SIMPLIFICATION TECHNIQUES AND TRICKS

The topic Simplification is asked in each and every exam. In bank exams, Simplification covers almost 30-40% of the Quant section. Simplification also covers the percentage chapter. There might be 2-3 questions that have asked to simplify but they are related to percentages. Simplification topic is asked to check the ability of students to find their ability to deal with the numbers. So, it's important to have knowledge about simplification. Let's try to understand about simplification-

Simplification means to play with the questions by doing complex calculations.

Some of the tricks and tactics you must know to score good by saving your valuable time-

- Learn BODMAS.
- Use the concept of digital sum.
- Memorize tables up to 30.
- Memorize cubes and squares of numbers up to 35.
- Learn tricks to find squares and cubes of numbers greater than 35.
- Learn tricks to find cube roots and square roots of large number.
- Learn the concept of percentages (conversion of fractions to percentage & percentage to fractions)
- Memorize the reciprocals.

RULES OF SIMPLIFICATION

V → Vinculum
B → Remove Brackets - in the order ( ) , { }, [ ]
O → Of
D → Division

M → Multiplication
A → Addition
S → Subtraction

- **B** Brackets first
- **O** Orders (i.e. Powers and Square Roots, etc.)
- **DM** Division and Multiplication (left-to-right)
- **AS** Addition and Subtraction (left-to-right)

Let's discuss an example based on BODMAS -

Example: $152 \times 2^3 + (228 \div 19)^2$ =?

Sol:
⇒ $15 \times (12)^2$ [brackets are solved first and table of 19 and 15 must be on tips]
⇒ 120+144 [must know the squares]
⇒ 264

IMPORTANT PARTS OF SIMPLIFICATION

- Digital Sum
- Number System
- Reciprocals
- HCF & LCM
- Percentages
- Square & Cube
- Approximation
- Fractions & Decimals
- Surds & Indices

DIGITAL SUM

Digital sum is the sum obtained after adding all the digits of any given number successively.

- **Example:** 568 = 5+6+8 = 19, 1 + 9 = 10.

Note: if any number multiplied by 9, then the digital sum is always 9.

- **Example:** 6 × 9 = 54, 5+4 = 9

Trick: In order to save time if we find digit 9 or multiples of 9, then 9 or its multiple can be neglected.

- **Example:** 293 = 2 + 9 + 3 = 2 + 3 = 5 ['9' is omitted]

'9' is omitted to reduce the calculation.
If we don't omit '9', then also the digital sum remains same.
Example: 293 = 2 + 9 + 3 = 14, 1 + 4 = 5 [answer remains same]
Let's discuss one more example-

EXAMPLE: 326 × 890 =?

a. 291140
b. 290100
c. 290140
d. 293990
Sol: We can find out the answer by option method without doing multiplication. This is only possible with the help of Digital sum.

Now, Digital sum, 326 × 890 = (3 + 2 +6) × (8 +9 + 0)
⇒ 11 × 17
⇒ (1+1) × (1+7)
⇒ 2 × 8 = 16
⇒ digital sum (16) = 7
Now find out the digital sum of the given options-

1. DS (291140) = 8
2. DS (290100) = 3
3. DS (290140) = 7
4. DS (293990) = 5

Option C has the same digital sum as '7' as we have already found out. Thus the correct option is C.

NUMBER SYSTEM

- Classification
- Divisibility Test
- Division& Remainder Rules

- Sum Rules

Classification

Types	Description
Natural Numbers:	all counting numbers (1,2,3,4,5....∞)
Whole Numbers:	natural number + zero(0,1,2,3,4,5...∞)
Integers:	All whole numbers including Negative number + Positive number(∞.....-4,-3,-2,-1,0,1,2,3,4,5....∞)
Even & Odd Numbers :	All whole number divisible by 2 is Even (0,2,4,6,8,10,12.....∞) and which does not divide by 2 are Odd (1,3,5,7,9,11,13,15,17,19....∞)
Prime Numbers:	It can be positive or negative except 1, if the number is not divisible by any number except the number itself.(2,3,5,7,11,13,17,19,23,29,31,37,41,43,47,53,59,61....∞)
Composite Numbers:	Natural numbers which are not prime
Co-Prime:	Two natural number a and b are said to be co-prime if their HCF is 1.

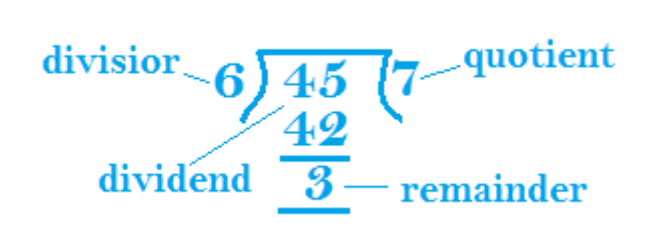
Divisibility

Numbers	IF A Number	Examples
Divisible by 2	End with 0,2,4,6,8 are divisible by 2	254,326,3546,4718 all are divisible by 2
Divisible by 3	Sum of its digits is divisible by 3	375,4251,78123 all are divisible by 3. [549=5+4+9][5+4+9=18]18 is divisible by 3 hence 549 is divisible by 3.

Divisible by 4	Last two digit divisible by 4	5642 here last 2 digits are 42 which is divisible by 4 hence 5642 is also divisible by 4.
Divisible by 5	Ends with 0 or 5	225 or 330 here last digit digit is 0 or 5 that mean both the numbers are divisible by 5.
Divisible by 6	Divides by Both 2 & 3	4536 here last digit is 6 so it divisible by 2 & sum of its digit (like 4+5+3+6=18) is 18 which is divisible by 3.Hence 4536 is divisible by 6.
Divisible by 8	Last 3 digit divide by 8	746848 here last 3 digit 848 is divisible by 8 hence 746848 is also divisible by 8.
Divisible by 10	End with 0	220,450,1450,8450 all numbers has a last digit zero it means all are divisible by 10.
Divisible by 11	[Sum of its digit in odd places-Sum of its digits in even places]= 0 or multiple of 11	Consider the number 39798847 (Sum of its digits at odd places)-(Sum of its digits at even places)(7+8+9+9)-(4+8+7+3) (23-12) 23-12=11, which is divisible by 11. So 39798847 is divisible by 11.

Division & Remainder Rules

Suppose we divide 45 by 6



hence ,represent it as:

dividend = (divisor ✘ dividend) + remainder

or

divisior= [(dividend)-(remainder] / quotient

could be write it as

x = kq + r where (x = dividend,k = divisor,q = quotient,r = remainder)

Example:

On dividing a certain number by 342, we get 47 as remainder. If the same number is divided by 18, what will be the remainder ?

Number = 342k + 47

(18 ✘19k) + (18 ✘2) + 11

18 ✘(19k + 2) +11.

Remainder = 11

Sum Rules

$(1+2+3+.....+n) = {}^{1}/_{2}\, n(n+1)$

$(1^2+2^2+3^2+.....+n^2) = {}^{1}/_{6}\, n\,(n+1)\,(2n+1)$

$(1^3+2^3+3^3+.....+n^3) = {}^{1}/4\, n^2\,(n+1)^2$

Arithmetic Progression (A.P.)

a, a + d, a + 2d, a + 3d, ...are said to be in A.P. in which first term = a and common difference = d.

Let the nth term be t_n and last term = l, then

a) nth term = a + (n - 1) d

b) Sum of n terms = ${}^{n}/_{2}$ [2a + (n-1)d]

c) Sum of n terms = ${}^{n}/_{2}$ (a+l) where l is the last term

RECIPROCALS

Up to 5, the reciprocals are easy to remember. But after 5 are explained as below-

- 1/7 = 0.142857
- 2/7 = 0.285714
- 3/7 = 0.42857
- 5/7 = 0.714285
- 6/7 = 0.857142
- 1/8 = 0.125
- 2/8 = ¼ = 0.25
- 3/8 = 3 × 1/8 = 0.375
- 4/8 = ½ = 0.5

