Second step

Step 2

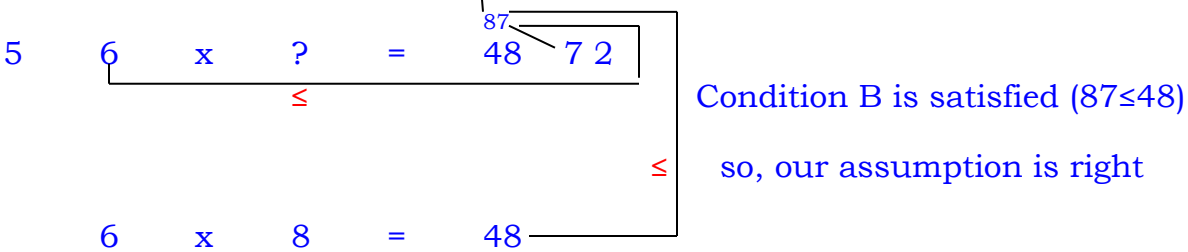
In step 2 it must follow two conditions

Condition A



Remaining value = 48 – 40 = 8

Condition B



Step 3

In step 3, we consider answer through practice.

Our competitive answers are 82 and 87

From step 2, we just miss 9 as second place digit.

So nearest value to 90, is 87.

56 x 87 = 4872

68 x ? = 5032

6 8 x ? = 5 0 3 2

Step 1

6 8 x ? = 50 3 2

=

8 x 4 = -2

+5

8 x 9 = -2

"-"means any digit from 1 to 9

8 — 4 — here 8 has two values 4, 9 as once place digit,

in either digit

9 — we take one digit as once place digit, we decide after step 2

Step 2

In step 2 it must follow two conditions

Condition A

6 8 x ? = 50 3 2

≤

6 x 1 = 5 condition A is satisfied (≤)

6 x 7 = 42 condition B must be satisfied (≤).

6 x 8 = 48 if B not satisfied both are not satisfied.

6 x 9 = 54 (not satisfied, it over comes 50)

Here 8 is second digit of our temporary answer

In Condition B, we must multiply by 8

Remaining value = 50 – 48 = 2

Condition B

23

6 8 x ? = 50 3 2

≤

Condition B is not satisfied (64≤23)

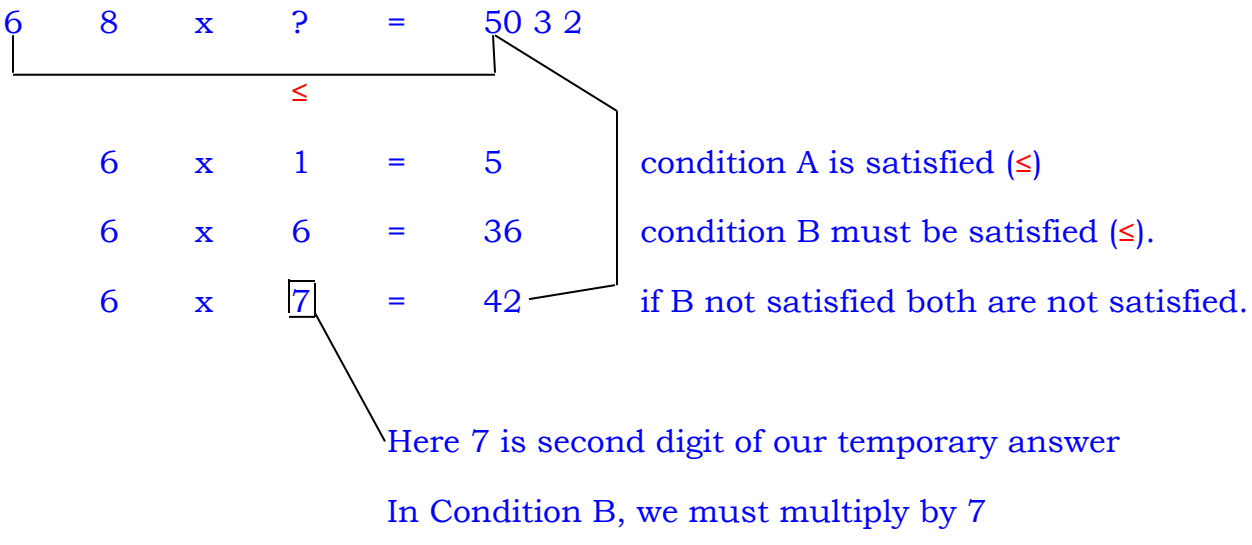
≤ so, our assumption is rang

8 x 8 = 64 now I am going to Second step

Step 2

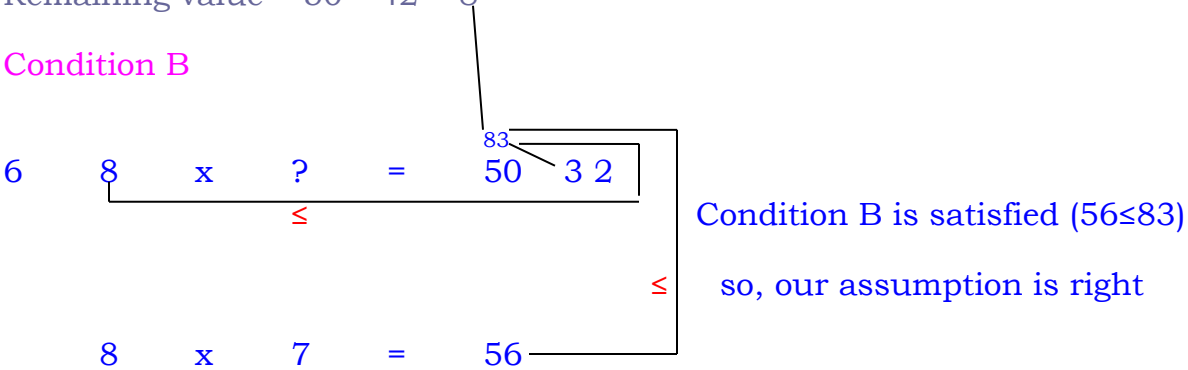
In step 2 it must follow two conditions

Condition A



Remaining value = 50 – 42 = 8

Condition B



Step 3

In step 3, we consider answer through practice.

Our competitive answers are 74 and 79

From step 2, remaining value is (83-56=27)

It is less value, So answer is 74

68 x 74 = 5032

68 x ? = 5372

6 8 x ? = 5 3 7 2

Step 1

6 8 x ? = 50 3 2

=

8 x 4 = -2

+5

8 x 9 = -2

"-"means any digit from 1 to 9

8 — 4 — here 8 has two values 4, 9 as once place digit,

in either digit

9 — we take one digit as once place digit, we decide after step 2

Step 2

In step 2 it must follow two conditions

Condition A

6 8 x ? = 53 7 2

≤

6 x 1 = 5 condition A is satisfied (≤)

6 x 7 = 42 condition B must be satisfied (≤).

6 x 8 = 48 if B not satisfied both are not satisfied.

6 x 9 = 54 (not satisfied, it over comes 53)

Here 8 is second digit of our temporary answer

In Condition B, we must multiply by 8

Remaining value = 53 – 48 = 5

Condition B

57

6 8 x ? = 53 7 2

≤

Condition B is not satisfied (64≤57)

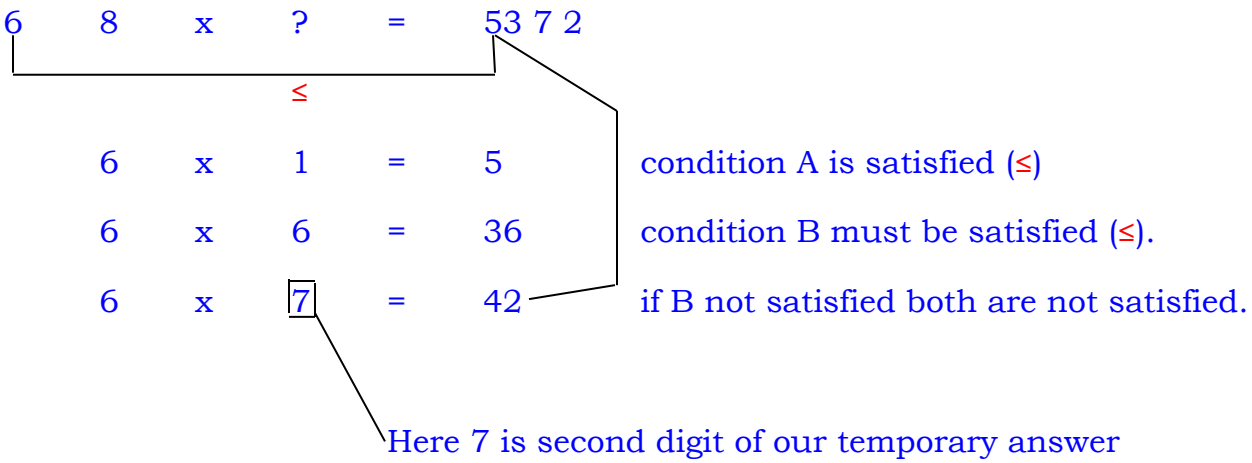
≤ so, our assumption is rang

8 x 8 = 64 now I am going to Second step

Step 2

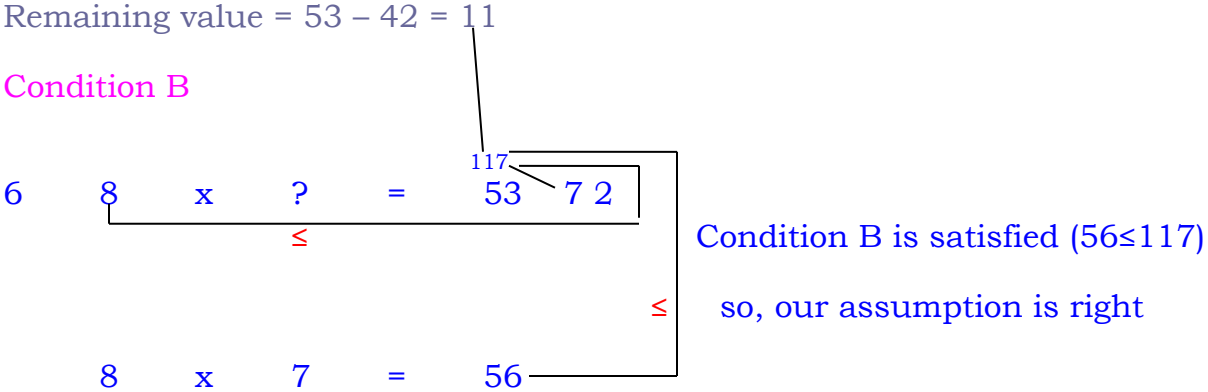
In step 2 it must follow two conditions

Condition A



Remaining value = 53 – 42 = 11

Condition B



Step 3

In step 3, we consider answer through practice.

Our competitive answers are 74 and 79

From step 2, remaining value is (117-56=61), It is more value, So answer is 79

Or From step 2, we just miss 9 as second place digit.

So nearest value to 80, is 79.

68 x 79 = 5032

Home Work

Try in single step (30 – 45 seconds) the following

I. 24 x ? =1944
II. 24 x ? =2064
III. 26 x ? = 1248
IV. 26 x ? = 1118
V. 28 x ? = 1456
VI. 28 x ? = 1596
VII. 32 x ? = 1952
VIII. 32 x ? = 2112
IX. 34 x ? = 2516
X. 34 x ? = 2686
XI. 36 x ? = 2916
XII. 36 x ? = 3096
XIII. 38 x ? = 3116
XIV. 38 x ? = 3306
XV. 42x ? = 3486
XVI. 42 x ? = 3696
XVII. 46 x ? = 4186
XVIII. 46 x ? = 4416
XIX. 48 x ? = 4464
XX. 48 x ? = 4704

Take 100 problems as you like and solve them in 30 to 45 seconds.

Division when end digit is 5 in 2 digit numbers,

15 x ? = 795

15 x ? = 795

I multiply by 2 both sides (LHS, RHS)

15 x 2 x ? = 795 x 2

30 x ? = 795 x 2

$$? = \frac{79.5 \times 2}{30}$$

$$? = \frac{\cancel{79}\,^{26.5}\cancel{.5} \times 2}{\cancel{3}}$$

? = 26.5 x 2

? = 53

25 x ? = 2025

25 x ? = 2025

I multiply by 4 both sides (LHS, RHS)

25 x 4 x ? = 2025 x 4

100 x ? = 2025x 4

$$? = \frac{20.25x\ 4}{100}$$

$$? = \frac{20\ .\ 25 \times 4}{1}$$

? = 20.25 x 4

? = 81

35 x ? = 2065

35 x ? = 2065

I multiply by 2 both sides (LHS, RHS)

35 x 2 x ? = 795 x 2

70 x ? = 2065 x 2

? = 206.5 x 2 / 70

? = 29.5 x 2

? = 59

45 x ? = 1665

45 x ? = 1665

I multiply by 2 both sides (LHS, RHS)

45 x 2 x ? = 1665 x 2

90 x ? = 1665 x 2

? = 166.5 x 2 / 90

? = 18.5 x 2

? = 37

55 x ? = 3740

55 x ? = 3740

I multiply by 2 both sides (LHS, RHS)

55 x 2 x ? = 3740 x 2

110 x ? = 3740 x 2

$$? = \frac{374.0 \times 2}{11\ 0}$$

$$? = \frac{\overset{3}{\cancel{37}}\overset{4}{\cancel{4}} \times 2}{\cancel{11}}$$

? = 34 x 2

? = 68

65 x ? = 3380

65 x ? = 3380

I multiply by 2 both sides (LHS, RHS)

65 x 2 x ? = 3380 x 2

130 x ? = 3380 x 2

$$? = \frac{338\ 0 \times 2}{13\ 0}$$

$$? = \frac{\overset{2}{\cancel{33}}\overset{6}{\cancel{8}} \times 2}{\cancel{13}}$$

? = 26 x 2

? = 52

75 x ? = 3525

75 x ? = 3525

I multiply by 4 both sides (LHS, RHS)

75 x 4 x ? = 3380 x 4

300 x ? = 3525 x 4

? = 35. 25 x 4 / 3 00

? = 11 . 7 5 / 35 .2 2 1 5 x 4 / 3

? = 11.75 x 4

? = 47

85 x ? = 1785

85 x ? = 1785

I multiply by 2 both sides (LHS, RHS)

85 x 2 x ? = 1785 x 2

170 x ? = 1785 x 2

? = 178 .5 x 2 / 17 0

? = 1 0 . 5 / 178.5 x 2 / 17

? = 10.5 x 2

? = 21

95 x ? = 1520

95 x ? = 1520

I multiply by 2 both sides (LHS, RHS)

95 x 2 x ? = 1520x 2

190 x ? = 1520x 2

$$? = \frac{152\,0 \times 2}{19\,0}$$

$$? = \frac{\cancel{152}x\ 2}{\cancel{19}}$$

? = 8 x 2

? = 16

Home Work

Try in single step (30 – 45 seconds) the following

1. 25 x ? = 900
2. 35 x ? = 2975
3. 45 x ? = 3060
4. 55 x ? = 5280
5. 65 x ? = 5460

DIVISIBILITY PRINCIPLES

QUANTITATIVE APTITUDE

Divisibility by 2: A number is divisible by 2, if its unit's digit is any of 0, 2, 4, 6 and 8.