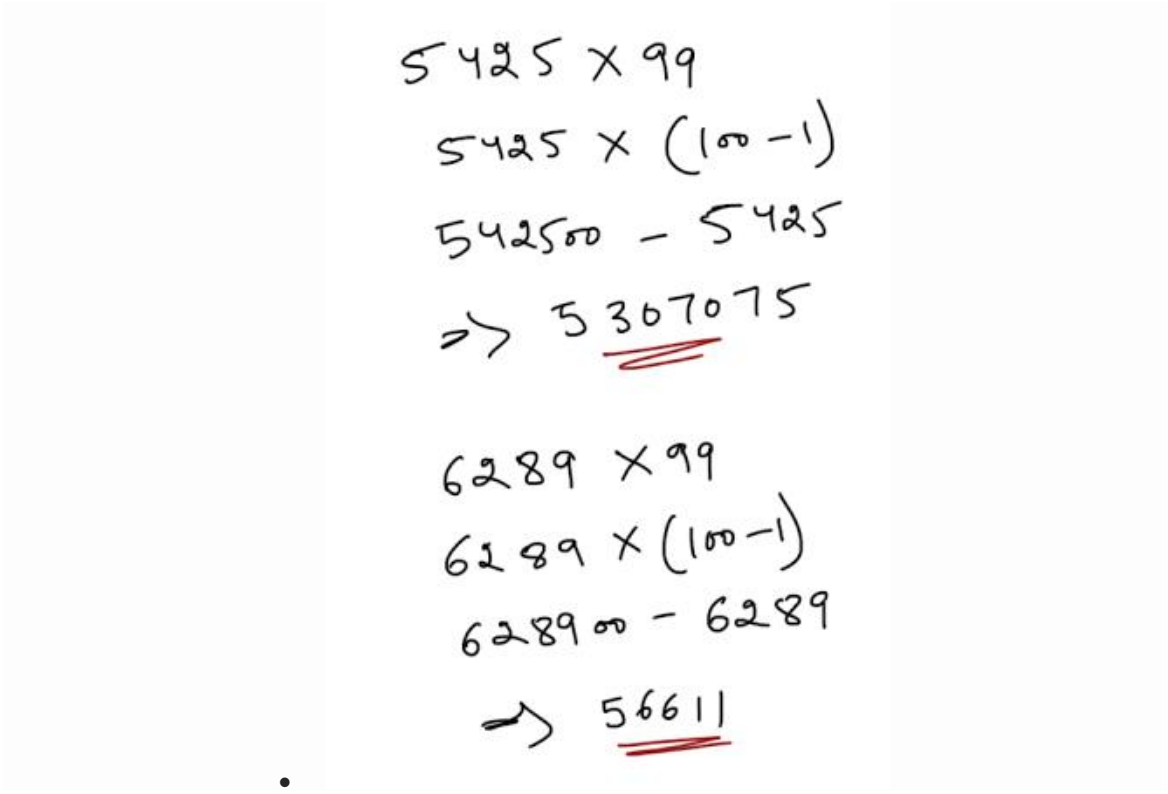
- 5/8 = 4/8 + 1/8 = 0.5 + 0.125 = 0.625
- 6/8 = ¾ = 0.75
- 7/8 = 6/8 + 1/8 = 0.75 + 1.25 = 0.875
- 1/9 = 0.1111...
- 2/9 = 0.2222...
- 3/9 = 0.3333...
- 1/11 = 0.090909...
- 2/11 = 0.181818...
- 3/11 = 0.272727...
- 10/11 = 0.909090...
- 1/12 = ½ × 1/6 = ½ × 0.166666 = 0.083333...
- 1/13 = 0.076923
- 1/14 = 0.071428
- 1/15 = 1/3 × 1/5 = 0.33333 × 0.2
- 1/15 = 0.0666...
- 1/16 = ½ × 1/8 = ½ × 0.125 = 0.0625
- 1/17 = 0.058823
- 1/18 = ½ × 1/9 = ½ × 0.111111 = 0.0555...
- 1/19 = 0.052631
- 1/20 = 0.05

MULTIPLICATION TRICKS - FIND SOLUTION WITHIN 20 SECONDS

- Today I am going to share quick multiplication tricks that will help you find the solution within 20 seconds. Must read - 10 Coolest Maths tricks

MULTIPLY BY 9,99,999,ETC...

- 56*99=5544
- Step 1:Place a zero at the end for each 9 :5600
- Step 2 : Subtract the original number from Step 1 like this 5600-56=5544



MULTIPLY BY 125

- **68*125=8500**
- Step 1 :Place three zeros at the end of the number :68000
- Step 2: Divide the number from Step 1 by 8:68000/8=8500

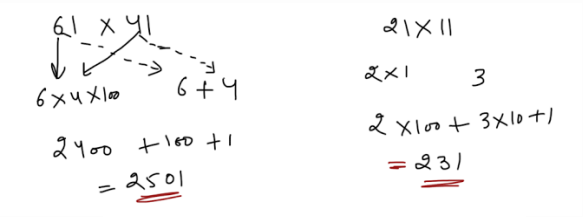
- 64*125 is the same as :
- 32*250 is the same as
- 16*500 is the same as
- 8*1000

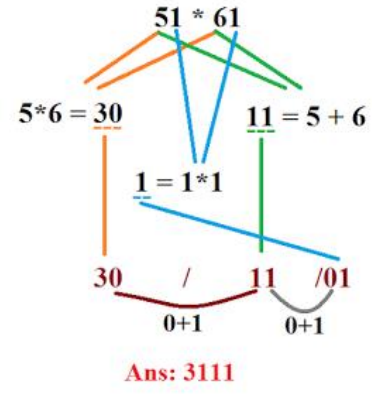
- **64*125**
- Step 1. Each time you just need to pick 125 multiply it by 8 will get 1000
- Step 2. Pick 64 and divide it by 8 will get 8
- Step 3. Multiply the results with each other 8* 1000
- Hence Solution is 8000
- [Hint: Just remember 125*8=1000]

MULTIPLY TWO DIGITS NUMBERS ENDING IN 1

- **51*31=1581**
- Step 1: Multiply the left most digits : 5*3=15
- Step 2: Add the left most digits:5+3=8

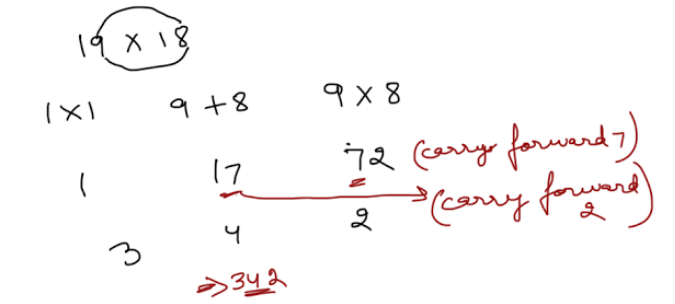
- Step 3: Places the result from Step 2 next to the result from Step 1:158
- Step 4 : Places 1 next to the result from Step 3 : 1581





MULTIPLY NUMBERS BETWEEN 11 AND 19

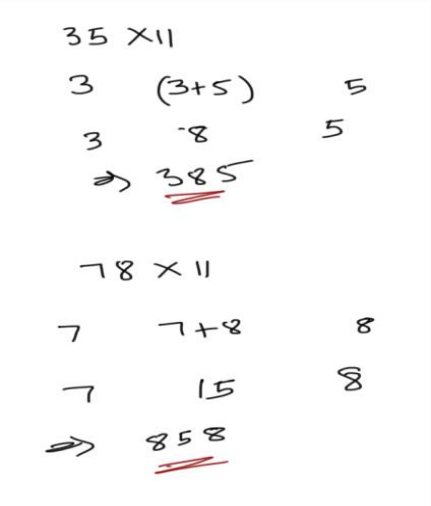
- **14*18=252**
- Step 1: Add the larger number to the right most digit of the other number:18+4=22
- Step 2: Put a 0 at the end of the result from step 1:220
- Step 3 :Multiply the right most digits of both original numbers : 8*4=32
- Step 4:Add Step 2 and step 3 :220+32=252



MULTIPLY TWO DIGIT NUMBER BY 11

- **53*11=583**
- Step 1: Add the both digts of the two digit number:5+3=8
- Step 2: Place the result in between both digits : 583
- **59*11=649**

- Step 1: 5+9=14
- Step 2 : Carry the 1 when the result is greater than 9:5+1=6
- Step 3: 649



MULTIPLY BY 5

- **1234 *5 =6170**
- Step 1 : Divide the number by 2 :1234/2=617
- Step 2: Multiply the result from Step 1 by 10 : 617*10=6170

MULTIPLY BY 25

- **18*25=450**
  Step 1: Divide the number by 4:18/4
  Step 2: Multiply the number from Step 1 by 100: 4.5 * 100 = 450
-

MULTIPLY BY 9

- **56*9=504**
- Step 1: Multiply the number by 10: 56*10=560
- Step 2: Subtract the original number from Step 1: 560-56=504
-

FACTORIZATION

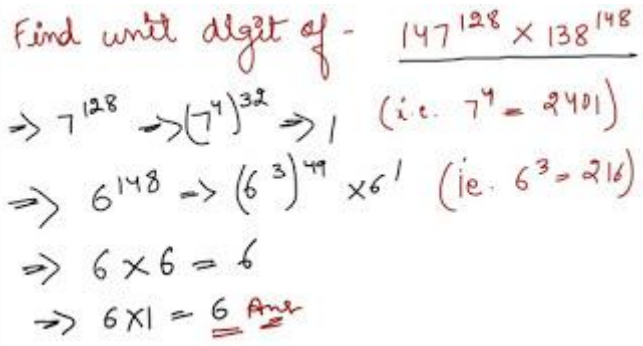
- By Factoring number,you can break down problems into simpler multiplication tasks.Also,you may be able to apply some techniques you learned.

- **21*33**
- step 1 : 21*11*3
- Step 2: 231*3
- Step 3 :693

- **67*81**
- Step 1: 67*9*9
- Step 2:603*9=5427

- **28*125=3500**
- Step 1: 28*125
- Step 2: 28*25*5
- Step 3:28*(100/4)*5
- Step 4:28/4*100*5
- Step 5:7*500=3500

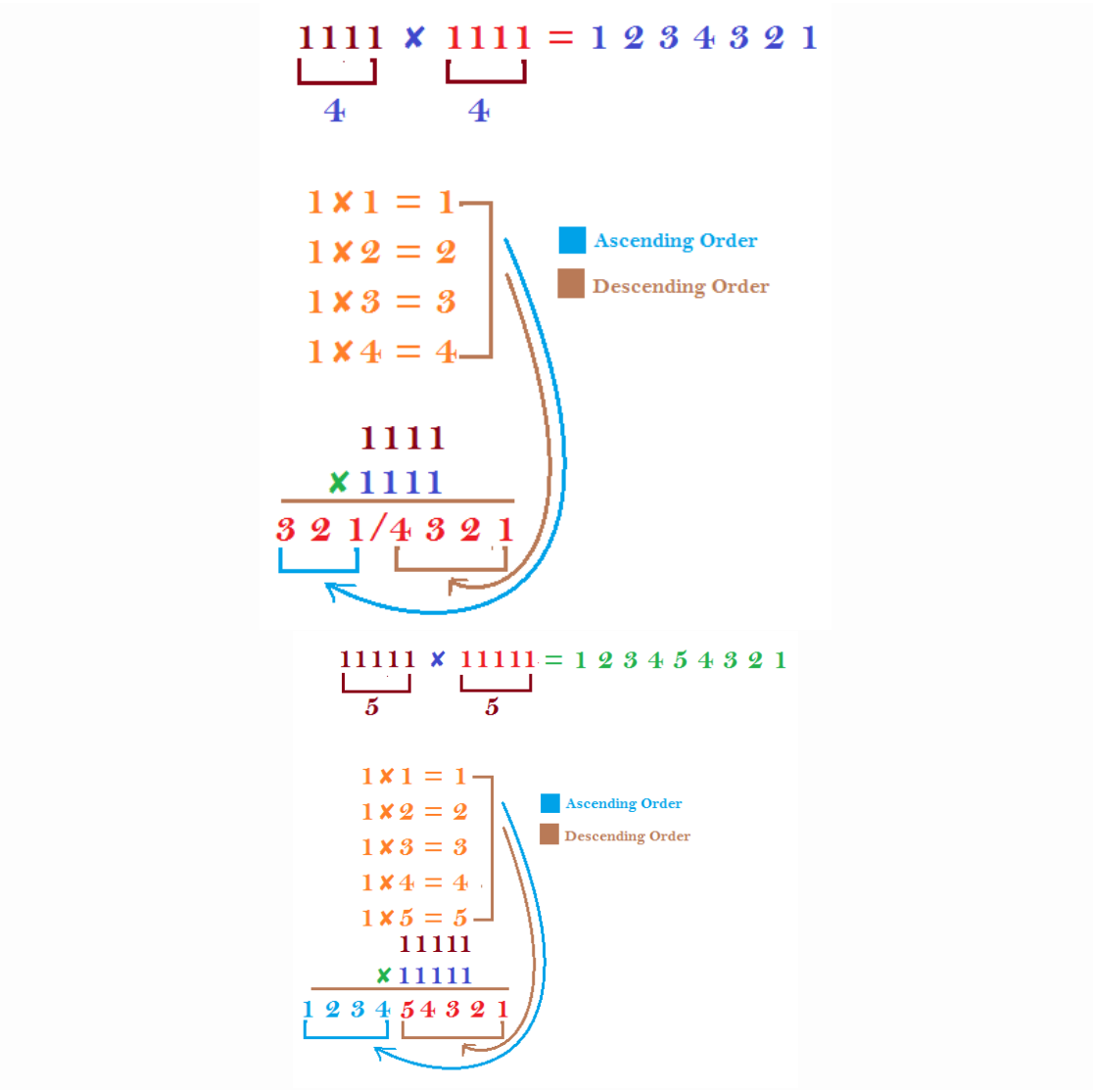
FIND THE UNIT DIGIT OF 147128 * 138148 ?



MULTIPLY BY 11,111,1111....SO ON

- **111111111 ✘ 111111111 = ?**
- **Sol:**
  No of digits in multiplier = 9
  Write in ascending order from left side like this:
  987654321
  and now 9-1=8
  write it in descending order just after it
  12345678
  now you will get like this:
  123456789876543 21
  hence

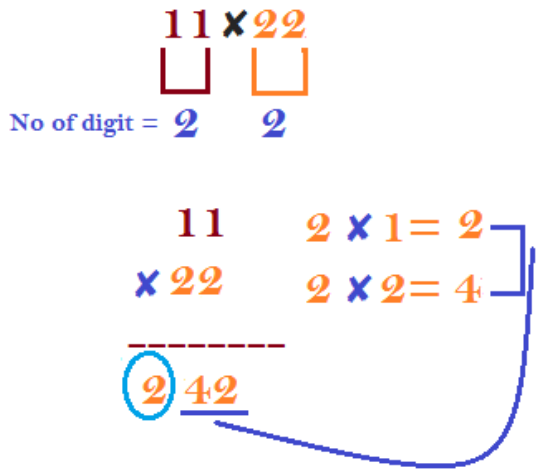
111111111 ✘ 111111111 = 12345678987654321

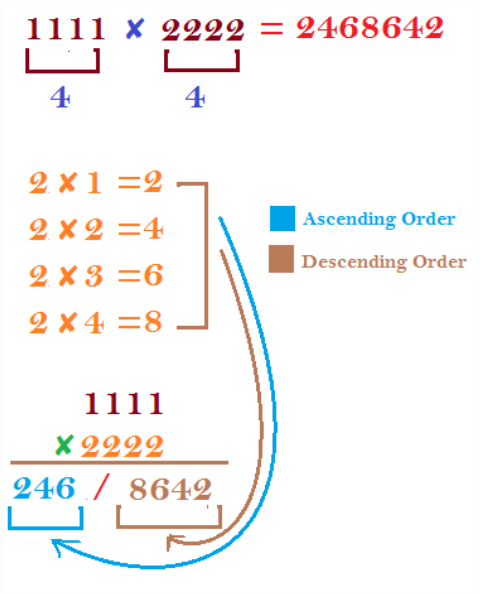


1111111111 ✘ 1111111111 = ?

Sol:
No of digits in multiplier =10
Write in ascending order from left side like this:
10 9 8 7 6 5 4 3 2 1
and now 10-1=9
write it in descending order just after it
1 2 3 4 5 6 7 8 9
and after it just add **the carry**
1 2 3 4 5 6 7 8/ 9/ **10** 9 8 7 6 5 4 3 2 1
8+1/ 9+1 / 0
1 2 3 4 5 6 7 9 0 0 9 8 7 6 5 4 3 2 1

now you will get like this:
1234567900987654321
hence
1111111111✘1111111111 = 1234567900987654321



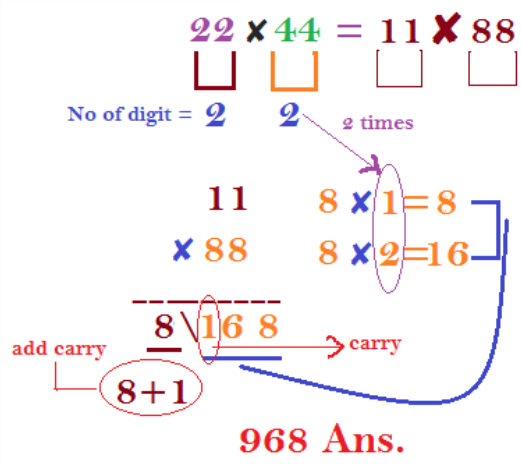


1111111✘2222222 = ?

Sol:
No of digit in the multiplier is 7 then let n=7;
Now Just multiply the digit 2 from 1 to 7 time & arrange them from extreme left to right in ascending order,you will get like this:
14 12 10 8 6 4 2
and now just subtract one from n.like this n=7,so n-1=6.
Multiply the digit 2 from 1 to 6 time & arrange them from just right after it,you will get like this:
2 4 6 8 10 12

Now placing both outcome like this & add the carry
2 4 6 8 **10 12 14 12 10** 8 6 4 2
8+1/0+1/2+1/4+1/2+1
You will get the answer:
2 4 6 9 1 3 5 3 0 8 6 4 2

1111111✘5555555 = ?
Sol:
No of digit = 7
Now Just multiply the digit 5 from 1 to 7 time & arrange them from extreme left to right in ascending order,you will get like this:
35 30 25 20 15 10 5
Just right after it perform same action but in descending order & till 6 times only.like this:
5 10 15 20 25 30
Now placing together ,just add the carry
5 10 15 20 25 30 35 30 25 20 15 10 5
6 1 7 2 8 3 8 2 7 1 6 0 5
1111111✘5555555=6172838271605



3 STEP MULTIPLICATION TRICK - A SHORTCUT METHOD

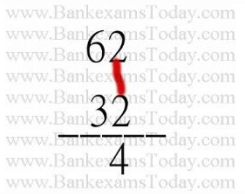
In the series of providing quantitative shortcuts and tricks, today I come up with multiplication trick.

While doing multiplication of a two digit number with another two digit number, we take at least 6 steps. Try yourself. Multiply 62 with 32.

Now let's do this with a trick

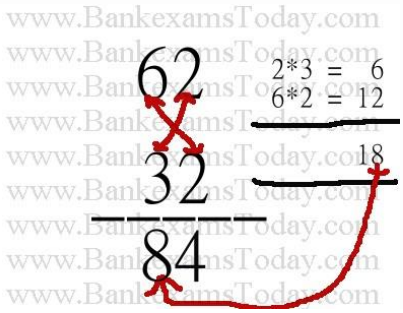
STEP 1

First step is same as conventional method, here we multiply 2 with 2.



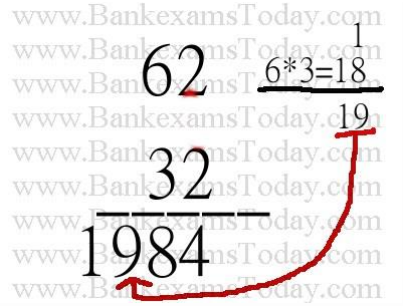
STEP 2

This is an interesting step. Now multiply last digit first value and first digit of second value and vice-versa. Then we add outcomes. But we need the last number that is 8 here.



STEP 3

This is the last step, in this step we do multiplication ten's digit of both value and add the remainder from previous calculation. That's it, we completed the calculation in 3 steps instead of six steps.



We can use this method for multiplication of three or even four digit numbers but time management is really important in IBPS exam and other recruitment exams so for longer calculations, estimation is the best trick. I will post an article about how to do long calculations using estimation and result is 95% accurate which is enough to arrive at answer.