Example

1. 59324

   Here Unit Digit is 4, which is divisible by 2

   Therefore 59324 is divisible by 2

Student: I can't believe it Sir/ how can I believe it Sir?

Teacher: yes, I can prove it.

Proof:

```
2) 5 9 3 2 4 (2 9 6 7
   4
  _________
    1 9
    1 8
  _________
        1 3
        1 2
  _________
          1 4
          1 4
  _____________
              0
  _____________
```

2. 87945

   Here Unit Digit is 5, which is not divisible by 2

   Therefore 87945 is not divisible by 2

3. 94578

   Here Unit Digit is 8, which is divisible by 2

   Therefore 94578 is divisible by 2

Practice Questions

1. 786543
2. 67354
3. 89369
4. 76457
5. 876548
6. 98450
7. 87452

Divisibility by 4: A number is divisible by 4, if the number formed by the last two digits of the given number is divisible by 4

$4 = 2^2$

Example

1. 876548

   Here last two digits are 48, which is divisible by 4

   Therefore 876548 is divisible by 4

2. 67354

   Here last two digits are 54, which is not divisible by 4

   Therefore 67354 is not divisible by 4

Practice Questions

1. 27452
2. 87494
3. 36872

Divisibility by 8: A number is divisible by 8, if the number formed by the last three digits of the given number is divisible by 8

$8 = 2^3$

Example

1. 976544

   Here last three digits are 544, which is divisible by 8

   Therefore 976544 is divisible by 8

2. 87348

   Here last three digits are 348, which is not divisible by 8

   Therefore 87348 is not divisible by 8

Practice Questions

1. 27456
2. 87494
3. 36872

Divisibility by 16: A number is divisible by 16, if the number formed by the last four digits of the given number is divisible by 16

$16 = 2^4$

Example

1. 9876656

   Here last four digits are 6656, which is divisible by 16

   Therefore 9876656 is divisible by 16
2. 894826

   Here last four digits are 4826, which is not divisible by 16

   Therefore 894826 is not divisible by 16

Divisibility by 3: A number is divisible by 3, if the sum of its digits is divisible by 3

Example

1. 876

   Sum of the digits are 8 + 7 + 6 = 21, which is divisible by 3

   Therefore 876 is divisible by 3

Student: can you prove it Sir?

Teacher: yes, I can

Proof:

```
3) 8 7 6 (2 9 2
   6
  _____
   2 7
   2 7
  _____
     0 6
       6
  _______
         0
  _______
```

2. 8945
   Sum of the digits are 8+9+4+5 = 26, which is not divisible by 3
   Therefore 8945 is not divisible by 3

Practice Questions

1. 27456
2. 87494
3. 36873

Divisibility by 9: A number is divisible by 9, if the sum of its digits is divisible by 9
Example

1. 8766
   Sum of the digits are 8 + 7 + 6 + 6 = 27, which is divisible by 9
   Therefore 8766 is divisible by 9

2. 27456
   Sum of the digits are 2+7+4+5+6 = 24, which is not divisible by 9
   Therefore 27456 is not divisible by 9

Practice Questions

1. 274565
2. 874947
3. 36873

Divisibility by 6: A number is divisible by 6, if it is divisible by both 2 and 3
Example

1. 8766
   Divisibility by 2:
   Here Unit Digit is 6, which is divisible by 2
   Hence 8766 is divisible by 2
   Divisibility by 3:
   Sum of the digits are 8 + 7 + 6 + 6 = 27, which is divisible by 3
   Hence 8766 is divisible by 3
   Therefore 8766 is divisible by 6

Practice Questions

1. 36873
2. 27456
3. 87494

Divisibility by 5: A number is divisible by 5, if its unit digit is either 0 or 5

Example

1. 8765

   Here Unit Digit is 5, which is divisible by 5

   Therefore 8765 is divisible by 5

2. 9867

   Here Unit Digit is 7, which is not divisible by 5

   Therefore 9867 is not divisible by 5

3. 7630

   Here Unit Digit is 0, which is divisible by 5

   Therefore 7630 is divisible by 5

Divisibility by 11: A number is divisible by 11, if the difference of the sum of its digits at odd places and the sum of its digits at even places, is either 0 or a number divisible by 11

Example

1. 4679653

4 6 7 9 6 5 3

Odd Digits 4 7 6 3

Sum of odd Digits 4 + 7 + 6 + 3 = 20

4 6 7 9 6 5 3

Even Digits 6 9 5

Sum of odd Digits 6 + 9 + 5 = 20

The difference of Sum of even digits – Sum of odd digits

20-20 =0

Here difference is 0

Therefore 4679653 is divisible by 11

2. 918071

9 1 8 0 7 1
Odd Digits 9 8 7
Sum of odd Digits 9 + 8 + 7 = 24

9 1 8 0 7 1
Even Digits 1 0 1
Sum of odd Digits 1 + 0 + 1 = 2
The difference of Sum of even digits – Sum of odd digits
24-2 =22
Here difference is 22, which is divisible by 11
Therefore 918071 is divisible by 11

3. 368298

3 6 8 2 9 8
Odd Digits 3 8 9
Sum of odd Digits 3 + 8 + 9 = 20

3 6 8 2 9 8
Even Digits 6 2 8
Sum of odd Digits 6 + 2 + 8 = 16
The difference of Sum of even digits – Sum of odd digits
20-16 =4
Here difference is 4, which is not divisible by 11
Therefore 918071 is not divisible by 11

Practice Questions

1. 874247
2. 274565
3. 37873

Applications

1. What least value must be assigned to * so that the number 197*5462 is divisible by 9?
2. Which digits should come in place of * and $ if the number 62684*$ is divisible by both 8 and 5?
3. Are 4832714 divisible by 11?

MULTIPLICATION WITH 9

QUANTITATIVE APTITUDE

99 x 73 =?

Before we solve this, we take some example of Additions.

8 + 2 =?

STEP I

```
   8
   2
+ _____
  _____
```

OR

```
   08
   02
+ _____
  _____
```

STEP II

Now we add the once place digit (8 and 2)

```
   1
   08
   02
+ _____
   0
  _____
```

STEP III

Now we add the tenth place digit (1, 0 and 0)

```
   1
   08
   02
+ _____
   10
  _____
```

7 + 3 =?

STEP I

```
    7
    3
+ _____
  _____
```

OR

```
    07
    03
+ _____
  _____
```

STEP II

Now we add the once place digit (7 and 3)

```
    1
    07
    03
+ _____
    0
  _____
```

STEP III

Now we add the tenth digit place (1, 0 and 0)

```
    1
    07
    03
+ _____
   10
  _____
```

2 + 8 =?

STEP I

```
   2
   8
+ _____
  _____
```

OR

```
   02
   08
+ _____
  _____
```

STEP II

Now we add the once place digit (2 and 8)

```
   1
   02
   08
+ _____
   0
  _____
```

STEP III

Now we add the tenth place digit (1, 0 and 0)

```
   1
   02
   08
+ _____
   10
  _____
```

COMPLEMENT OF 10

8 + ? = 10

STEP I

```
    8
    ?
+ _____
   10
_______
```

OR

```
    08
     ?
+ _____
    10
_______
```

STEP II

```
    08
     ?      Here, how much we have to add to get 10.
+ _____
    10
_______
```

STEP III

Here, I substitutes **01** in place of question mark (It is my first Trail)

08 +**01** = 09 < 10 so my assumption is rang.

Here, I substitutes **02** in place of question mark (It is my second Trail)

08 +**02** = 10 = 10 so my assumption is right.

```
    08
    02
+ _____
    10
_______
```

08 + 02 = 10 or 8 + 2 = 10 (to get 10, we add 02 or 2)

7 + ? = 10

STEP I

```
   7
   ?
+ _____
  10
_______
```

OR

```
   07
    ?
+ _____
   10
_______
```

STEP II

```
   07
    ?      Here, how much we have to add to get 10.
+ _____
   10
_______
```

STEP III

Here, I substitutes **01** in place of question mark (It is my first Trail)

07 +**01** = 08 < 10 so my assumption is rang.

Here, I substitutes **02** in place of question mark (It is my second Trail)

07 +**02** = 09 < 10 so my assumption is rang.

Here, I substitutes **03** in place of question mark (It is my Nth Trail)

07 +**03** = 10 = 10 so my assumption is right.

```
   07
   03
+ _____
   10
_______
```

07 + 03 = 10 or 7 + 3 = 10 (to get 10, we add 03 or 3)

2 + ? = 10

STEP I

```
   2
   ?
+ _____
  10
_____
```

OR

```
   02
    ?
+ _____
   10
_____
```

STEP II

```
   02
    ?      Here, how much we have to add to get 10.
+ _____
   10
_____
```

STEP III

Here, I substitutes **01** in place of question mark (It is my first Trail)

02 +**01** = 03 < 10 so my assumption is rang.

Here, I substitutes **02** in place of question mark (It is my second Trail)

02 +**02** = 4 < 10 so my assumption is rang.

Here, I substitutes **08** in place of question mark (It is my Nth Trail)

02 +**08** = 10 = 10 so my assumption is right.

```
   02
   08
+ _____
   10
_____
```

02 + 08 = 10 or 8 + 2 = 10 (to get 10, we add 08 or 8)

83 + 17 =?

STEP I

```
   83
   17
+ _____
  _____
```

OR

```
  0 83
  0 17
+ _____
  _____
```

STEP II

Now we add the once place digit (3 and 7)

```
    1
  0 83
  0 17
+ _____
    0
  _____
```

STEP III

Now we add the tenth place digit (1, 8 and 1)

```
  1 1
  0 83
  0 17
+ _____
   00
  _____
```

STEP IV

Now we add the hundredth place digit (1, 0 and 0)

```
  1 1
  0 83
  0 17
+ _____
  1 00
  _____
```

32 + 68 =?

STEP I

```
   32
   68
+ _____
  _____
```

OR

```
   0 32
   0 68
+ _____
  _____
```

STEP II

Now we add the once place digit (2 and 8)

```
     1
   0 32
   0 68
+ _____
     0
  _____
```

STEP III

Now we add the tenth place digit (1, 3 and 6)

```
   1 1
   0 32
   0 68
+ _____
    00
  _____
```

STEP IV

Now we add the hundredth place digit (1, 0 and 0)

```
   1 1
   0 32
   0 68
+ _____
   1 00
  _____
```

26 + 74 =?

STEP I

```
   26
   74
+ _____
  _____
```

OR

```
   0 26
   0 74
+ _____
  _____
```

STEP II

Now we add the once place digit (6 and 4)

```
     1
   0 26
   0 74
+ _____
     0
  _____
```

STEP III

Now we add the tenth place digit (1, 2 and 7)

```
   1 1
   0 26
   0 74
+ _____
    00
  _____
```

STEP IV

Now we add the hundredth place digit (1, 0 and 0)

```
   1 1
   0 26
   0 74
+ _____
   1 00
  _____
```

COMPLEMENT OF 100

83 + ? = 100

STEP I

```
   83
    ?
+ _____
  100
_______
```

OR

```
   083
     ?
+ _____
  100
_______
```

STEP II

```
   083
     ?    Here, how much we have to add to get 100.
+ _____
  100
_______
```

STEP III

Here, I substitutes **001** in place of question mark (It is my first Trail)

083 +**001** = 084 < 100 so my assumption is rang.

Here, I substitutes **002** in place of question mark (It is my second Trail)

083 +**002** = 85 < 100 so my assumption is rang.
Here, I substitutes **017** in place of question mark (It is my Nth Trail)
083 +**017** = 100 = 100 so my assumption is right.

```
   083
   017
+ _____
  100
_______
```

083 + 017 = 100 or 83 + 17 = 100 (to get 100, we add 017 or 17)

32 + ? = 100

STEP I

```
   32
    ?
+ _____
  100
_______
```

OR

```
   032
    ?
+ _____
  100
_______
```

STEP II

```
   032
    ?    Here, how much we have to add to get 100.
+ _____
  100
_______
```

STEP III

Here, I substitutes **001** in place of question mark (It is my first Trail)

032 +**001** = 033 < 100 so my assumption is rang.

Here, I substitutes **002** in place of question mark (It is my second Trail)

032 +**002** = 34 < 100 so my assumption is rang.

Here, I substitutes **068** in place of question mark (It is my Nth Trail)

032 +**068** = 100 = 100 so my assumption is right.

```
   032
   068
+ _____
  100
_______
```

032 + 068 = 100 or 32 + 68 = 100 (to get 100, we add 068 or 68)

26 + ? = 100

STEP I

```
   26
    ?
+ _____
  100
_______
```

OR

```
   026
    ?
+ _____
  100
_______
```

STEP II

```
   026
    ?     Here, how much we have to add to get 100.
+ _____
  100
_______
```

STEP III

Here, I substitutes **001** in place of question mark (It is my first Trail)

026 +**001** = 027 < 100 so my assumption is rang.

Here, I substitutes **002** in place of question mark (It is my second Trail)

026 +**002** = 28 < 100 so my assumption is rang.

Here, I substitutes **074** in place of question mark (It is my Nth Trail)

026 +**074** = 100 = 100 so my assumption is right.

```
   026
   074
+ _____
  100
_______
```

026 + 074 = 100 or 26 + 74 = 100 (to get 100, we add 026 or 74)

Practice Questions

Please say the answer with mouth within Second

1 76 (how much we have to add to get 100)
2 75 (how much we have to add to get 100)
3 74 (how much we have to add to get 100)
4 73 (how much we have to add to get 100)
5 72 (how much we have to add to get 100)
6 71 (how much we have to add to get 100)
7 77 (how much we have to add to get 100)
8 78 (how much we have to add to get 100)
9 79 (how much we have to add to get 100)
10 76 (how much we have to add to get 100)
11 27 (how much we have to add to get 100)
12 54 (how much we have to add to get 100)
13 32 (how much we have to add to get 100)
14 17 (how much we have to add to get 100)
15 38 (how much we have to add to get 100)
16 45 (how much we have to add to get 100)
17 82 (how much we have to add to get 100)
18 28 (how much we have to add to get 100)
19 53 (how much we have to add to get 100)
20 31 (how much we have to add to get 100)
21 89 (how much we have to add to get 100)
22 91 (how much we have to add to get 100)
23 19 (how much we have to add to get 100)
24 48 (how much we have to add to get 100)
25 69 (how much we have to add to get 100)
26 234 (how much we have to add to get 1000)
27 345 (how much we have to add to get 1000)
28 456 (how much we have to add to get 1000)
29 567 (how much we have to add to get 1000)
30 678 (how much we have to add to get 1000)
31 789 (how much we have to add to get 1000)
32 891 (how much we have to add to get 1000)
33 021 (how much we have to add to get 1000)
34 512 (how much we have to add to get 1000)
35 723 (how much we have to add to get 1000)
36 345 (how much we have to add to get 1000)

Now I am going to the first Problem

99 x 73 = ?