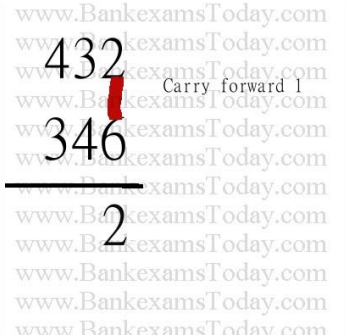
Update 06-09-2013

As two of the readers namely Rahul and Ansh have requested me to use this technique in longer calculations multiplications. I am updating this article.

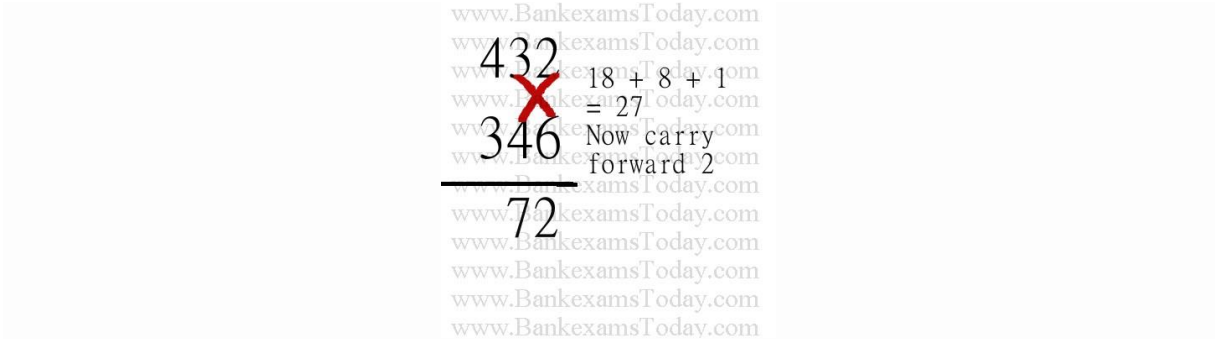
MULTIPLICATION OF 3 DIGIT NUMBERS

In this example I will multiply 432 with 346. Now the 3 step multiplication method will become 5 step. This method can be used for 4 and even 5 digit numbers but as in bank exams there is lack of time available for calculations I recommend you to use approximation for long calculations.

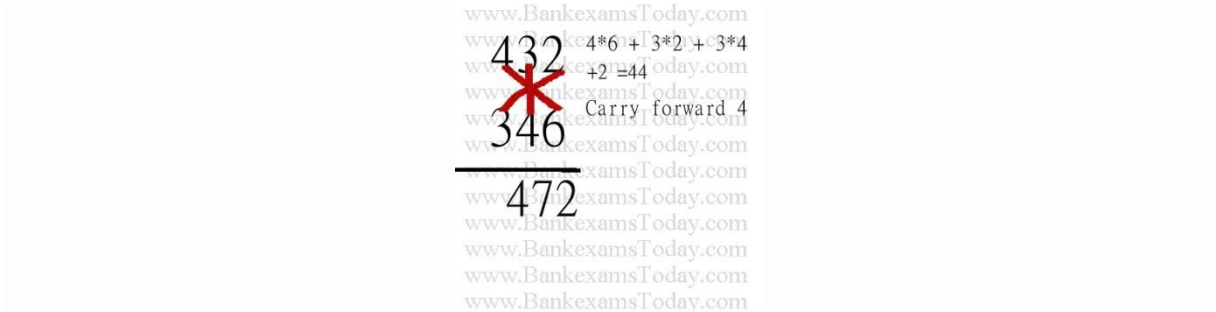
STEP 1



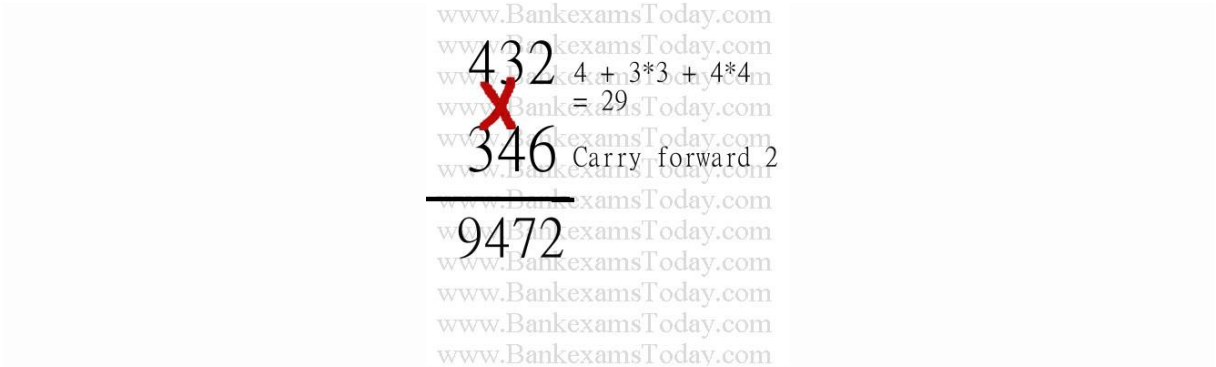
STEP 2



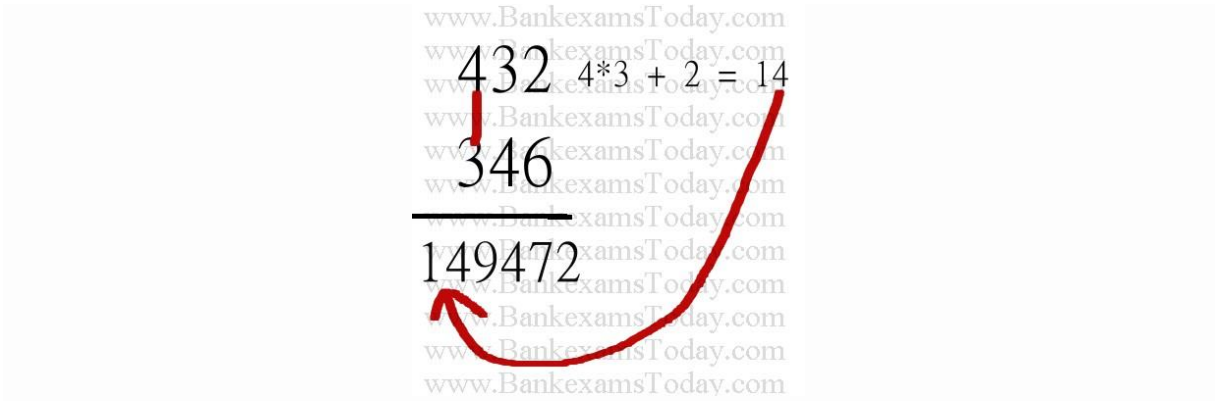
STEP 3



STEP 4



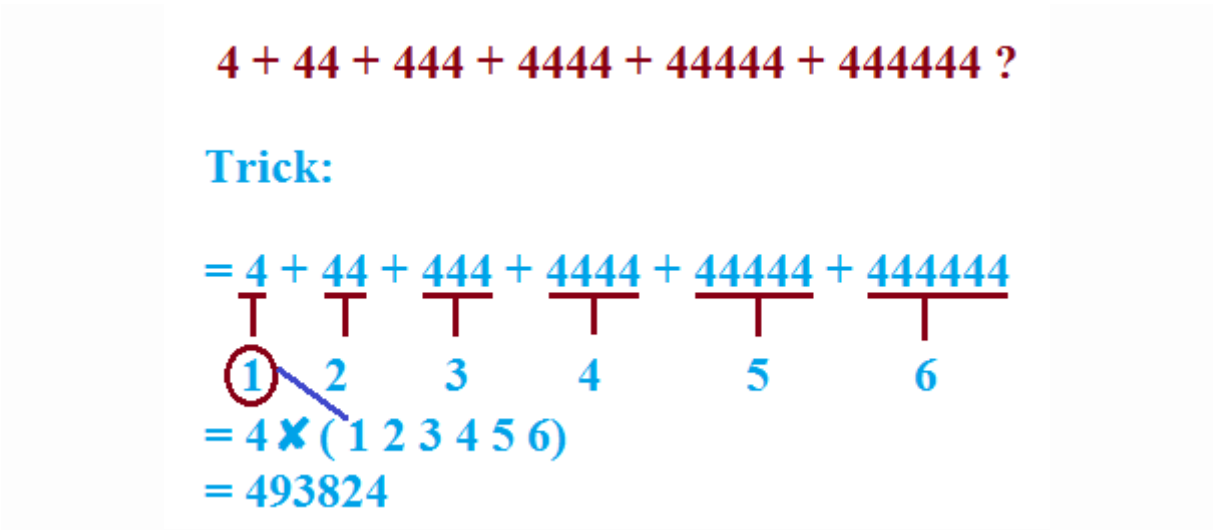
STEP 5



In case you find any difficulty to understand the above multiplication method then ask your question in the comments. I will try to answer every query asap.