STEP I:

9 9 X 7 3 = ?

	7	3	(how much we add to get 100)
		?	
1	0	0	

	7	3	
	2	7	(Here, I am adding 27)
1	0	0	

_ _ 2 7

STEP II:

Subtract 1 from 73.
7 3 – 1 = 7 2

7 2 _ _

STEP III:

From Step I _ _ 2 7

From Step II 7 2 _ _

From Step I & Step II 7 2 2 7

99 x 56= ?

STEP I:

9 9 X 5 6 = ?

	5	6 ?	(how much we add to get 100)
1	0	0	
	5	6	
	4	4	(Here, I am adding 44)
1	0	0	

_ _ 4 4

STEP II:

Subtract 1 from 56.

5 6 – 1 = 5 5

5 5 _ _

STEP III:

From Step I _ _ 4 4

From Step II 5 5 _ _

From Step I & Step II 5 5 4 4

99 x 64= ?

STEP I:

9 9 X 6 4 = ?

	6	4	(how much we add to get 100)
		?	
1	0	0	

	6	4	
	3	6	(Here, I am adding 36)
1	0	0	

_ _ 3 6

STEP II:

Subtract 1 from 64.

6 4 – 1 = 6 3

6 3 _ _

STEP III:

From Step I _ _ 3 6

From Step II 6 3 _ _

From Step I & Step II 6 3 3 6

Practice Questions

Please say the answer with mouth within three Seconds.

1 99 x 82 =?
2 99 x 26 =?
3 99 x 67 =?
4 99 x 82 =?
5 99 x 54 =?
6 99 x 45 =?
7 99 x 37 =?
8 99 x 89 =?
9 99 x 31 =?
10 99 x 17 =?

999 x 678= ?

STEP I:

999X678 = ?

	6	7	8	(how much we add to get 1000)
			?	
1	0	0	0	

	6	7	8	
	3	2	2	(Here, I am adding 322)
1	0	0	0	

_ _ _ 3 2 2

STEP II:

Subtract 1 from 678.

6 7 8 – 1 = 6 7 7

6 7 7 _ _ _

STEP III:

From Step I _ _ _ 3 2 2

From Step II 6 7 7 _ _ _

From Step I & Step II 6 7 7 3 2 2

999 x 567= ?

STEP I:

999X567 = ?

	5	6	7	(how much we add to get 1000)
			?	
1	0	0	0	

	5	6	7	
	4	3	3	(Here, I am adding 433)
1	0	0	0	

_ _ _ 4 3 3

STEP II:

Subtract 1 from 567.

5 6 7 – 1 = 5 6 6

5 6 6 _ _ _

STEP III:

From Step I _ _ _ 4 3 3

From Step II 5 6 6 _ _ _

From Step I & Step II 5 6 6 4 3 3

999 x 468= ?

STEP I:

999X468 = ?

	4	6	8	(how much we add to get 1000)
			?	
1	0	0	0	

	4	6	8	
	5	3	2	(Here, I am adding 532)
1	0	0	0	

_ _ _ 5 3 2

STEP II:

Subtract 1 from 567.

4 6 8 – 1 = 4 6 7

4 6 7 _ _ _

STEP III:

From Step I _ _ _ 5 3 2

From Step II 4 6 7 _ _ _

From Step I & Step II 4 6 7 5 3 2

Practice Questions

Please say the answer with mouth within five Seconds.

1 999 x 832 =?
2 999 x 262 =?
3 999 x 467 =?
4 999 x 852 =?
5 999 x 548 =?
6 999 x 245 =?
7 999 x 337 =?
8 999 x 894 =?
9 999 x 731 =?
10 999 x 187 =?

999 x 78= ?

STEP I:

999X78 = ?

	7	8	(how much we add to get 100)
		?	
1	0	0	
	7	8	
	2	2	(Here, I am adding 22)
1	0	0	

___22

STEP II:

$$\underline{9\,9\,9} \times \underline{7\,\dot{8}} = ?$$

Here, three digits are. Here, two digits are.

So,

$$\boxed{9}\,\underline{9\,9} \times \underline{7\,\dot{8}} = ?$$

Here, two digits are. Here, two digits are.

$$\_\ \_\ 9\ \_\ \_$$

STEP III:

Subtract 1 from $7\dot{8}$.

$7\dot{8} - 1 = 7\,7$

$$7\,7\ \_\ \_\ \_$$

STEP IV:

From Step I $\_\ \_\ \_\ 2\,2$

From Step II $\_\ \_\ 9\ \_\ \_$

From Step III $7\,7\ \_\ \_\ \_$

From Step I, Step II and Step III $7\,7\,9\,2\,2$

999 x 53= ?

STEP I:

999X53 = ?

	5	3	(how much we add to get 100)
		?	
1	0	0	

	5	3	
	4	7	(Here, I am adding 47)
1	0	0	

_ _ _ 4 7

STEP II:

$$\underline{999} \times \underline{53} = ?$$

Here, three digits are. Here, two digits are.

So,

$$\boxed{9}\,\underline{99} \times \underline{53} = ?$$

Here, two digits are. Here, two digits are.

_ _ 9 _ _

STEP III:

Subtract 1 from 53.

53 – 1 = 52

52 _ _ _

STEP IV:

From Step I _ _ _ 4 7

From Step II _ _ 9 _ _

From Step III 52 _ _ _

From Step I, Step II and Step III 52947

999 x 42= ?

STEP I:

999X42 = ?

	4	2	(how much we add to get 100)
		?	
1	0	0	

	4	2	
	5	8	(Here, I am adding 58)
1	0	0	

_ _ _ 5 8

STEP II:

$$999 \times 42 = ?$$

Here, three digits are. Here, two digits are.

So,

$$\boxed{9}\,99 \times 42 = ?$$

Here, two digits are. Here, two digits are.

_ _ 9 _ _

STEP III:

Subtract 1 from 42.

42 – 1 = 41

41 _ _ _

STEP IV:

From Step I _ _ _ 58

From Step II _ _ 9 _ _

From Step III 41 _ _ _

From Step I, Step II and Step III 41958

Practice Questions

Please say the answer with mouth within five Seconds.

1 999 x 32 =?
2 999 x 22 =?
3 999 x 46 =?
4 999 x 85 =?
5 999 x 58 =?
6 999 x 45 =?
7 999 x 37 =?
8 999 x 84 =?
9 999 x 73 =?
10 999 x 18 =?

9999 x 5678= ?

STEP I:

9 9 9 9 X 5 6 7 8= ?

	5	6	7	8	(how much we add to get 10000)
				?	
1	0	0	0	0	
	5	6	7	8	
	4	3	2	2	(Here, I am adding 4322)
1	0	0	0	0	

_ _ _ _ 4 3 2 2

STEP II:

Subtract 1 from 5678.

5 6 7 8 – 1 = 5 6 7 7

5 6 7 7 _ _ _ _

STEP III:

From Step I _ _ _ _ 4 3 2 2

From Step II 5 6 7 7 _ _ _ _

From Step I & Step II 5 6 7 7 4 3 2 2

9999 x 4567= ?

STEP I:

9 9 9 9 X 4 5 6 7= ?

	4	5	6	7	(how much we add to get 10000)
				?	
1	0	0	0	0	
	4	5	6	7	
	5	4	3	3	(Here, I am adding 5433)
1	0	0	0	0	

_ _ _ _ 5 4 3 3

STEP II:

Subtract 1 from 4567.

4 5 6 7 – 1 = 4 5 6 6

4 5 6 6 _ _ _ _

STEP III:

From Step I _ _ _ _ 5 4 3 3

From Step II 4 5 6 6 _ _ _ _

From Step I & Step II 4 5 6 6 5 4 3 3

9999 x 3456= ?

STEP I:

9 9 9 9 X 3 4 5 6= ?

	3	4	5	6 ?	(how much we add to get 10000)
1	0	0	0	0	
	3	4	5	6	
	6	5	4	4	(Here, I am adding 6544)
1	0	0	0	0	

_ _ _ _ 6 5 4 4

STEP II:

Subtract 1 from 3456.

3 4 5 6 – 1 = 3 4 5 5

3 4 5 5 _ _ _ _

STEP III:

From Step I _ _ _ _ 6 5 4 4

From Step II 3 4 5 5 _ _ _ _

From Step I & Step II 3 4 5 5 6 5 4 4

Practice Questions

Please say the answer with mouth within ten Seconds.

1 9999 x 3322 =?
2 9999 x 2122 =?
3 9999 x 4576 =?
4 9999 x 8135 =?
5 9999 x 5478 =?
6 9999 x 4375 =?
7 9999 x 3527 =?
8 9999 x 8264 =?
9 9999 x 7643 =?
10 9999 x 1948 =?

9999 x 456= ?

STEP I:

9999X456=?

	4	5	6 ?	(how much we add to get 1000)
1	0	0	0	
	4	5	6	
	5	4	4	(Here, I am adding 544)
1	0	0	0	

____544

STEP II:

$9\,999 \times 456 = ?$

Here, four digits are. Here, three digits are.

So,

$9\,999 \times 456 = ?$

Here, three digits are. Here, three digits are.

_ _ _ 9 _ _ _

STEP III:

Subtract 1 from 456.

4 5 6 – 1 = 4 5 5

4 5 5 _ _ _ _

STEP IV:

From Step I _ _ _ _ 5 4 4

From Step II _ _ _ 9 _ _ _

From Step III 4 5 5 _ _ _ _

From Step I, Step II and Step III 4 5 5 9 5 4 4

9999 x 369= ?

STEP I:

9999X369=?

		3	6	9 (how much we add to get 1000)
				?
1	0	0	0	
		3	6	9
		6	3	1 (Here, I am adding 631)
1	0	0	0	

____631

STEP II:

$$9\,999 \times 369 = ?$$

Here, four digits are. Here, three digits are.

So,

$$9\,999 \times 369 = ?$$

Here, three digits are. Here, three digits are.

_ _ _ 9 _ _ _

STEP III:

Subtract 1 from 369.

3 6 9 – 1 = 3 6 8

3 6 8 _ _ _ _

STEP IV:

From Step I _ _ _ _ 6 3 1

From Step II _ _ _ 9 _ _ _

From Step III 3 6 8 _ _ _ _

From Step I, Step II and Step III 3 6 8 9 6 3 1

9999 x 482= ?

STEP I:

9999X482=?

	4	8	2 ?	(how much we add to get 1000)
1	0	0	0	
	4	8	2	
	5	1	8	(Here, I am adding 518)
1	0	0	0	

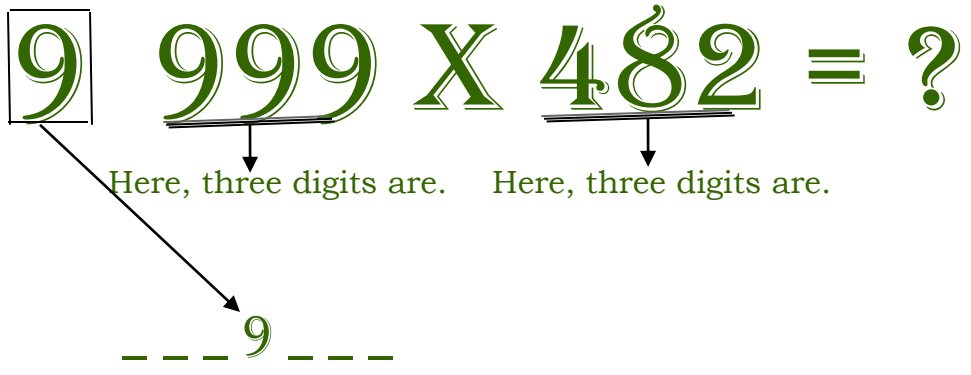
____518

STEP II:

9 999 X 482 = ?

Here, four digits are. Here, three digits are.

So,



STEP III:

Subtract 1 from 482.

4 8 2 – 1 = 4 8 1

4 8 1 _ _ _ _

STEP IV:

From Step I _ _ _ _ 5 1 8

From Step II _ _ _ 9 _ _ _

From Step III 4 8 1 _ _ _ _

From Step I, Step II and Step III 4 8 1 9 5 1 8

Practice Questions

Please say the answer with mouth within ten Seconds.

1 9999 x 322 =?
2 9999 x 222 =?
3 9999 x 476 =?
4 9999 x 835 =?
5 9999 x 578 =?
6 9999 x 475 =?
7 9999 x 327 =?
8 9999 x 864 =?
9 9999 x 743 =?
10 9999 x 148 =?

9999 x 82= ?

STEP I:

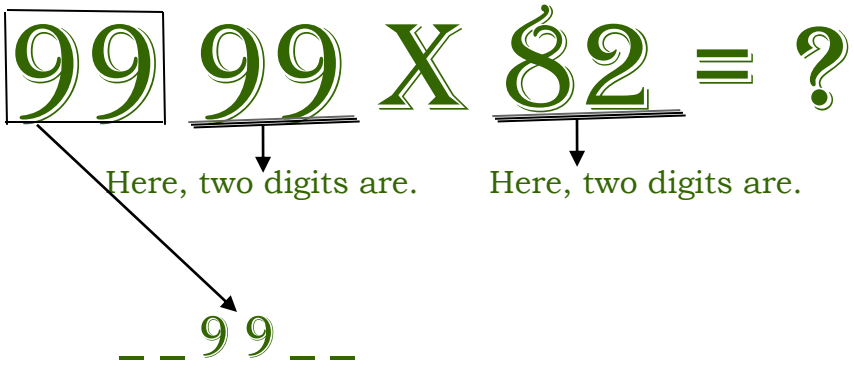
9999X82=?

	8	2	(how much we add to get 100)
		?	
1	0	0	
	8	2	
	1	8	(Here, I am adding 18)
1	0	0	

____18

STEP II:

So,



STEP III:

Subtract 1 from 82.

8 2 – 1 = 8 1

8 1 _ _ _ _

STEP IV:

From Step I _ _ _ _ 1 8

From Step II _ _ 9 9 _ _

From Step III 8 1 _ _ _ _

From Step I, Step II and Step III 8 1 9 9 1 8

9999 x 48= ?

STEP I:

9999X48=?

	4	8	(how much we add to get 100)
		?	
1	0	0	
	4	8	
	5	2	(Here, I am adding 52)
1	0	0	

____52

STEP II:

$9\,999 \times 48 = ?$

Here, four digits are. Here, two digits are.

So,

$99\,99 \times 48 = ?$

Here, two digits are. Here, two digits are.

_ _ 9 9 _ _

STEP III:

Subtract 1 from 48.

48 – 1 = 47

4 7 _ _ _ _

STEP IV:

From Step I _ _ _ _ 5 2

From Step II _ _ 9 9 _ _

From Step III 4 7 _ _ _ _

From Step I, Step II and Step III 4 7 9 9 5 2

9999 x 26= ?

STEP I:

9999X26=?

	2	6	(how much we add to get 100)
		?	
1	0	0	
	2	6	
	7	4	(Here, I am adding 74)
1	0	0	

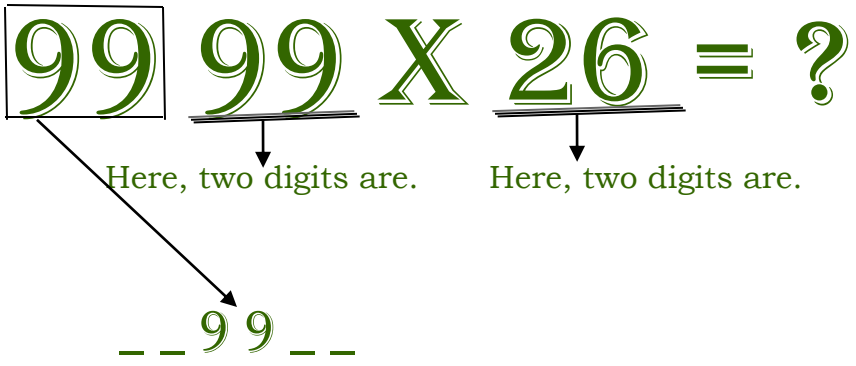
_ _ _ _ 7 4

STEP II:

9 999 X 26 = ?

Here, four digits are. Here, two digits are.

So,



STEP III:

Subtract 1 from 26.

2 6 – 1 = 2 5

2 5 _ _ _ _

STEP IV:

From Step I _ _ _ _ 7 4

From Step II _ _ 9 9 _ _

From Step III 2 5 _ _ _ _

From Step I, Step II and Step III 2 5 9 9 7 4

Practice Questions

Please say the answer with mouth within ten Seconds.

1 9999 x 32 =?
2 9999 x 22 =?
3 9999 x 47 =?
4 9999 x 83 =?
5 9999 x 57 =?
6 9999 x 47 =?
7 9999 x 32 =?
8 9999 x 86 =?
9 9999 x 74 =?
10 9999 x 14 =?

9999 x 9999= ?

STEP I:

9 9 9 9 X 9 9 9 9= ?

	9	9	9	9	(how much we add to get 10000)
				?	
1	0	0	0	0	
	9	9	9	9	
	0	0	0	1	(Here, I am adding 0001)
1	0	0	0	0	

_ _ _ _ 0 0 0 1

STEP II:

Subtract 1 from 9999.

9 9 9 9 – 1 = 9 9 9 8

9 9 9 8 _ _ _ _

STEP III:

From Step I _ _ _ _ 0 0 0 1

From Step II 9 9 9 8 _ _ _ _

From Step I & Step II 9 9 9 8 0 0 0 1

9999 x 999= ?

STEP I:

9999X999=?

	9	9	9	(how much we add to get 1000)
			?	
1	0	0	0	
	9	9	9	
	0	0	1	(Here, I am adding 001)
1	0	0	0	

_ _ _ _ 0 0 1

STEP II:

9 999 X 999 = ?

Here, four digits are. Here, three digits are.

So,

9 999 X 999 = ?

Here, three digits are. Here, three digits are.

_ _ _ 9 _ _ _

STEP III:

Subtract 1 from 999.

9 9 9 – 1 = 9 9 8

9 9 8 _ _ _ _

STEP IV:

From Step I _ _ _ _ 0 0 1

From Step II _ _ _ 9 _ _ _

From Step III 9 9 8 _ _ _ _

From Step I, Step II and Step III 9 9 8 9 0 0 1

9999 x 99= ?

STEP I:

9999X99=?

	9	9	(how much we add to get 100)
		?	
1	0	0	
	9	9	
	0	1	(Here, I am adding 01)
1	0	0	

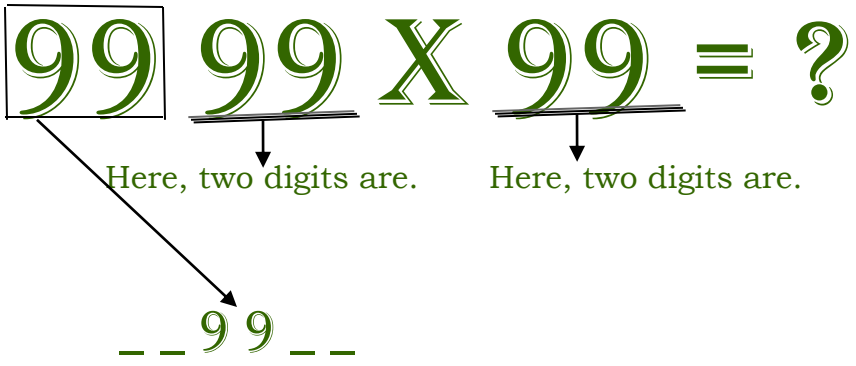
_ _ _ _ 0 1

STEP II:

9 999 X 99 = ?

Here, four digits are. Here, two digits are.

So,



STEP III:

Subtract 1 from 99.

9 9 – 1 = 9 8

9 8 _ _ _ _

STEP IV:

From Step I _ _ _ _ 0 1

From Step II _ _ 9 9 _ _

From Step III 9 8 _ _ _ _

From Step I, Step II and Step III 9 8 9 9 0 1

Practice Questions

Please say the answer with mouth within ten Seconds.

1 9999 x 9999=?
2 9999 x 99=?
3 9999 x 9 =?
4 99999 x 99999 =?
5 99999 x 99 =?
6 99999 x 999 =?
7 99999 x 9999 =?
8 999999 x 999999 =?
9 999999 x 99999 =?
10 999999 x 999 =?

PROFIT AND LOSS

QUANTITATIVE APTITUDE

Arvind build a house, for this house he spent Rs 4.

In market, real estate boom increase. So he wants to sell his house with Rs 5.

At this movement, what is his Profit and what is his Profit Percent.

Profit:

Selling Price is more than Cast Price (Invest Price). Then we can get Profit.

SP > CP (Symbolically)

After some time, he built new house, for this house, he spent Rs 4.

But he wants to sell his house to marry his daughter to dowry.

So, sell his house Rs 3, when boom decrease.

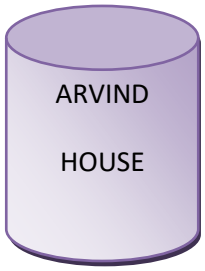
At this movement, what is his Loss and what is his Loss percent.

Loss:

Selling Price is less than Cast Price (Invest Price). Then we can get Loss.

SP < CP (Symbolically)

Rs 4 Cost Price



Rs 5 Selling Price

Cost Price = Rs 4

Selling Price = Rs 5

Questions

1. What is the profit

   Salvation
   Here, Selling Price is more compare to Cost Price. So we get profit
   Here, Profit is Rs 1.

2. What is Profit Percent

   Salvation

   Principle

$$\text{Profit Percent} = \frac{\text{Profit}}{\text{Cost Price}} \times 100\%$$

$$= \frac{1}{4} \times 100\%$$

$$= \frac{100}{4}\ \%$$

$$= 25\%$$

Rs 4 Cost Price

Profit = 25%
Selling Price = ?

From the above diagram, he does not tell Selling price, instead of this he tell his Profit Percentage. Then we find out Selling Price

3. Cost Price = Rs4
   Selling Price = ?
   Profit Percent = 25%

   Salvation

   Formula

$$\text{Selling Price} = \text{Cost Price} \times \frac{100 + \text{Profit Percent}}{100}$$

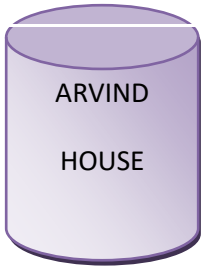
$$\text{Selling Price} = 4 \times \frac{100 + 25}{100}$$

$$\text{Selling Price} = 4 \times \frac{125}{100}$$

$$\text{Selling Price} = 4 \times \frac{5}{4}$$

Selling Price = Rs5

Cost Price = ?



Rs 5 Selling Price

Profit = 25%

From the above diagram, he does not tell Cost price, instead of this he tell his Profit Percentage. Then we find out Cost Price

1. Cost Price = ?
   Selling Price = Rs5
   Profit Percent = 25%

   Salvation

   Formula

$$\text{Selling Price} = \text{Cost Price} \times \frac{100 + \text{Profit Percent}}{100}$$

$$5 = \text{Cost Price} \times \frac{100 + 25}{100}$$

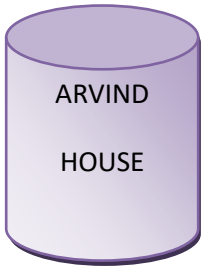
$$5 = \text{Cost Price} \times \frac{125}{100}$$

$$5 = \text{Cost Price} \times \frac{5}{4}$$

Cost Price = Rs4

Rs 4 Cost Price

Rs 3 Selling Price



Cost Price = Rs 4

Selling Price = Rs 3

Questions

1. What is the Loss

   Salvation
   Here, Selling Price is less compare to Cost Price. So we get Loss
   Here, Loss is Rs 1.

2. What is Loss Percent

   Salvation

   Principle

$$\text{Loss Percent} = \frac{\text{Loss}}{\text{Cost Price}} \times 100\%$$

$$= \frac{1}{4} \times 100\%$$

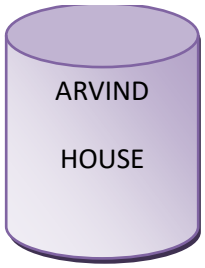
$$= \frac{100}{4} \%$$

$$= 25\%$$

Rs 4 Cost Price

Loss= 25%

Selling Price = ?



From the above diagram, he does not tell Selling price, instead of this he tell his Loss Percentage. Then we find out Selling Price

3. Cost Price = Rs4
   Selling Price = ?
   Loss Percent = 25%

   Salvation

   Formula

$$\text{Selling Price} = \text{Cost Price} \times \frac{100 - \text{Profit Percent}}{100}$$

$$\text{Selling Price} = 4 \times \frac{100 - 25}{100}$$

$$\text{Selling Price} = 4 \times \frac{75}{100}$$

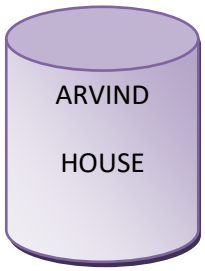
$$\text{Selling Price} = 4 \times \frac{3}{4}$$

Selling Price = Rs 3

Cost Price = ?

Rs 3 Selling Price

Profit = 25%



From the above diagram, he does not tell Cost price, instead of this he tell his Loss Percentage. Then we find out Cost Price

1. Cost Price = ?
   Selling Price = Rs3
   Profit Percent = 25%

   Salvation

   Formula

$$\text{Selling Price} = \text{Cost Price} \times \frac{100 - \text{Profit Percent}}{100}$$

$$3 = \text{Cost Price} \times \frac{100 - 25}{100}$$

$$3 = \text{Cost Price} \times \frac{75}{100}$$

$$3 = \text{Cost Price} \times \frac{3}{4}$$

Cost Price = Rs 4

TIME AND DISTANCE

QUANTITATIVE APTITUDE

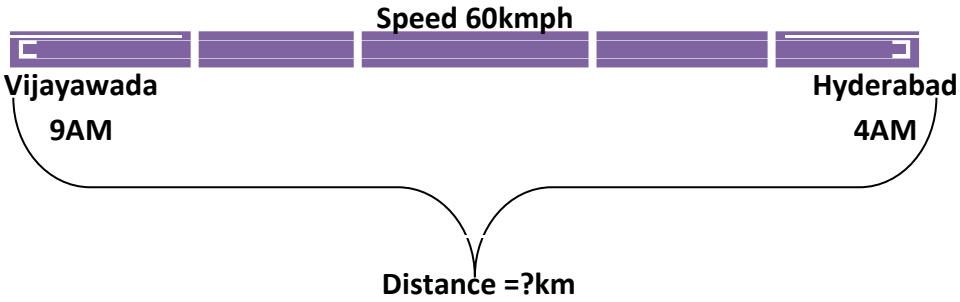
A business man, he launch new branch in Vijayawada. He belongs to Hyderabad. He travels in car from Hyderabad to Vijayawada with the speed of 60 kmph. He start the car 4AM and he reach that place at 9AM.

Note

In Time and Distance, new word is 'Speed'.