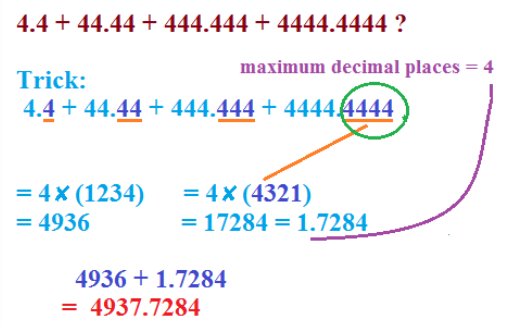
TRICKS TO SOLVE SIMPLIFICATION - ADDITION AND SUBTRACTION

SERIES/ADDITION/SUBTRACTION



Q1 Find 8 + 888 + 8888 + 88888 ?

a) 97760 b) 98572 c) 98672 d) 97672 e) None of the above



Q2. Find 9.4 + 99.44 + 999.444 + 9999.4444 ?

a) 11207.728 b) 11107.728 c) 11106.728 d) 11111.728 e) None of these

$(15-6) = [(15)^2 + 15 \times 6 + (6)^2] = ?$

Trick:

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

$a = 15, b = 6$;

$(a)^3 = 625$;

$(b)^3 = 216$;

$[(a)^3 - (b)^3] = 409$

$(3-5)(3+5)[(3)^2 - (5)^2] = ?$

Trick:

$(a^4 - b^4) = (a-b)(a+b)(a^2 - b^2)$

$a = 3, b = -5$;

$a = 3$; $(a^4) = 81$

$b = 5$; $(b^4) = 625$

$(a^4 - b^4) = 544$

Q3. $(2.3 + 3.3)[(2.3)^2 - 2.3 \times 3.3 + (3.3)^2] = ?$

a) 48.104 b) 47.104 c) 47.204 d) 48.204 e) None of these

Q4. $(3-2)[(3)^4 + ((3)^3 \times 2) + (3)^2 \times (2)^2 + (3 \times 2^3) + 2^4] = ?$

a) 311 b) 211 c) 201 c) 221 d) 301 e) None of these

Q5. $(125.824 + 124.654)^2 + (125.824 - 124.54)^2 / ((125.824)^2 + (124.54)^2)$

a) 1.166 b) 1 b) 2 c) 625 d) 250.478 e) None of these

$2 \div 2 \div 2 \div 2 \div 2 \div 2 = ?$

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

$$= \frac{1}{16}$$

$2 \div 2 \div 2 \div 2 \div 2$ of $2 = ?$

$2 \div 2 \div 2 \div 2 \div 4 = ?$

$$\frac{2}{2 \times 2 \times 2 \times 4} = ?$$

$$\frac{1}{16}$$

$2 \div 2 \div 2 \div 2 \div 2 \times 2 = ?$

$2 \div 2 \div 2 \div 2 \div 4 = ?$

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

$\frac{1}{4}$

$5 \div 5 \div 5 \div 5 \div 5 \div 5 = ?$

$\frac{5}{5 \times 5} + \frac{5}{5 \times 5} = ?$

$\frac{1}{5} + \frac{1}{5} = ?$

$\frac{2}{5}$

$$\frac{1}{1 \times 4} + \frac{1}{4 \times 7} + \frac{1}{7 \times 10} + \frac{1}{10 \times 13} + \frac{1}{13 \times 16} + \frac{1}{16 \times 19}$$

Difference of the number $4-1 = 3$

$7-4 = 3$

$10-7 = 3$

$$\frac{1}{3}\left[1 - \frac{1}{19}\right] = \frac{1}{3} \times \frac{18}{19} = \frac{6}{19}$$

$$\frac{1}{2} + \frac{1}{6} + \frac{1}{12} + \frac{1}{30} + \frac{1}{42} + \frac{1}{56}$$

$$1 - \frac{1}{2} + \frac{1}{2} - \frac{1}{3} + \frac{1}{3} - \frac{1}{4} + \frac{1}{4} - \frac{1}{5} + \frac{1}{5} - \frac{1}{6} + \frac{1}{6} - \frac{1}{7} + \frac{1}{7} - \frac{1}{8}$$

$1 - \frac{1}{8} = \frac{7}{8}$

Trick :

$$\frac{1}{\text{Difference}} \text{ [first number- last number]}$$

Q6. Evaluate $1 + {}^{1}/_{1*3} + {}^{1}/_{1*3*9} + {}^{1}/_{1*3*9*27} + {}^{1}/_{1*3*9*27*81}$ up to three places of decimals ?

a)1.367 b) 1.370 c) 1.361 d) 1.267 e) None of these

Q7. 2 ÷ [2+ 2÷{2+2 ÷ 4)}]= x / 19. Find x.

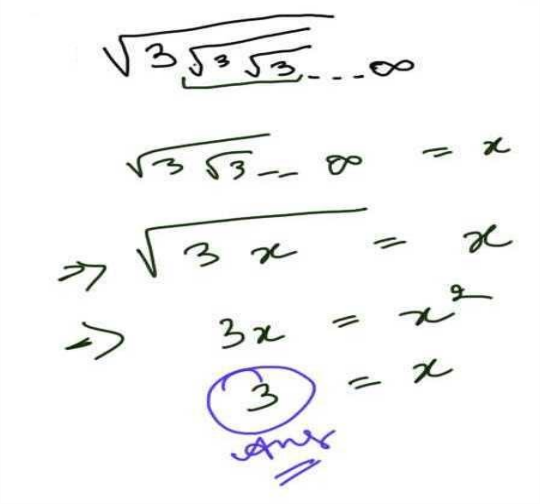
a) 3 b) 4 c) 5 d) 6 e) None of these

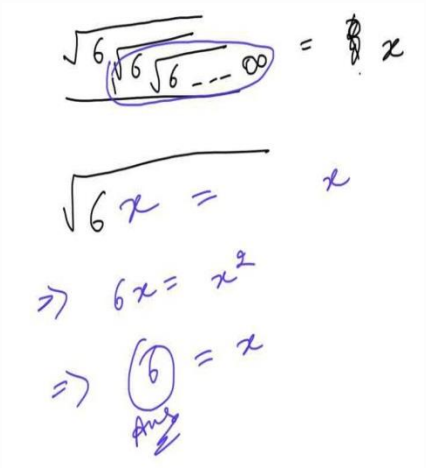
Q8. $\overline{4.45} + 2.9\overline{27} + 0.\overline{6}$?

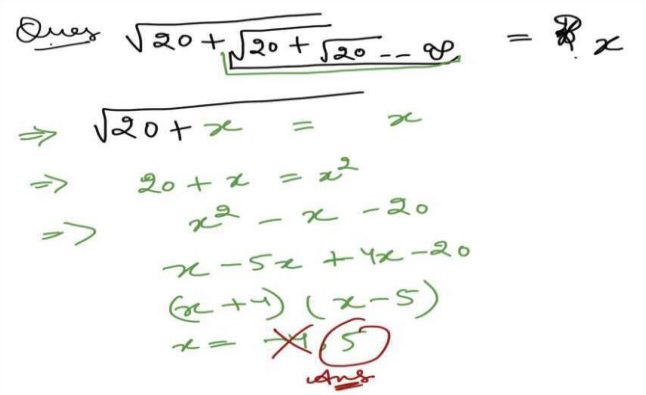
a) 0.67 b) 0.77 c) 0.87 d) 0.97 e) None of these

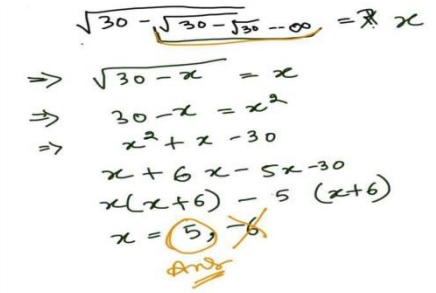
Q9) Find the sum of all even natural numbers less than 75.

a) 1416 b) 1426 c) 1396 d) 1406 e) None of these









$$\sqrt{30-\sqrt{30-\sqrt{30}\cdots\infty}} = x$$

$$\Rightarrow \sqrt{30-x} = x$$

$$\Rightarrow 30-x = x^2$$

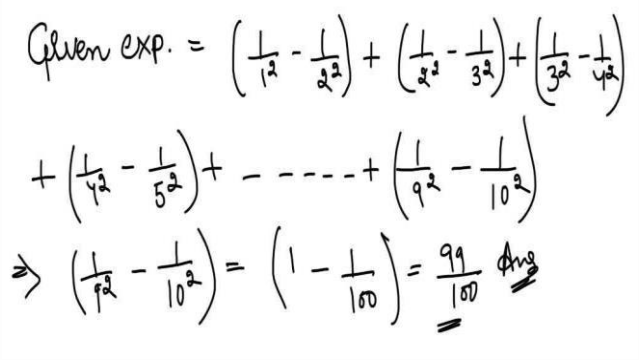
$$\Rightarrow x^2+x-30$$

$$x+6x-5x-30$$

$$x(x+6)-5(x+6)$$

$$x = 5, -6$$

Ans



$$\text{Given exp.} = \left(\frac{1}{1^2}-\frac{1}{2^2}\right)+\left(\frac{1}{2^2}-\frac{1}{3^2}\right)+\left(\frac{1}{3^2}-\frac{1}{4^2}\right)$$

$$+\left(\frac{1}{4^2}-\frac{1}{5^2}\right)+ \text{-----} +\left(\frac{1}{9^2}-\frac{1}{10^2}\right)$$

$$\Rightarrow \left(\frac{1}{9^2}-\frac{1}{10^2}\right) = \left(1-\frac{1}{100}\right) = \frac{99}{100}$$ Ans

SOLUTION:

(1)

Sol : Option (c)

8*(12345) - 88 = 98672

(2)

Sol: Option (b)

9✘(1234) = 11106

4✘(4321) = 17284

=1.7284

=11106+1.7284=11107.7284

(3)

Sol: Option (a)

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

a = 2.3, b = 3.3;

$(a)^3$ = 12.167, $(b)^3$ = 35.937 (a^3+b^3)=48.104

(4)

Sol: option (b)

$(a^5-b^5)=(a-b)\ [a^4+a^3b+a^2b^2+ab^3+b^4]$ = ?

a = 3, b = 2; (3)5=243, (2)5 =32;

(a^5-b^5) = 243-32= 211

(5)
Sol: Option (b)
$(a+b)^2 + (a-b)^2=2((a)^2+(b)^2)$ Hence Answer is 2

(6)
Sol: Option (a)
1+0.33+0.0370 ... hence (a) is the answer no further addition is required.