Relation among Time, Distance and Speed

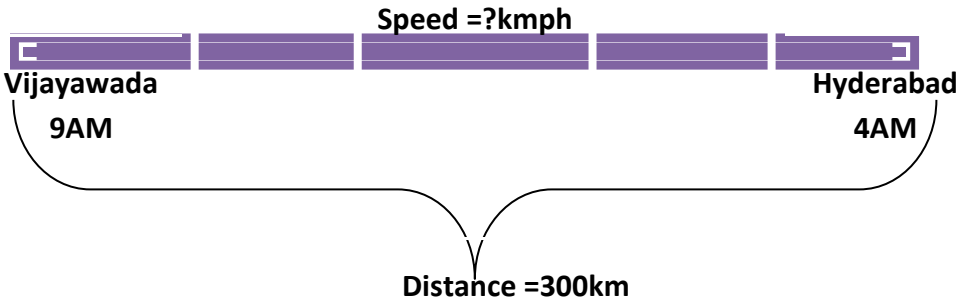
Distance = Speed x Time



Questions

1. Distance = ?
   Speed = 60kmph
   Time = 4AM to 9AM

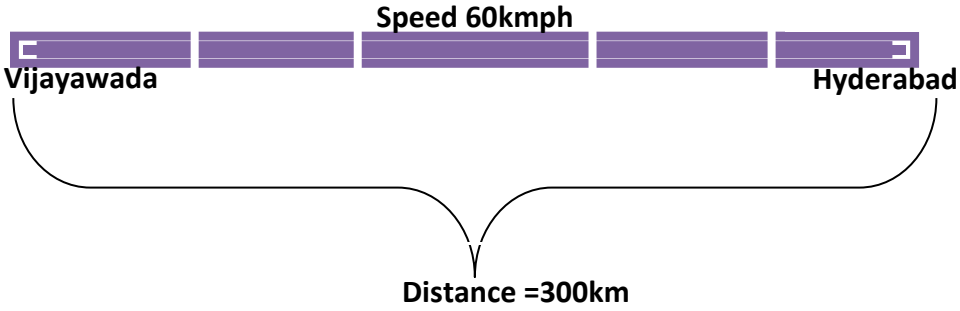
   Solution
   In the above problem we find out Distance.
   Here, time is 5hours (9am – 4am)
   Speed = 60kmph
   Formula
   Distance = Speed x Time
   Distance = 60kmph x 5h
   Distance = [60km x 5h]/h (. · . h/h = 1)
   Distance = 60 x 5 km
   Distance = 300 km



Questions

1. Distance = 300km
   Speed = ?kmph
   Time = 4AM to 9AM

   Solution
   In the above problem we find out Speed of the car.
   Distance = 300km
   Here, time is 5hours (9am – 4am)
   Formula
   Distance = Speed x Time
   300km = Speed x 5h
   300km/5h = Speed
   60km/h = Speed
   60kmph = Speed
   Speed = 60kmph



Questions

1. Distance = 300km
   Speed = 60kmph
   Time = ? in Hours

   Solution
   In the above problem we find out Time.
   Distance = 300km
   Speed = 60kmph
   Formula
   Distance = Speed x Time
   300km = 60kmph x Time
   300km/60kmph = Time
   300kmh/60km = Time
   300h/60 = Time
   5h = Time
   Time = 5h

1Kilo Metre = 1000 Metre
1Hour = 60 Minutes
1 Minute = 60 Seconds
1 Hour = 3600 Seconds

AND

1Mitre = [1/1000] Kilo Metre
1Munite = [1/60] Hours
1Second = [1/60] Minutes
1Second = [1/3600] Hours

1Hour = 60 Minutes
= 1Minute (1M = 60S)
= 60 x 60 Seconds
1Hour = 3600 Seconds

1Second = [1/60] Minutes
= 1Minute [1M = (1/60H)]
= [1/ (60 x 60)] Hours
1 Seconds = (1/3600) Hours

Questions

2. 1KMPH convert into MPS

Solution

- ⇨ 1KMPH
- ⇨ 1KM/H
- ⇨ 1000M/3600S
- ⇨ 5M/18S
- ⇨ (5/18)M/S
- ⇨ (5/18)MPS

3. 1KMPH convert into MPH

Solution

- ⇨ 1KMPH
- ⇨ 1KM/H
- ⇨ 1000M/H
- ⇨ 1000M/H
- ⇨ 1000MPH

4. 1KMPH convert into KMPS

Solution

- ⇨ 1KMPH
- ⇨ 1KM/H
- ⇨ 1KM/3600S
- ⇨ (1/3600)KM/S
- ⇨ (1/3600)KMPS

5. 1KMPH convert into MPM

Solution

- ⇨ 1KMPH
- ⇨ 1KM/H
- ⇨ 1000M/60M
- ⇨ (1000/60)M/M
- ⇨ (50/3)MPM

6. 1KMPH convert into KMPM

Solution

⇨ 1KMPH
⇨ 1KM/H
⇨ 1KM/60M
⇨ (1/60)KM/M
⇨ (1/60)KMPM

7. 1MPS convert into KMPH

Solution

⇨ 1MPS
⇨ 1M/S
⇨ 1 x (1/1000)KM/(1/3600)H
⇨ (3600/1000)KM/H
⇨ (18/5)KMPH

8. 1MPS convert into KMPS

Solution

⇨ 1MPS
⇨ 1M/S
⇨ (1/1000)KM/S
⇨ (1/1000)KMPS

9. 1MPS convert into MPH

Solution

⇨ 1MPS
⇨ 1M/S
⇨ 1M/(1/3600)H
⇨ 3600MPH

10. 1MPS convert into KMPM

Solution

- ⇨ 1MPS
- ⇨ (1/1000)M/(1/60)M
- ⇨ 60KM/1000M
- ⇨ (3/50)KMPM

11. 1MPS convert into MPM

Solution

- ⇨ 1MPS
- ⇨ 1M/(1/60)M
- ⇨ 60M/1M
- ⇨ 60MPM

I. Convert 18kmph into mps.

Solution

- ⇨ 18KMPH
- ⇨ 18KM/H
- ⇨ [18x1000M]/3600S
- ⇨ [18x5M]/18S
- ⇨ 5M/S
- ⇨ 5MPS

II. Convert 36kmph into mps.

Solution

- ⇨ 36KMPH
- ⇨ 36KM/H
- ⇨ [36x1000M]/3600S
- ⇨ [36x5M]/18S
- ⇨ 2x5M/S
- ⇨ 10MPS

III. Convert 54kmph into mps.

Solution

- ⇨ 54KMPH
- ⇨ 54KM/H
- ⇨ [54x1000M]/3600S
- ⇨ [54x5M]/18S
- ⇨ 3x5M/S
- ⇨ 15MPS

Watch the following

KMPH	MPS
18	5
36	10
54	15
72	20
90	25

IV. Convert 5mps into Kmph.

Solution

- ⇨ 5MPS
- ⇨ 5M/S
- ⇨ 5 x (1/1000)KM/(1/3600)H
- ⇨ (5x3600/1000)KM/H
- ⇨ 18KMPS

V. Convert 10mps into Kmph.

Solution

- ⇨ 10MPS
- ⇨ 10M/S
- ⇨ 10 x (1/1000)KM/(1/3600)H
- ⇨ (10x3600/1000)KM/H
- ⇨ 36KMPS

Note

5mps = 18kmph x 1 =18kmph

10mps = 18kmph x 2 =36kmph

15mps = 18kmph x 3 =54kmph

Watch the following

MPS	KMPH
5	18
10	36
15	54
20	72
25	90

TABLES

QUANTITATIVE APTITUDE

TABLES

X	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80

Note: Every one must know upto 8 tables
Not nesesary that much effort in this tables 09, 10 and 11

Table 12

1. 12 x 11 =?

Step 1

12 has how much more, compare to 10, ie 02
11 has how much more, compare to 10, ie 01

12	02
11	01

Step 2

12	02	
11	01	02 x 01 = 2

2

Step 3

12	02	
11	01	12 + 01 = 13

13	2

Practice Questions

1. 12 x 12 =?
2. 12 x 13 =?
3. 12 x 14 =?
4. 12 x 15 =?
5. 12 x 16 =?
6. 12 x 17 =?
7. 12 x 18 =?
8. 12 x 19 =?

Table 13

1. 13 x 12 =?

Step 1

13 has how much more, compare to 10, ie 03
12 has how much more, compare to 10, ie 02

13	03
12	02

Step 2

13	03	
12	02	03 x 02 = 6

6

Step 3

13	03	
12	02	13 + 02 = 15

15	6

Practice Questions

1. 13 x 11 =?
2. 13 x 13 =?
3. 13 x 14 =?
4. 13 x 15 =?
5. 13 x 16 =?
6. 13 x 17 =?
7. 13 x 18 =?
8. 13 x 19 =?

Table 14

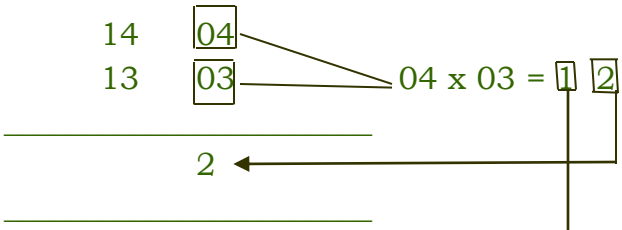
1. 14 x 13 =?

Step 1

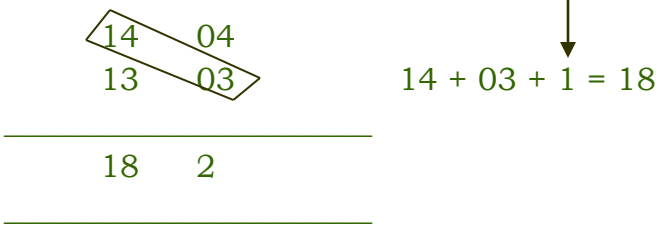
14 has how much more, compare to 10, ie 04
13 has how much more, compare to 10, ie 03

14	04
13	03

Step 2



Step 3



Practice Questions

1. 14 x 11 =?
2. 14 x 12 =?
3. 14 x 14 =?
4. 14 x 15 =?
5. 14 x 16 =?
6. 14 x 17 =?
7. 14 x 18 =?
8. 14 x 19 =?

Table 15

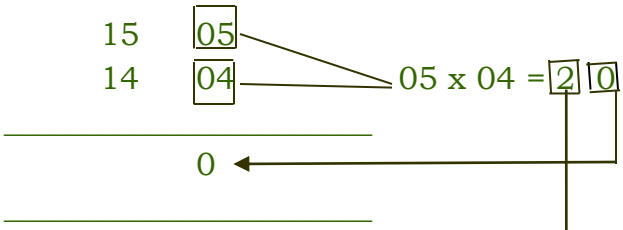
1. 15 x 14 =?

Step 1

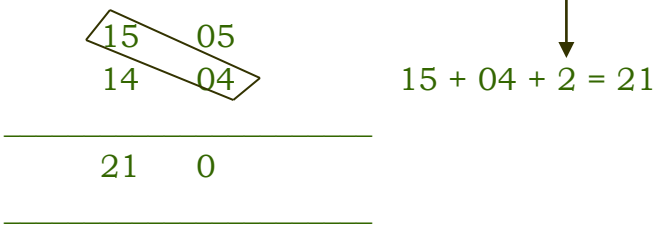
15 has how much more, compare to 10, ie 05
14 has how much more, compare to 10, ie 04

15	05
14	04

Step 2



Step 3



Practice Questions

1. 15 x 11 =?
2. 15 x 12 =?
3. 15 x 13 =?
4. 15 x 15 =?
5. 15 x 16 =?
6. 15 x 17 =?
7. 15 x 18 =?
8. 15 x 19 =?

Table 16

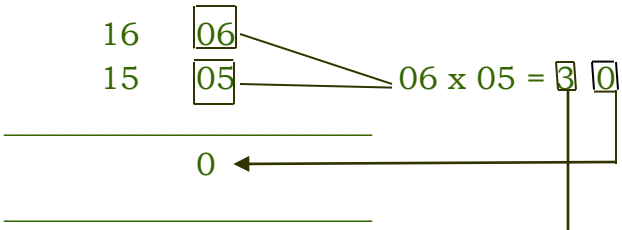
1. 16 x 15 =?

Step 1

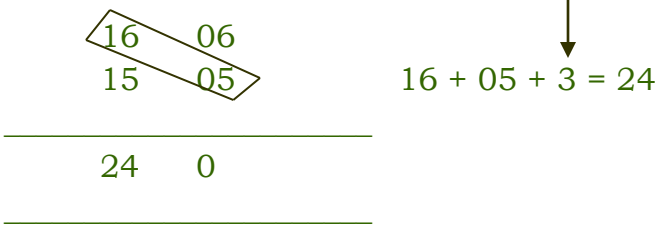
16 has how much more, compare to 10, ie 06
15 has how much more, compare to 10, ie 05

16	06
15	05

Step 2



Step 3



Practice Questions

1. 16 x 11 =?
2. 16 x 12 =?
3. 16 x 13 =?
4. 16 x 14 =?
5. 16 x 16 =?
6. 16 x 17 =?
7. 16 x 18 =?
8. 16 x 19 =?

Table 17

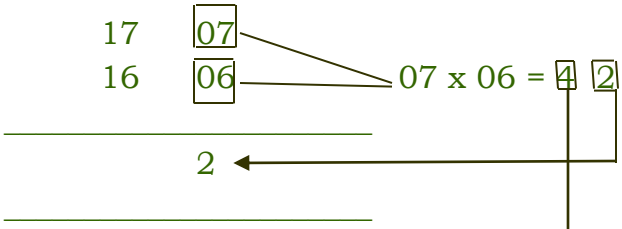
1. 17 x 16 =?

Step 1

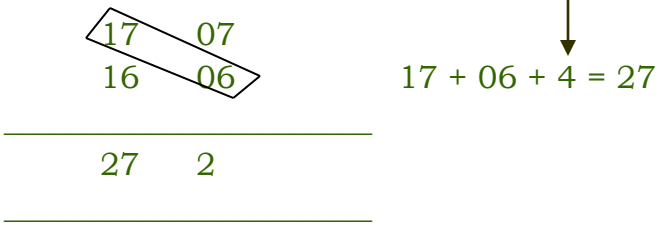
17 has how much more, compare to 10, ie 07
16 has how much more, compare to 10, ie 06

17	07
16	06

Step 2



Step 3



Practice Questions

1. 17 x 11 =?
2. 17 x 12 =?
3. 17 x 13 =?
4. 17 x 14 =?
5. 17 x 15 =?
6. 17 x 17 =?
7. 17 x 18 =?
8. 17 x 19 =?

Table 18

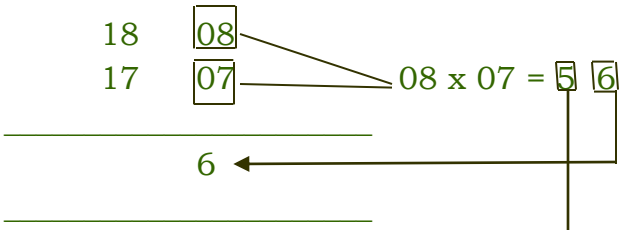
1. 18 x 17 =?

Step 1

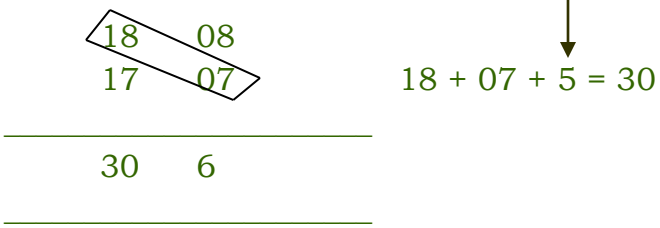
18 has how much more, compare to 10, ie 08
17 has how much more, compare to 10, ie 07

18	08
17	07

Step 2



Step 3



Practice Questions

1. 18 x 11 =?
2. 18 x 12 =?
3. 18 x 13 =?
4. 18 x 14 =?
5. 18 x 15 =?
6. 18 x 16 =?
7. 18 x 18 =?
8. 18 x 19 =?

Table 19

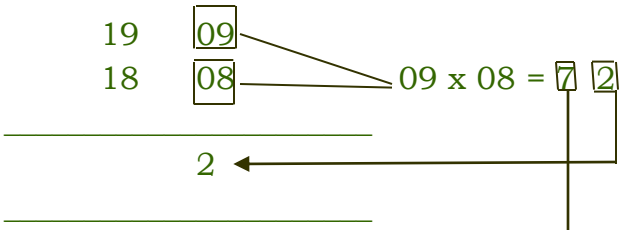
1. 19 x 18 =?