(7)
Sol: option (e)
Using VODMAS method
Step 1. [2+ 2/4] = 5/2.
Step 2. (2 + 2 ÷5/2) = 2÷ 2✘2/5 =14/5
Step 3. [2+2÷14/5]=2+2*5/14=19/7
Step 4. L.H.S = 2÷19/7=14/19 = x/19 Hence x=19

(8)

Sol: Option (c)

= -4 + 0.45 + 2 + ⁹²⁷⁻⁹/₉₉₀ +6/9

= -4 + 0.45 + 2 + ⁹¹⁸/990 +3/2

= (- 4 + 2) + (0.45+1.5) + (⁵¹/55)

= -2 + 1.95 + 0.92 = 0.87

(9)

Sol: Option (d)

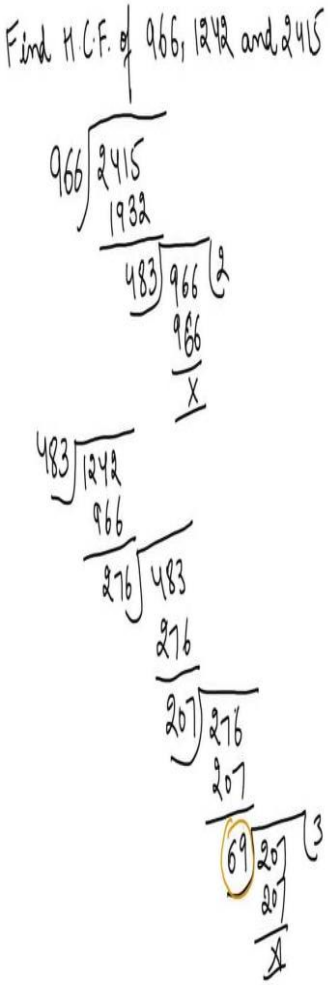
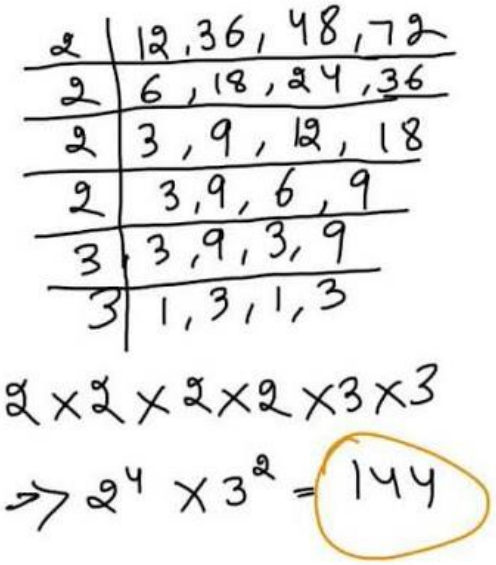
sum= 2 + 4 + 6 + ...+74 a=2 , d=(4-2)=2,l=74 n=37; sum= n/2 (a+l) 37/2✘(2+74)=(37✘38) =37✘(40-2) =(37✘40)-(37✘2) =(1480-74)=1406

H.C.F. & L.C.M.

- Factorization & Division Method
- HCF & LCM of Fractions & Decimal Fractions

Methods

On Basis	H.C.F. or G.C.M	L.C.M.
Factorization Method	Write each number as the product of the prime factors. The product of least powers of common prime factors gives H.C.F. **Example:** Find the H.C.F. of 108, 288 and 360. $108 = 2^2 \times 3^3$, $288 = 2^5 \times 32$ and $360 = 23 \times 5 \times 32$ H.C.F. = $22 \times 32=36$	Write each numbers into a product of prime factors. Then, L.C.M is the product of highest powers of all the factors. **Examples:** Find the L.C.M. of 72, 108 and 2100. $72=23 \times 32,108=33 \times 22,$ $2100=22 \times 52 \times 3 \times 7.$ L.C.M.=$23 \times 33 \times 52 \times 7=37800$
Division Method	Let we have two numbers .Pick the smaller one and divide it by the larger one. After that divide the	Let we have set of numbers. First of all find the number which divide at least two of the number in a given set of

	divisor with the remainder. This process of dividing the preceding number by the remainder will repeated until we got the zero as remainder. The last divisor is the required H.C.F. **Example:**  H.C.F. of given numbers = 69	number. remainder and not divisible numbers will carry forward as it is. Repeat the process till at least two number is not divisible by any number except 1.The product of the divisor and the undivided numbers is the required L.C.M. **Example:** Find the L.C.M. of 12,36,48,72 
H.C.F. & L.C.M. of Fractions	H.C.F. = H.C.F. of Numerator / L.C.M. of Denominators	L.C.M. = L.C.M. of Numerator /H.C.F. of Denominators

Product of H.C.F. & L.C.M.	H.C.F * L.C.M. = product of two numbers	
Decimal numbers	H.C.F. of Decimal numbers Step 1. Find the HCF of the given numbers without decimal. Step 2.Put the decimal point (in the HCF of Step 1) from right to left according to the MAXIMUM deciaml places among the given numbers.	L.C.M. of Decimal numbers Step 1. Find the LCM of the given numbers without decimal. Step 2.Put the decimal point (in the LCM of Step 1) from right to left according to the MINIMUM deciaml places among the given numbers.

HCF & LCM - PRACTICE SET 1

- **Q1.** 12^2,12^4,12^{10},12^6 Find the L.C.M.
- a) 12 b) 12^2 c)12^6 d)12^{10}
- **Q2.** 6^{-1},6^{-3},6^{-10},6^{-12} Find the H.C.F.
  a) 6^{-1} b) 1 c)6^{-12} d)6^{-11}

  Q3. The L.C.M of the fraction of $^2/_3$,$^4/_9$,$^5/_6$,$^7/_{12}$ is:
- a) $^{35}/_9$ b) $^1/_{36}$ c) $^1/_{18}$ d)$^{140}/_3$

  Q4. The ratio of two number is 5:6, if their H,C.F. is 9 and L.C.M. is 270. Find the numbers.
  a) 72,63 b) 81,108 c) 45,54 d) 225,108

  Q5. The multiplication of two numbers is 20,000 if their L.C.M is 800. Find the H.C.F.
  a)400 b) 25 c) 2,000 d) 800

  Q6. Find the least number which when divided by 4,6,7,8,9,12. leaves the same

remainder 3 in each case.
a) 504 b) 501 c) 507 d) 506

Q7. The smallest number which is divisible by 12,15,20 and is a perfect square is:
a) 400 b) 900 c) 1600 d) 3600

Q8. The largest number which divided by 77, 147 and 252 to leave the same remainder in each case is:
a) 9 b) 15 c)35 d) 25

Q9. The H.C.F. of the fraction of $^{36}/25, ^{48}/25, ^{72}/75$
a)$^{12}/75$ b) $^{4}/25$ c) $^{36}/25$ d) ^{36}

SOLUTION:

- **(1)**
  Sol: Option (d)
- $12^2, 12^4, 12^{10}, 12^6$ Find the L.C.M.
  L.C.M. = 12^{10}

  (2)
  Sol: Option(c)
- $6^{-1}, 6^{-3}, 6^{-10}, 6^{-12}$ Find the H.C.F.
- $^1/_6, ^1/_6{}^3, ^1/_6{}^{10}, ^1/_6{}^{12}$
- H.C.F.= $^{H.C.F.}/_{L.C.M.}$= $^1/_6{}^{12}$
  = 16^{-12}

  (3)
  Sol: Option (d)
- Fraction of L.C.M. = $^{L.C.M.}$/H.C.F. =$^{140}/3$

  (4)
  Sol: Option (c)
  The ratio of numbers is 5:6
  The number is 5✘9=45
  =6✘9=54

(5)
Sol: Option (b)
L.C.M. ✘ H.C.F. = Ist No ✘ 2nd No.
800 ✘ H.C.F. = 20,000
H.C.F. = $^{20,000}/_{800}$ = 25

(6)
Sol: Option (c)
L.C.M. of the number 4,6,7,8,9,12
L.C.M. = 8 ✘ 9 ✘ 7 = 504
and Remainder = 3
So the number is L.C.M. + 3
504 + 3 = 507

(7)
Sol: Option (b)
L.C.M. = $(3 \times 5 \times 2^2)$
Required number = $(3^2 \times 5^2 \times 2^2)=900$

(8)
Sol: Option (c)
Required number = H.C.F. of (147-77)
(252-147) and (252-77)
= H.C.F. of 70,105 and 175
= 35
(70 = 2 ✘ 5 ✘ 7, 105 = 5 ✘ 3 ✘ 7 and 175=5 ✘ 5 ✘ 7)
H.C.F. =5 ✘ 7 = 35

(9)
Sol: Option (a)
= $^{\text{H.C.F. of numerator}}$/ L.C.M. of denominator
H.C.F.= $^{12}/75$

HCF & LCM - PRACTICE SET 2

Q1. 468 can be expressed as as a product of prime as :a) 2×2×13×7×2×3 b) 2×2×13×7 c) 2×2×13×3×3 d) 2×2×3×3 ×7 e) None of these