Step 1

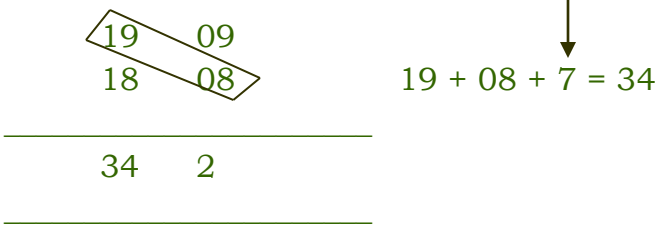
19 has how much more, compare to 10, ie 09
18 has how much more, compare to 10, ie 08

19	09
18	08

Step 2



Step 3



Practice Questions

1. 19 x 11 =?
2. 19 x 12 =?
3. 19 x 13 =?
4. 19 x 14 =?
5. 19 x 15 =?
6. 19 x 16 =?
7. 19 x 17 =?
8. 19 x 19 =?

1. 13 x 7 =?

Step 1

13 has how much more, compare to 10, ie 03
07 has how much less, compare to 10, ie 03

13 03
07 - 3

Step 2

13 03
07 - 3 03 x - 3 = - 09

0
- 9

Step 3

13 03
07 - 3 13 + (- 3) = 10

10 0
-9

Step 4

1 0 0
- 9

9 1

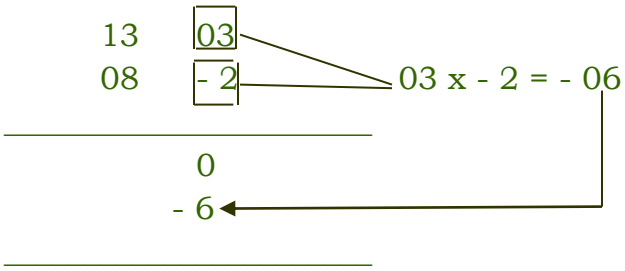
1. 13 x 8 =?

Step 1

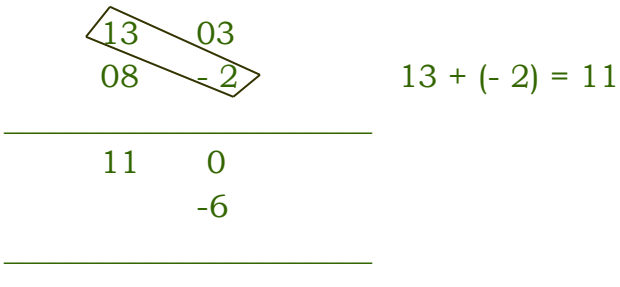
13 has how much more, compare to 10, ie 03
08 has how much less, compare to 10, ie 02

13	03
08	- 2

Step 2



Step 3



Step 4

1 1 0
- 6

1 0 4

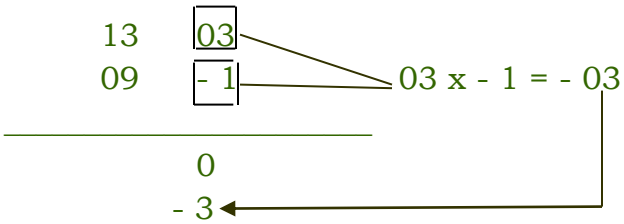
1. 13 x 9 =?

Step 1

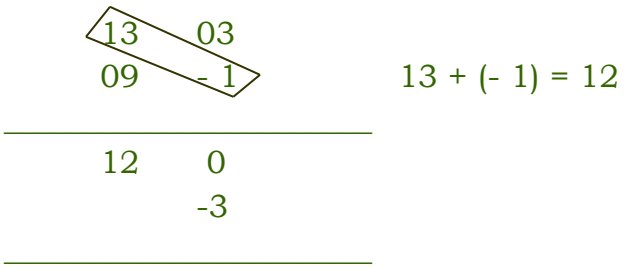
13 has how much more, compare to 10, ie 03
09 has how much less, compare to 10, ie 01

13	03
09	- 1

Step 2



Step 3



Step 4

1 2 0
- 3

1 1 7

Note: If you interest, write tables from 1 to 20

CUBE AND CUBE ROOT

QUANTITATIVE APTITUDE

CUBE

$(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$

Using above formula, we find out cubes of two digit numbers.

1. Find out 12 cube value?

   Here I am taking 12 as a=10, b=2 [.-. $(a+b)^3 = (10+2)^3$]
   $(10+2)3 = 10^3 + 3.10^2.2 + 3.10.2^2 + 2^3$

   This is the process, but I am not going that way.

   $(12)^3$=

   Step 1
   2^3 (= b^3) value = 8 (this is our unit value of 12 cube)
   $(12)^3$ = ---8.

   Step 2
   $3.1.2^2$ (=$3.a.b^2$) value 3.1.4 = 12 (Here 2 is tenth place and 1 added to hundred digit place).

   1
   $(12)^3$ = --28.

   Step 3
   $3.1^2.2$ (=$3.a^2.b$) value $3.1^2.2$ = 6 (Here 6, 1 is added to this = 7 is hundred place).

   1
   $(12)^3$ = -728.

   Step 4
   1^3 (=a^3) value 1^3 = 1 (Here 1 is thousand place).

   1
   $(12)^3$ = 1728.

   Our 12 cube value is 1728

$(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$

1. Find out 13 cube value?

Step 1

3^3 (= b^3) value = 27 (here 7 is our unit place value of 13 cube and 2 added to the tenth place digit value)

2

$(13)^3$ = ---7.

Step 2

$3.1.3^2$ (=$3.a.b^2$) value 3.1.9 = 27 (Here 7, 2 is added to this =9 is tenth place and 2 added to hundred place digit value).

2

$(13)^3$ = --97.

Step 3

$3.1^2.3$ (=$3.a^2.b$) value $3.1^2.3$ = 9 (Here 9, 2 is added to this = 11. Here 1 is hundred place and 1is added to thousand places).

12

$(13)^3$ = -197.

Step 4

1^3 (=a^3) value 1^3 = 1 (Here 1, 1 added to this = 2 is thousand place).

12

$(13)^3$ = 2197

Our 13 cube value is 2197

2. Find out 54 cube value?

Step1

$4^3 = 64$

6

(54) = -----4

Step 2

$3.5.4^2 = 3x5x16 = 240$

6 240 +6=246

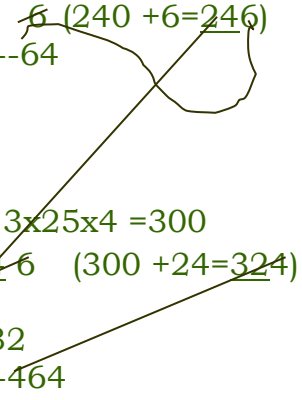
(54) = ----64

Step 3

$3.5.4^2 = 3x5x16 = 240$

6 (240 +6=246)

(54) = ----64



Step 4

$3.5^2.4 = 3x25x4 = 300$

24 6 (300 +24=324)

32

(54) = ---464

Step 5

$5^3 = 125$

125+32 =157

(54) = --7464

Step 6

(54) = 157464

Cube Values

$1^3 = 1$
$2^3 = 8$
$3^3 = 27$
$4^3 = 64$
$5^3 = 125$
$6^3 = 216$
$7^3 = 343$
$8^3 = 512$
$9^3 = 729$
$10^3 = 1000$
$11^3 = 1331$

Try the following cube values in single line.

14
15
16
17
18
19

37
86
49

CUBE ROOT

One digit cube values end digit

1 = 1
2 = 8
3 = 7
4 = 4
5 = 5
6 = 6
7 = 3
8 = 2
9 = 9

Here, 2, 3 and 7, 8 are changed. (2's complement 8, 3's complement 7 and 7's complement 3, 8's complement 2)

Complement of 10

2 + ? = 10
3 + ? = 10
4 + ? = 10
5 + ? = 10
6 + ? = 10
7 + ? = 10
8 + ? = 10
9 + ? = 10

Here, 2 is, how much we add to get 10?

Two digit cube values end digit

-1 = 1
-2 = 8
-3 = 7
-4 = 4
-5 = 5
-6 = 6
-7 = 3
-8 = 2
-9 = 9

Here, - means any digit from 1 to 9

Three digit cube values end digit

--1 = 1
--2 = 8
--3 = 7
--4 = 4
--5 = 5
--6 = 6
--7 = 3
--8 = 2
--9 = 9

Here, -- means any two digit from 1 to 9

Last digit of cube root

1 = 1
2 = 8
3 = 7
4 = 4
5 = 5
6 = 6
7 = 3
8 = 2
9 = 9

1. $\sqrt{[2744]}^{1/3}$

Step 1

Cube root of last digit	1	2	3	4	5	6	7	8	9
Result	1	8	7	4	5	6	3	2	9

= -4

Step 2

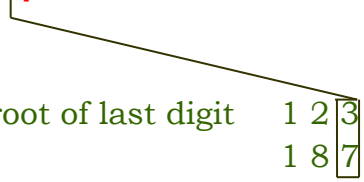
2744 (We cancel the last three digits)

Here remaining 2 only

$1^3 = 1$ (1<2) (It satisfied)
$2^3 = 8$ (8<2) (Rang, not satisfied)

= 12
Cube root of 2744 is 12.

2. $\sqrt{[12167]}^{1/3}$



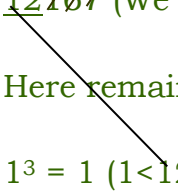
Step 1

Cube root of last digit	1	2	3	4	5	6	7	8	9
Result	1	8	7	4	5	6	3	2	9

= -3

Step 2

12167 (We cancel the last three digits)



Here remaining 2 only

$1^3 = 1$ (1<12)
$2^3 = 8$ (8<12)
$3^3 = 27$
Here 2^3 value is within 12, but 3^3 value is more than 12. So we consider 2^3 value, therefore we take 2
= 23
Cube root of 12167 is 23.

3. $\sqrt{[157464]}^{1/3}$

Step 1

Cube root of last digit	1	2	3	4	5	6	7	8	9
Result	1	8	7	4	5	6	3	2	9

= -4

Step 2

157464 (We cancel the last three digits)

Here remaining 157.

$1^3 = 1$ (1<157)
$2^3 = 8$ (8<157)
$3^3 = 27$(27<157)
$4^3 = 64$(64<157)
$5^3 = 125$(125<157)
$6^3 = 216$
Here 5^3 value is within 157, but 6^3 value is more than 157. So we consider 5^3 value, therefore we take 5
= 54
Cube root of 157464 is 54.

4. $\sqrt[1/3]{5832}$

Step 1

Cube root of last digit	1	2	3	4	5	6	7	8	9
Result	1	8	7	4	5	6	3	2	9

= -8

Step 2

5832 (We cancel the last three digits)

Here remaining 5 only

$1^3 = 1$ (1<5)
$2^3 = 8$
Here 1^3 value is within 5, but 2^3 value is more than 5. So we consider 1^3 value, therefore we take 1
= 18
Cube root of 5832 is 18

Find out the following in single step

1. $\sqrt[1/3]{912673}$
2. $\sqrt[1/3]{4096}$
3. $\sqrt[1/3]{4913}$
4. $\sqrt[1/3]{238328}$
5. $\sqrt[1/3]{389017}$

AVERAGE

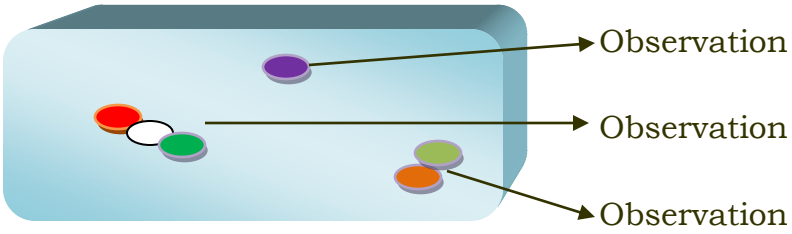
QUANTITATIVE APTITUDE

Average usually refers to the sum of observations divided by the number of observations

OR

$$\text{Average} = \frac{\text{Sum of observations}}{\text{Number of observations}}$$

Observations: the close watching of someone or something



Image

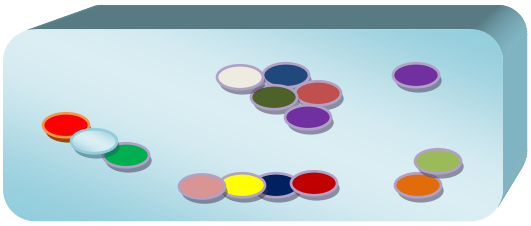
In image, we observe some observations

Number of observations: from the above image, how many observations we observe? Yeah, 3 (three)

Sum of observation: from the above image,

From the left side	: 3
From the centre	: 1
From the right side	: 2

Here, how many observations we have? Yeah, 6 (six) = 3 + 1 + 2



Find the average from above image?

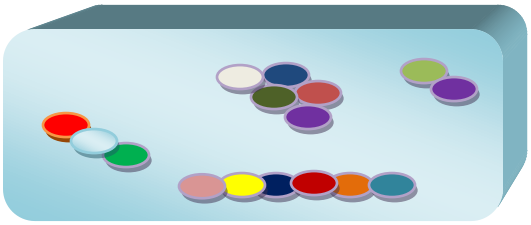
$$\text{Average} = \frac{\text{Sum of observations}}{\text{Number of observations}}$$

Here, 5 (five) observations are. So number of observations are 5

Sum of observations = 3 + 4 + 5 + 2 + 1
Sum of observations = 15

$$\text{Average} = \frac{15}{5}$$

Average = 3



Find the average from above image?