Q2. A number n is said to be perfect if the sum of all its divisor (excluding n itself) is equal to n. An example of perfect number is:
a) 27 b) 35 c) 21 d) 6 e) None of these

Q3. $^{70105}/_{21035}$ when expressed in simplest form is
a) $^{203}/601$ b) $^{2003}/603$ c) $^{2003}/601$ d) $^{2001}/603$ e) None of these

Q4. H.C.F. of $2^2\times3^3\times5^5$, $2^3\times3^2\times5^2\times7$ and $2^4\times3^4\times7^2\times5\times11$ is :
a)22×32×5
b)22×32×5×7×11
c)24×34×55
d)24×34×55×7×11
e) None of these

5. $5^2\times3\times2^4\times2^2\times3^2\times7$ Find the L.C.M.
a) 12300 b) 12600 c) 24600 d) 25200

Q6. H.C.F. of 4×27×3125, 8×9×25×27 & 16×81×5×11×49 is:
a) 180 b) 360 c) 540 d) 1260 e) None of these

Q7. The greatest 5-digit number that is exactly divisible by 100 is:
a) 99899 b) 99800 c) 99900 d) 99889 e) None of these

Q8. What will be the remainder when $(29)^{36}$ is divided by 28 ?
a) 0 b) 1 c) 29 d) 5 e) Cannot be determined

Q9. A number when divided by 627 leaves a remainder 43. By dividing the same number by 19, the remainder will be
a)19 b) 24 c) 43 d) 5 e) 13

Q10. The numbers 1, 3, 5 ... 25 are multiplied together. The number of zeroes at the right end of the product is :
a) 22 b) 8 c) 13 d) 6 e) 0

Q11. When a certain number is multiplied by 21, the product consist oof only fours. The smallest such number is:
a) 21164 b) 4444 c) 444444 d) 444 e) None of these

Q12. In a question, divisor is 2/3 of the dividend and twice the remainder. If the remainder is 5, then the dividend is
a) 85 b) 145 c) 225 d) 65 e) None of these

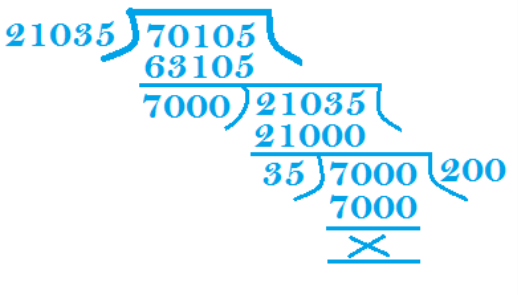
SOLUTION

(1)
Sol : Option (c)
$2 \times 2 \times 13 \times 3 \times 3 = 468$

(2)
Sol : Option (d)

n	Divisors excluding n	Sum of divisor
27	$3 \times 9 \times 1$	13
35	$5 \times 7 \times 1$	13
21	$3 \times 7 \times 1$	11
6	$3 \times 2 \times 1$	6

(3)
Sol : Option (c)



(4)
Sol: Option (a)

(5)
Sol: Option (d)
50+75+150+250+350
=875

(6)
Sol: Option (a)
$4 \times 27 \times 3125 = 2^3 \times 3^3 \times 5^5$
$8 \times 9 \times 25 \times 7 = 2^3 \times 3^2 \times 5^{2 \times 7}$
$16 \times 81 \times 5 \times 11 * 49 = 2^4 \times 3^4 \times 7^2 \times 5 \times 11$
H.C.F. $= 2^2 \times 3^2 \times 7 = 180$

(7)
Sol: Option (c)

(8)
Sol: Option (b)

(9)
Sol: Option (d)

(10)
Sol: Option (e)

(11)
Sol: Option (a)

(12)
Sol: Option (e)

1/3 × 100 = 33.33%	1/10 × 100 = 10%
1/4 × 100 = 25%	1/11 × 100 = 9.09%
1/5 × 100 = 20%	1/12 × 100 = 8.33%
1/6 × 100 = 16.66%	1/13 × 100 = 7.69%
1/7 × 100 = 14.28%	1/14× 100 = 7.14%
1/8 × 100 = 12.5%	1/15× 100 = 6.66%
1/9 × 100 = 11.11%	1/16 × 100 = 6.25%

EXAMPLE:12.5% OF 800

Sol: 1/8 × 800 [12.5% = 1/8, Learn the ratio- equivalence table]
⇒100

SQUARE & CUBE

- Square & Cube
- Square Root & Cube Root
- Factorization Method

Perfect Square	Non-Perfect Square
last digit is 1, 4, 9, 6, 5	last digit is 2, 3, 7, 8

Chart of Perfect Squares 1 to 30

$1^2 = 1$	$11^2 = 121$	$21^2 = 441$
$2^2 = 4$	$12^2 = 144$	$22^2 = 484$
$3^2 = 9$	$13^2 = 169$	$23^2 = 529$
$4^2 = 16$	$14^2 = 196$	$24^2 = 576$
$5^2 = 25$	$15^2 = 225$	$25^2 = 625$
$6^2 = 36$	$16^2 = 256$	$26^2 = 676$
$7^2 = 49$	$17^2 = 289$	$27^2 = 729$
$8^2 = 64$	$18^2 = 324$	$28^2 = 784$
$9^2 = 81$	$19^2 = 361$	$29^2 = 841$
$10^2 = 100$	$20^2 = 400$	$30^2 = 900$

1	4	9	16	25	36	49	64	81	100
121	144	169	196	225	256	289	324	361	400
441	484	529	576	625	676	729	784	841	900
961	1024	1089	1156	1225	1296	1369	1444	1521	1600
1681	1764	1849	1936	2025	2116	2209	2304	2401	2500
2601	2704	2809	2916	3025	3136	3249	3364	3481	3600
3721	3844	3969	4096	4225	4356	4489	4624	4761	4900
5041	5184	5329	5476	5625	5776	5929	6084	6241	6400
6561	6724	6889	7056	7225	7396	7569	7744	7921	8100
8281	8464	8649	8836	9025	9216	9409	9604	9801	10000

Square Root & Cube Root

$\sqrt{1} = 1$ since $1^2 = 1$

$\sqrt{4} = 2$ since $2^2 = 4$

$\sqrt{9} = 3$ since $3^2 = 9$

$\sqrt{16} = 4$ since $4^2 = 16$

$\sqrt{25} = 5$ since $5^2 = 25$

$\sqrt{36} = 6$ since $6^2 = 36$

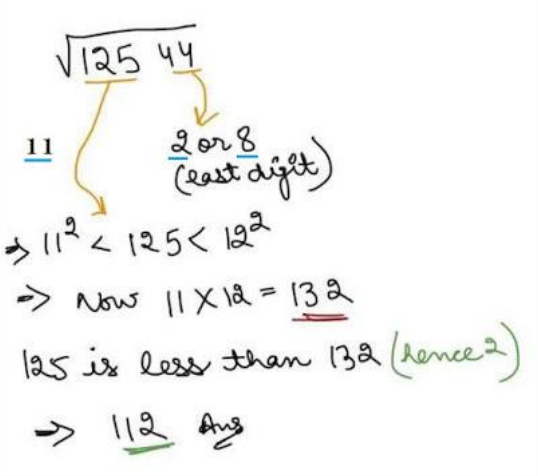
$\sqrt{49} = 7$ since $7^2 = 49$

$\sqrt{64} = 8$ since $8^2 = 64$

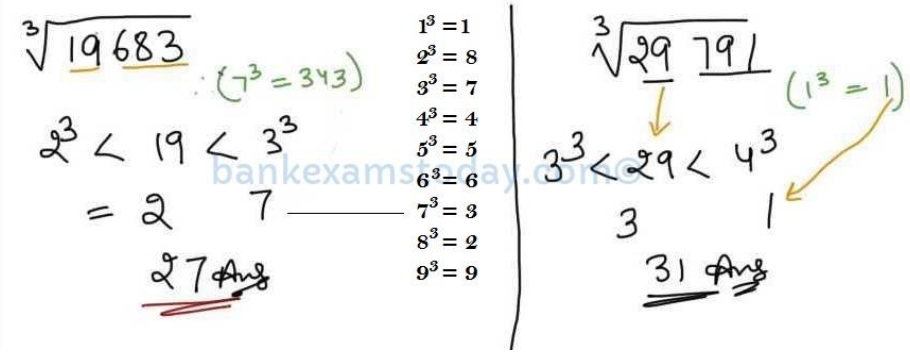
$\sqrt{81} = 9$ since $9^2 = 81$

$\sqrt{100} = 10$ since $10^2 = 100$

numbers	squares	last digit
1	1	1
2	4	4
3	9	9
4	16	6
5	25	5
6	36	6
7	49	9
8	64	4
9	81	1



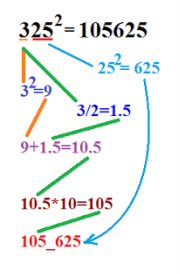
No.	Cube	Unit digit of cube
1	1	1
2	8	8
3	27	7
4	64	4
5	125	5
6	216	6
7	343	3
8	512	2
9	729	9
10	1000	0



FIND SQUARE OF ANY NUMBER WITHIN 10 SECONDS

Today i am going to share an interesting vedic maths trick. At first you will find it difficult but with practice, you will be able to find square of any number within 10 seconds.