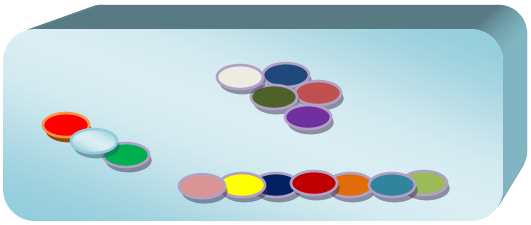
$$\text{Average} = \frac{\text{Sum of observations}}{\text{Number of observations}}$$

Here, 4 (four) observations are. So number of observations are 4

Sum of observations = 3 + 5 + 6 + 2
Sum of observations = 16

$$\text{Average} = \frac{16}{4}$$

Average = 4



Find the average from above image?

$$\text{Average} = \frac{\text{Sum of observations}}{\text{Number of observations}}$$

Here, 3 (three) observations are. So number of observations are 3

Sum of observations = 3 + 5 + 7
Sum of observations = 15

$$\text{Average} = \frac{15}{3}$$

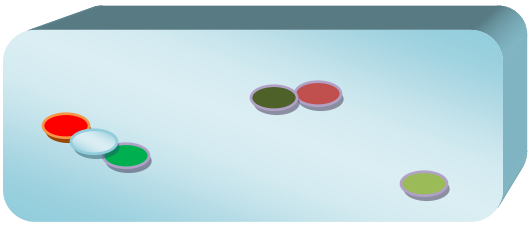
Average = 5

Practice Questions

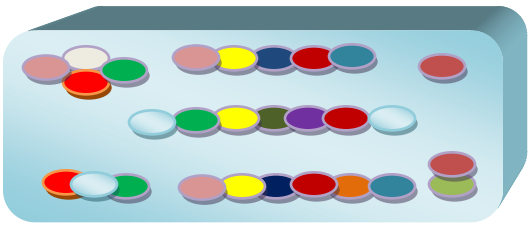
Find the Average the following questions in image

1

2



3



SriVally completes 9th class and enter into 10th class. Her teacher asked her what your average marks are in 9th stand. SriVally replied that my Average marks are 70. Think, how she said her Average marks?

SriVally marks as subject wise

Telugu	Hindi	English	Math	Science	Social
72	64	81	77	62	64

Then find out Average marks of SriVally

Here, how many subjects are of SriVally?
Yeah, 6 (six)
Here, total marks of SriVally are 72 + 64 + 81 + 77 + 62 + 64
Total marks = 420

$$\text{Average} = \frac{\text{Total marks of SriVally}}{\text{Number of subjects}}$$

$$\text{Average} = \frac{420}{6}$$

Average = 70

Practice Questions

1. Ajay marks as subject wise, then find out Average marks of Ajay

Telugu	Hindi	English	Math	Science	Social
50	25	70	65	50	40

2. Vijay marks as subject wise, then find out Average marks of Vijay

Telugu	Hindi	English	Math	Science	Social
62	20	72	38	42	36

We have to know how to find out the Average when numbers are given in sequence.

1. Average of 1, 2, 3, 4, 5, 6, 7.

MODEL I

This is the sequence of Natural numbers from 1 to 7

$$\text{Average} = \frac{\text{Sum of observations}}{\text{Number of observations}}$$

Here, 7 (seven) observations are. So number of observations are 7

Sum of observations = 1 + 2 + 3 + 4 + 5 + 6 + 7
Sum of observations = 28

$$\text{Average} = \frac{28}{7}$$

Average = 4

MODEL II

1, 2, 3, 4, 5, 6, 7

Here, we take first Number + last Number

By 2

1 + 7

2

8/2

AVERAGE = 4

THIS METHOD IS APPLIED WHEN NUMBERS ARE SEQUENCE

MODEL III

STEP I

1, 2, 3, 4, 5, 6, 7

We eliminate one Number from Left side and one Number from Right side

~~1~~, 2, 3, 4, 5, 6, ~~7~~

STEP II

We eliminate one Number from Left side and one Number from Right side

~~1~~, ~~2~~, 3, 4, 5, ~~6~~, ~~7~~

STEP III

We eliminate one Number from Left side and one Number from Right side

~~1~~, ~~2~~, ~~3~~, 4, ~~5~~, ~~6~~, ~~7~~

STEP IV

Average = 4

THIS METHOD IS APPLIED WHEN NUMBERS ARE SEQUENCE

2. Average of 8, 9, 10, 11, 12.

These numbers are in sequence from 8 to 12

STEP I

8, 9, 10, 11, 12

We eliminate one Number from Left side and one Number from Right side

~~8~~, 9, 10, 11, ~~12~~

STEP II

We eliminate one Number from Left side and one Number from Right side

~~8~~,~~9~~, 10, ~~11~~, ~~12~~

STEP III

Average = 10

3. Average of 15, 16, 17.

These numbers are in sequence from 15 to 17

STEP I

15, 16, 17

We eliminate one Number from Left side and one Number from Right side

~~15~~, 16, ~~17~~

STEP II

Average = 16

Practice Questions

Please observe the following questions of Average and say the answer with mouth within Three Seconds.

1 18, 19, 20, 21, 22
2 25, 26, 27
3 31, 32, 33, 34, 35
4 18, 19, 20, 21, 22, 23, 24
5 44, 45, 46, 47, 48
6 81, 82, 83
7 93, 94, 95, 96, 97, 98, 99
8 75, 76, 77
9 66, 67, 68, 69, 70
10 53, 54, 55

1. Average of 1, 2, 3, 4.

This is the sequence of Natural numbers from 1 to 4

STEP I

1, 2, 3, 4

We eliminate one Number from Left side and one Number from Right side

~~1~~, 2, 3,~~4~~

STEP II

~~1~~, 2, 3,~~4~~

Can we expect any value between 2 and 3?

Yeah! That is 2.5

STEP III

Average = 2.5

1. Average of 8, 9, 10, 11, 12, 13.

These numbers are in sequence from 8 to 12

STEP I

8, 9, 10, 11, 12, 13

We eliminate one Number from Left side and one Number from Right side

~~8~~, 9, 10, 11, 12, ~~13~~

STEP II

~~8~~, 9, 10, 11, 12, ~~13~~

We eliminate one Number from Left side and one Number from Right side

~~8~~,~~9~~, 10, 11, ~~12~~, ~~13~~

STEP III

~~8~~,~~9~~, 10, 11, ~~12~~, ~~13~~

Can we expect any value between 10 and 11?

Yeah! That is 10.5

STEP IV

Average = 10.5

2. Average of 21, 22, 23, 24, 25, 26.

These numbers are in sequence from 21 to 26

STEP I

21, 22, 23, 24, 25, 26

We eliminate one Number from Left side and one Number from Right side

~~21~~, 22, 23, 24, 25, ~~26~~

STEP II

~~21~~, 22, 23, 24, 25, ~~26~~

We eliminate one Number from Left side and one Number from Right side

~~21~~, ~~22~~, 23, 24, ~~25~~, ~~26~~

STEP III

~~21~~, ~~22~~, 23, 24, ~~25~~, ~~26~~

Can we expect any value between 23 and 24?

Yeah! That is 23.5

STEP IV

Average = 23.5

Practice Questions

Please observe the following questions of Average and say the answer with mouth within Three Seconds.

1 19, 20, 21, 22
2 25, 26, 27, 28
3 31, 32, 33, 34, 35, 36
4 18, 19, 20, 21, 22, 23, 24, 25
5 44, 45, 46, 47
6 80, 81, 82, 83
7 93, 94, 95, 96, 97, 98
8 74, 75, 76, 77
9 67, 68, 69, 70
10 53, 54, 55, 56

1. Average of 2, 4, 6, 8, 10.

This is the even numbers sequence from 2 to 10

STEP I

2, 4, 6, 8, 10

We eliminate one Number from Left side and one Number from Right side

~~2~~, 4, 6, 8, ~~10~~

STEP II

~~2~~, 4, 6, 8, ~~10~~

We eliminate one Number from Left side and one Number from Right side

~~2~~, ~~4~~, 6, ~~8~~, ~~10~~

STEP III

Average = 6

2. Average of 18, 20, 22, 24, 26.

This is the even numbers sequence from 18 to 26

STEP I

18, 20, 22, 24, 26

We eliminate one Number from Left side and one Number from Right side

~~18~~, 20, 22, 24, ~~26~~

STEP II

~~18~~, 20, 22, 24, ~~26~~

We eliminate one Number from Left side and one Number from Right side

~~18~~, ~~20~~, 22, ~~24~~, ~~26~~

STEP III

Average = 22

3. Average of 32, 34, 36.

This is the even numbers sequence from 32 to 36

STEP I

32, 34, 36

We eliminate one Number from Left side and one Number from Right side

~~32~~, 34, ~~36~~

STEP II

Average = 22

Practice Questions

Please observe the following questions of Average and say the answer with mouth within Three Seconds.

1 20, 22, 24
2 24, 26, 28, 30, 32
3 32, 34, 36, 38, 40, 42, 44
4 18, 20, 22, 24, 26, 28, 30
5 44, 46, 48, 50, 52
6 80, 82, 84
7 92, 94, 96, 98, 100
8 74, 76, 78
9 66, 68, 70
10 52, 54, 56, 58, 60

1. Average of 2, 4, 6, 8, 10, 12.

This is the even numbers sequence from 2 to 12

STEP I

2, 4, 6, 8, 10, 12

We eliminate one Number from Left side and one Number from Right side

~~2~~, 4, 6, 8, 10, ~~12~~

STEP II

~~2~~, 4, 6, 8, 10, ~~12~~

We eliminate one Number from Left side and one Number from Right side

~~2~~,~~4~~, 6, 8, ~~10~~, ~~12~~

STEP III

~~2~~,~~4~~, 6, 8, ~~10~~, ~~12~~

Can we expect any value between 6 and 8?

Yeah! That is 7

STEP IV

Average = 7

2. Average of 18, 20, 22, 24.

This is the even numbers sequence from 18 to 24

STEP I

18, 20, 22, 24

We eliminate one Number from Left side and one Number from Right side

~~18~~, 20, 22, ~~24~~

STEP II

~~18~~, 20, 22, ~~24~~

Can we expect any value between 20 and 22?

Yeah! That is 21

STEP IV

Average = 21

3. Average of 28, 30, 32, 34, 36, 38.

This is the even numbers sequence from 28 to 38

STEP I

28, 30, 32, 34, 36, 38

We eliminate one Number from Left side and one Number from Right side

~~28~~, 30, 32, 34, 36, ~~38~~

STEP II

~~28~~, 30, 32, 34, 36, ~~38~~

We eliminate one Number from Left side and one Number from Right side

~~28~~, ~~30~~, 32, 34, ~~36~~, ~~38~~

STEP III

~~28~~, ~~30~~, 32, 34, ~~36~~, ~~38~~

Can we expect any value between 32 and 34?

Yeah! That is 33

STEP IV

Average = 33

Practice Questions

Please observe the following questions of Average and say the answer with mouth within Three Seconds.

1 20, 22, 24, 26
2 24, 26, 28, 30, 32, 34
3 32, 34, 36, 38, 40, 42
4 18, 20, 22, 24
5 42, 44, 46, 48, 50, 52
6 80, 82, 84, 86
7 92, 94, 96, 98
8 74, 76, 78, 80
9 66, 68, 70, 72
10 50, 52, 54, 56, 58, 60

1. Average of 1, 3, 5, 7, 9.

This is the odd numbers sequence from 1 to 9

STEP I

1, 3, 5, 7, 9

We eliminate one Number from Left side and one Number from Right side

~~1~~, 3, 5, 7, ~~9~~

STEP II

~~1~~, 3, 5, 7, ~~9~~

We eliminate one Number from Left side and one Number from Right side

~~1~~, ~~3~~, 5, ~~7~~, ~~9~~

STEP III

Average = 5

2. Average of 21, 23, 25, 27, 29.

This is the odd numbers sequence from 21 to 29

STEP I

21, 23, 25, 27, 29

We eliminate one Number from Left side and one Number from Right side

~~21~~, 23, 25, 27, ~~29~~

STEP II

~~21~~, 23, 25, 27, ~~29~~

We eliminate one Number from Left side and one Number from Right side

~~21~~, ~~23~~, 25, ~~27~~, ~~29~~

STEP III

Average = 25

3. Average of 47, 49, 51, 53, 55.

This is the odd numbers sequence from 47 to 55

STEP I

47, 49, 51, 53, 55

We eliminate one Number from Left side and one Number from Right side

~~47~~, 49, 51, 53, ~~55~~

STEP II

~~47~~, 49, 51, 53, ~~55~~

We eliminate one Number from Left side and one Number from Right side

~~47~~, ~~49~~, 51, ~~53~~, ~~55~~

STEP III

Average = 51

Practice Questions

Please observe the following questions of Average and say the answer with mouth within Three Seconds.

1 39, 41, 43
2 75, 77, 79, 81, 83
3 83, 85, 87, 89, 91
4 3, 5, 7, 9, 11, 13, 15
5 21, 23, 25
6 55, 57, 59, 61, 63
7 91, 93, 95, 97, 99
8 77, 79, 81, 83, 85
9 87, 89, 91
10 43, 45, 47, 49, 51

1. Average of 1, 3, 5, 7, 9, 11.

This is the odd numbers sequence from 1 to 11

STEP I

1, 3, 5, 7, 9, 11

We eliminate one Number from Left side and one Number from Right side

~~1~~, 3, 5, 7, 9, ~~11~~

STEP II

~~1~~, 3, 5, 7, 9, ~~11~~

We eliminate one Number from Left side and one Number from Right side

~~1~~,~~3~~, 5, 7, ~~9~~, ~~11~~

STEP III

~~1~~,~~3~~, 5, 7, ~~9~~, ~~11~~

Can we expect any value between 5 and 7?

Yeah! That is 6

STEP IV

Average = 6

2. Average of 49, 51, 53, 55.

This is the odd numbers sequence from 1 to 11

STEP I

49, 51, 53, 55

We eliminate one Number from Left side and one Number from Right side

~~49~~, 51, 53, ~~55~~

STEP II

~~49~~, 51, 53, ~~55~~

Can we expect any value between 51 and 53?

Yeah! That is **52**

STEP III

Average = **52**

3. Average of 87, 89, 91, 93, 95, 97.

This is the odd numbers sequence from 87 to 97

STEP I

87, 89, 91, 93, 95, 97

We eliminate one Number from Left side and one Number from Right side

~~87~~, 89, 91, 93, 95, ~~97~~

STEP II

~~87~~, 89, 91, 93, 95, ~~97~~

We eliminate one Number from Left side and one Number from Right side

~~87~~, ~~89~~, 91, 93, ~~95~~, ~~97~~

STEP III

~~87~~, ~~89~~, 91, 93, ~~95~~, ~~97~~

Can we expect any value between 91 and 93?

Yeah! That is 92

STEP IV

Average = 92

Practice Questions

Please observe the following questions of Average and say the answer with mouth within Three Seconds.

1 39, 41, 43, 45
2 73, 75, 77, 79, 81, 83
3 83, 85, 87, 89
4 5, 7, 9, 11, 13, 15
5 21, 23, 25, 37
6 53, 55, 57, 59, 61, 63
7 91, 93, 95, 97
8 77, 79, 81, 83, 85, 87
9 85, 87, 89, 91
10 43, 45, 47, 49, 51, 53

1. Average =?
   Sum of observations = 45
   Number of observations = 15

MODEL I

$$\text{Average} = \frac{\text{Sum of observations}}{\text{Number of observations}}$$

$$\text{Average} = \frac{45}{15}$$

Average = 3

MODEL II

Average =?
Sum of observations = 45
Number of observations = 15

$$\text{Sum of observations} = 45$$

Here, how can we get 45?

Number of observations = 15

15 X 1=15 <45 (I want to get 45, so my assumption 1 is wrong)

15 X 2 =30<45 (I want to get 45, so my assumption 2 is wrong)

15 X 3=45 = 45 (I want to get 45, so my assumption 3 is right)

$$45 = 15 \times 3$$

$$\text{Average} = 3$$

2. Average =?
   Sum of observations = 90
   Number of observations = 6

$$\text{Sum of observations} = 90$$

Here, how can we get 90?

Number of observations = 6

6 X 1 =6 < 90 (I want to get 90, so my assumption 1 is wrong)

6 X 2 =12 < 90 (I want to get 90, so my assumption 2 is wrong)

6 X 15=90 =90 (I want to get 90, so my assumption 15 is right)

$$90 = 6 \times 15$$

$$\text{Average} = 15$$

3. Average =?
   Sum of observations = 120
   Number of observations = 8

$$\text{Sum of observations} = 120$$

Here, how can we get 120?

Number of observations = 8

8 X 1=8<120 (I want to get 120, so my assumption 1 is wrong)

8X 2=16<120 (I want to get 120, so my assumption 2 is wrong)

8X15=120=20(I want to get 120, so my assumption 15 is right)

$$120 = 8 \times 15$$

$$\text{Average} = 15$$

Practice Questions

Please observe the following questions of Average and say the answer with mouth within Three Seconds.

1 Average =?
Sum of observations = 72
Number of observations = 4

2 Average =?
Sum of observations = 108
Number of observations = 9

3 Average =?
Sum of observations = 51
Number of observations = 17

4 Average =?
Sum of observations = 120
Number of observations = 8

5 Average =?
Sum of observations = 120
Number of observations = 6

6 Average =?
Sum of observations = 63
Number of observations = 7

7 Average =?
Sum of observations = 81
Number of observations = 9

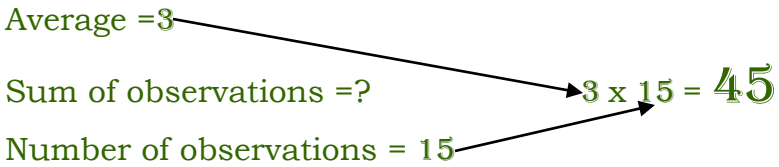
8 Average =?
Sum of observations = 77
Number of observations = 11

9 Average =?
Sum of observations = 65
Number of observations = 13

10 Average =?
Sum of observations = 45
Number of observations = 15

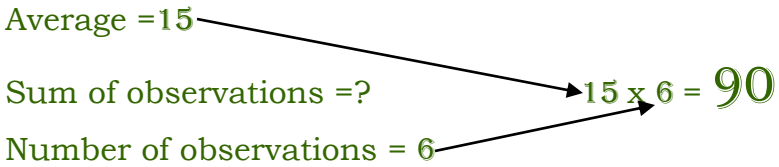
11 Average =?
Sum of observations = 95
Number of observations = 19

1. Average =3
   Sum of observations =?
   Number of observations = 15



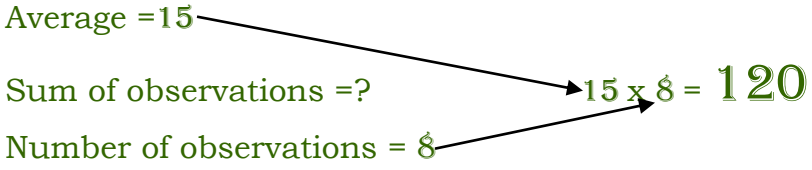
Sum of observations = 45

2. Average =15
   Sum of observations =?
   Number of observations = 6



Sum of observations = 90

3. Average =15
   Sum of observations =?
   Number of observations = 8



Sum of observations = 120

Practice Questions

Please observe the following questions of Average and say the answer with mouth within Three Seconds.

1 Average = 18
Sum of observations =?
Number of observations = 4

2 Average = 12
Sum of observations =?
Number of observations = 9

3 Average = 3
Sum of observations =?
Number of observations = 17

4 Average = 15
Sum of observations =?
Number of observations = 8

5 Average = 20
Sum of observations =?
Number of observations = 6

6 Average = 9
Sum of observations =?
Number of observations = 7

7 Average = 9
Sum of observations =?
Number of observations = 9

8 Average = 7
Sum of observations =?
Number of observations = 11

9 Average = 5
Sum of observations =?
Number of observations = 13

10 Average = 3
Sum of observations =?
Number of observations = 15

11 Average = 5
Sum of observations =?
Number of observations = 19

1. Average = 3
   Sum of observations = 45
   Number of observations =?

$$\text{Sum of observations} = 45$$

Here, how can we get 45?

Average = 3

3 X 1=3 < 45 (I want to get 45, so my assumption 1 is wrong)

3 X 2 =6 < 45 (I want to get 45, so my assumption 2 is wrong)

3 X 15 =45= 45(I want to get 45, so my assumption 15 is right)

$$45 = 3 \times 15$$

$$\text{Number of observations} = 15$$

2. Average = 15
   Sum of observations = 90
   Number of observations =?

$$\text{Sum of observations} = 90$$

Here, how can we get 90?

Average = 15

15 X 1=15< 45 (I want to get 90, so my assumption 1 is wrong)

15 X 2 =30<45 (I want to get 90, so my assumption 2 is wrong)

15 X 6 =90= 90(I want to get 90, so my assumption 6 is right)

$$90 = 15 \times 6$$

$$\text{Number of observations} = 6$$

1. Average = 15
   Sum of observations = 120
   Number of observations =?

$$\text{Sum of observations} = 120$$

Here, how can we get 120?

Average = 15

15 X1=5<120 (I want to get 120, so my assumption 1 is wrong)

15X2=30<120(I want to get 120, so my assumption 2 is wrong)

15X8=120=120(I want to get 120, so my assumption 8 is right)

$$120 = 15 \times 8$$

$$\text{Number of observations} = 8$$

Practice Questions

Please observe the following questions of Average and say the answer with mouth within Three Seconds.

1 Average = 18
Sum of observations = 72
Number of observations =?

2 Average = 12
Sum of observations = 108
Number of observations =?

3 Average = 3
Sum of observations = 51
Number of observations =?

4 Average = 15
Sum of observations = 120
Number of observations =?

5 Average = 20
Sum of observations = 120
Number of observations =?

6 Average = 9
Sum of observations = 63
Number of observations =?

7 Average =?
Sum of observations = 81
Number of observations = 9

8 Average = 7
Sum of observations = 77
Number of observations =?

9 Average =?
Sum of observations = 65
Number of observations = 13

10 Average = 3
Sum of observations = 45
Number of observations =?

11 Average = 5
Sum of observations = 95
Number of observations =?

UNIT DIGIT

QUANTITATIVE APTITUDE

UNIT DIGIT/ LAST DIGIT/ END DIGIT

1 5 6 7 8 9

Here 9 is Unit Digit

Examples

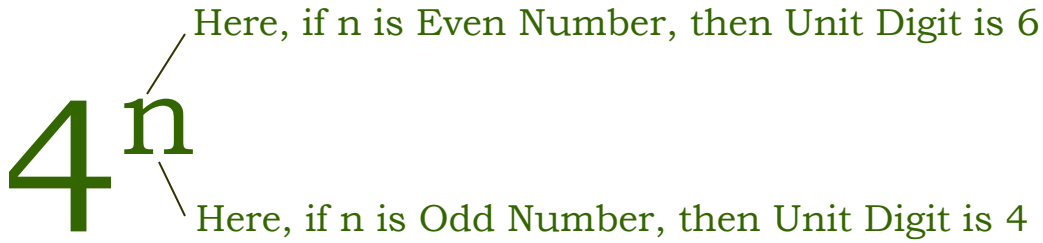
1. 78934
   Here Unit Digit is 4
2. 8963
   Here Unit Digit is 3
3. 954
   Here Unit Digit is 4

Unit Digit in the following one

1. 6^4
   6 x 6 x 6 x 6 = 1296
   Here Unit Digit is 6
2. 6^5
   6 x 6 x 6 x 6 x 6 = 7776
   Here Unit Digit is 6
3. 6^3
   6 x 6 x 6 = 216
   Here Unit Digit is 6

Note: In 6^n, the Unit Digit is always 6 (here n = 1, 2, 3, 4, 5 - - -)

4. 4^6
   4 x 4 x 4 x 4 x 4 x 4 = 4096
   Here Unit Digit is 6
5. 4^5
   4 x 4 x 4 x 4 x 4 = 1024
   Here Unit Digit is 4
6. 4^3
   4 x 4 x 4 = 64
   Here Unit Digit is 4
7. 4^8
   4 x 4 x 4 x 4 x 4 x 4 x 4 x 4 = 65536
   Here Unit Digit is 6
8. 4^4
   4 x 4 x 4 x 4 = 256
   Here Unit Digit is 6



Note: In 4^n, the Unit Digit is always 6 (when n = 2, 4, 6, 8, 10 - - -)
Note: In 4^n, the Unit Digit is always 4 (when n = 1, 3, 5, 7, 9 - - -)

9. 3^1
   3 = 3
   Here Unit Digit is 3
10. 3^2
   3 x 3 = 9
   Here Unit Digit is 9
11. 3^3
   3 x 3 x 3 = 27
   Here Unit Digit is 7
12. 3^4
   3 x 3 x 3 x 3 = 81
   Here Unit Digit is 1
13. 7^1
   7 = 7
   Here Unit Digit is 7
14. 7^2
   7 x 7 = 49
   Here Unit Digit is 9
15. 7^3
   7 x 7 x 7 = 343
   Here Unit Digit is 3
16. 7^4
   7 x 7 x 7 x 7 = 2401
   Here Unit Digit is 1
17. 1^1
   1 = 1
   Here Unit Digit is 1
18. 1^2
   1 x 1 = 1
   Here Unit Digit is 1
19. 1^3
   1 x 1 x 1 = 1

Here Unit Digit is 1

20. 1^n

1 x 1 x 1 x 1 - - - - - - x 1 = 1

Here Unit Digit is 1

21. 9^1

9 = 9

Here Unit Digit is 9

22. 9^2

9 x 9 = 81

Here Unit Digit is 1

Unit Digit in the following one

1. 3^4

3 x 3 x 3 x 3 = 81

Here Unit Digit is 1

2. 7^4

7 x 7 x 7x 7 = 2401

Here Unit Digit is 1

3. 3^{32}

$3^{4 \times 8}$ (4 x 8 = 32)

$(3^4)^8$

$(1)^8$ (Hence $3^4 = 1$)

1

Here Unit Digit is 1

4. 7^{48}

$7^{4 \times 12}$ (4 x 12 = 48)

$(3^4)^{12}$

$(1)^{12}$ (Hence $7^4 = 1$)

1

Here Unit Digit is 1

5. 3^{473}

$3^{4 \times 118 +1}$ (4 x 118 + 1 = 473)

$3^{(4 \times 118) + 1}$

$3^{(4 \times 118)} \times 3^1$

$3^{(4)\ 118} \times 3^1$

$(3^4)^{118} \times 3^1$

$(1)^{118} \times 3$

1 x 3

Here Unit Digit is 3

6. 7^{53}

$7^{4 \times 13 +1}$ (4 x 13 + 1 = 53)

$7^{(4 \times 13) + 1}$

$7^{(4 \times 13)} \times 7^1$

$7^{(4)\ 13} \times 7^{1}$

$(7^{4})^{13} \times 7^{1}$

$(1)^{13} \times 7$

1×7

Here Unit Digit is 7

7. 3^{92}

$3^{4 \times 23}$ $(4 \times 23 = 92)$

$(3^{4})^{23}$

$(1)^{23}$ (Hence $3^{4} = 1$)

1

Here Unit Digit is 1

8. 7^{67}

$7^{4 \times 16 + 3}$ $(4 \times 16 + 3 = 67)$

$7^{(4 \times 16) + 3}$

$7^{(4 \times 16)} \times 7^{3}$

$7^{(4)\ 16} \times 7 \times 7 \times 7$

$(7^{4})^{16} \times 343$

$(1)^{16} \times 3$

1×3

Here Unit Digit is 3

9. 3^{35}

$3^{4 \times 8 + 3}$ $(4 \times 8 + 3 = 35)$

$3^{(4 \times 8) + 3}$

$3^{(4 \times 8)} \times 3^{3}$

$3^{(4)\ 8} \times 3 \times 3 \times 3$

$(3^{4})^{8} \times 27$

$(1)^{8} \times 27$

1×7

Here Unit Digit is 7

10. 7^{466}

$7^{4 \times 116 + 2}$ $(4 \times 116 + 2 = 466)$

$7^{(4 \times 116) + 2}$

$7^{(4 \times 116)} \times 7^{2}$

$7^{(4)\ 116} \times 7 \times 7$

$(7^{4})^{116} \times 49$

$(1)^{116} \times 9$

1×9

Here Unit Digit is 9

Unit Digit in the following one

1. $3^{75} \times 6^{35} \times 4^{81} \times 7^{54}$ ($6^n = 6$)
   $3^{4x18+3} \times 6^{35} \times 4^{81} \times 7^{4x13+2}$ ($4^n = 4$, when n = Odd Number)
   $3^{4x18} \times 3^3 \times 6 \times 4 \times 7^{4x13} \times 7^2$
   $(3^4)^{18} \times 27 \times 6 \times 4 \times (7^4)^{13} \times 49$
   $(1)^{18} \times 7 \times 6 \times 4 \times (1)^{13} \times 9$
   $1x\ 7 \times 6 \times 4\ x1 \times 9$
   1512
   Here Unit Digit is 2

2. $7^{75} \times 6^{36} \times 4^{76}$
   $7^{75} \times 6^{36} \times 4^{76}$ ($4^n = 6$, when n = Even Number)
   $7^{4x8+3} \times 6 \times 6$
   $(7^4)^8 \times 7^3 \times 6 \times 6$
   $(1)^8 \times 343 \times 6 \times 6$
   $1 \times 3 \times 6 \times 6$
   108
   Here Unit Digit is 8

3. $7^{32} \times 3^{174} \times 6^{38} \times 4^{18}$
   $7^{32} \times 3^{174} \times 6^{38} \times 4^{18}$
   $7^{4x8} \times 3^{4x43+2} \times 6 \times 6$
   $(7^4)^8 \times (3^4)^{43} \times 3^2 \times 6 \times 6$
   $1 \times 1\ x9 \times 6 \times 6$
   324
   Here Unit Digit is 4

Practice Questions (find out the Unit Digit)

1. 786942
2. 9035764
3. 78345
4. 231 x 476 x 632
5. 879 x 432 x 279
6. 289 x 679 x 452
7. $7^{37} \times 3^{174} \times 5^3 \times 6^{318} \times 4^{118}$