SQUARE NUMBERS ENDING IN 25



$325^2 = 105625$

Step 1. 325 = 3_25 => 3

Step 2. Square the number from Step 1: $3^2 = 9$

Step 3. Divide the number from Step 1 by 2: 3/2 =1.5

Step 4. Add Step 2 and Step 3 : 9 + 1.5 = 10.5

Step 5. Multiply the number from Step 4 by 10: 10.5 * 10 =105

Step 6. Write the number 625 next to the result from Step 5: 105_625 = 105625

SQUARE NUMBERS BETWEEN 80 AND 130

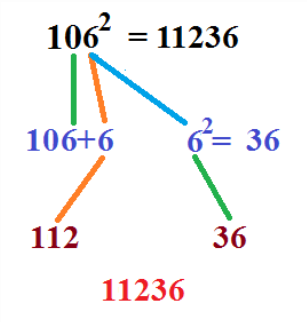
ABOVE 100

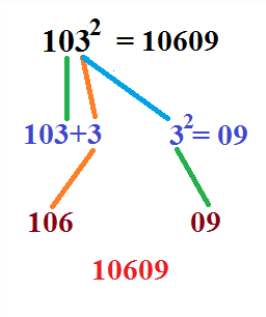
$103^2 = 10609$

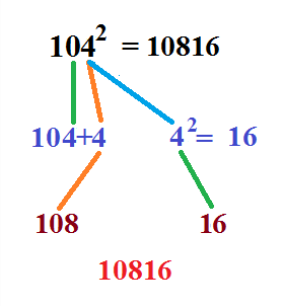
Step 1. Add the number to the ones digit:
103 + 3 = 106

Step 2. Square the ones digit number (if the result is a single digit put a 0 in front of it):
3^2 = 09

Step 3. Place the result from Step 2 next to the result from Step 1 : 10609







BELOW 100

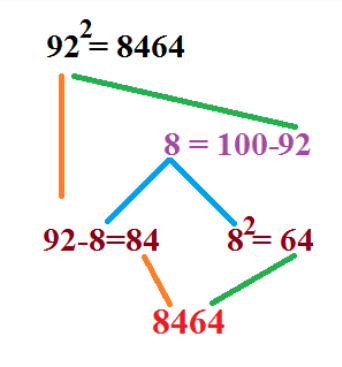
97^2 = 9409

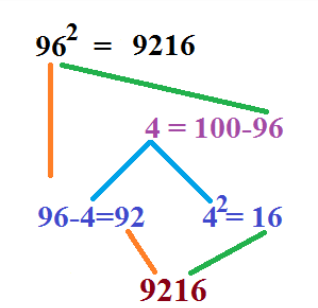
Step 1. Subtract the number from 100: 100- 97 = 3

Step 2. Subtract the number (from Step 1) from original number : 97-3 =94

Step 3. Square the result from Step 1 (if the result is a single digit put a 0 in front of it) : 3^2 = 09

Step 4. Place the result from Step 3 next to the result from Step 2: 9409





SQUARE NUMBERS BETWEEN 30 AND 80

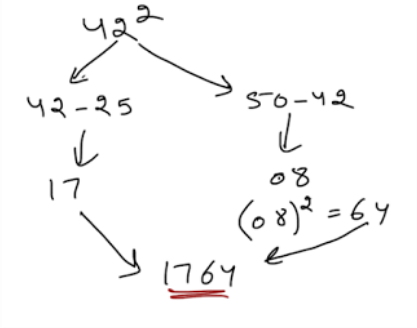
BELOW 50

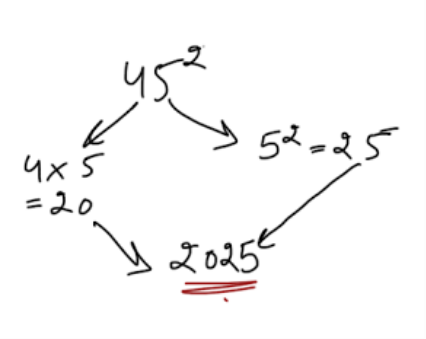
48^2 = 2304
Step 1 . Subtract the number from 50: 50-48=2

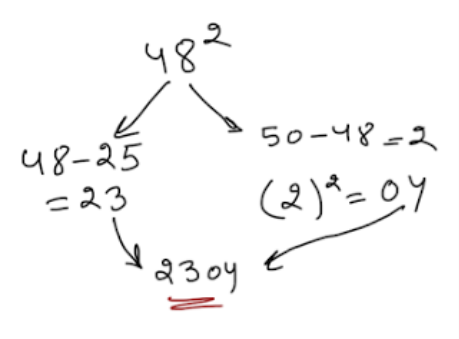
Step 2 . Subtract the result (from Step 1) from 25: 25-2 =23

Step 3 . Square the result from Step 1 (if the result is a single digit put a 0 in front of it) : 2^2 = 04

Step 4 . Place the result from Step 3 next to the result from Step 2 : 2304







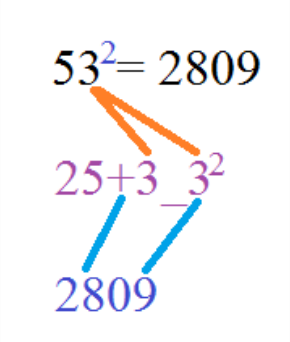
ABOVE 50

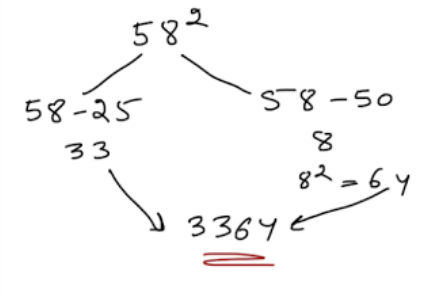
53^2 = 2809

Step 1. Add 25 to the ones digit: 25 + 3 = 28

Step 2. Square the ones digit number (if the result is a single digit put a 0 in front of it) : 3^2 = 09

Step 3. Place the result from Step 2 next to the result from Step 1 : 2809



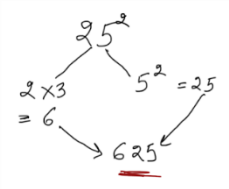


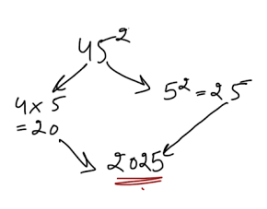
SQUARE NUMBERS ENDING IN 5

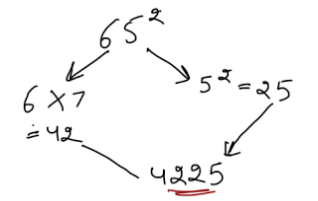
$35^2 = 1225$

Step 1. Multiply the first digit by the first digit plus one: 3 * (3 + 1) = 12

Step 2. Write the numbers 25 next to the result from Step 1 : 1225







UPDATED ON 29TH JUNE 2015

SQUARE NUMBERS BETWEEN 10 AND 19

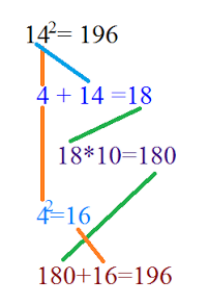
$14^2 = 196$

Step 1: Add the number to the ones digit : 14 + 4 = 18

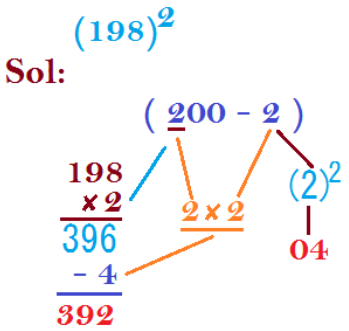
Step 2: Multiply the number from Step 1 by 10: 18 *10 = 180

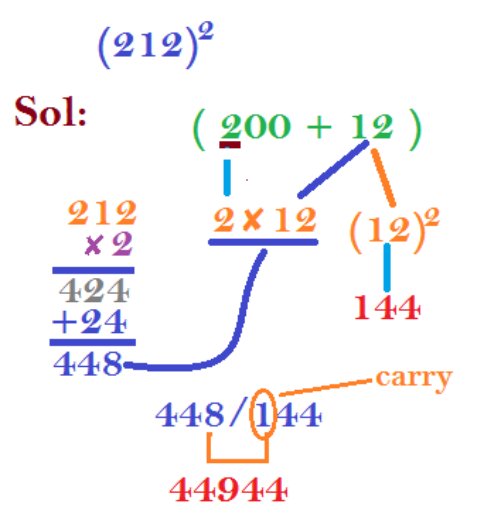
Step 3: Square the ones digit number $4^2 = 16$

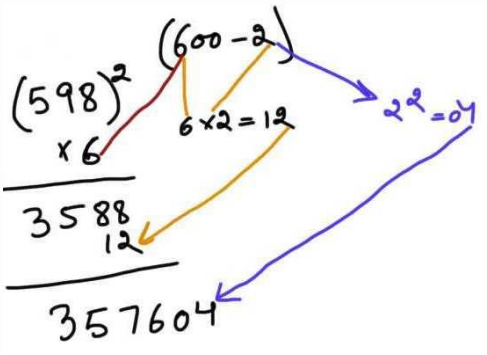
Step 4: Add Step 2 and Step 3 : 180 + 16 = 196

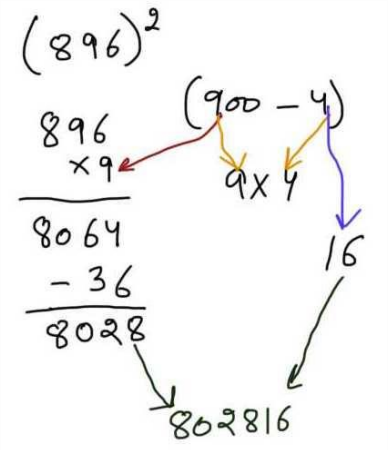


SQUARE OF NEAREST VALUE OF 100,200,300...SO ON



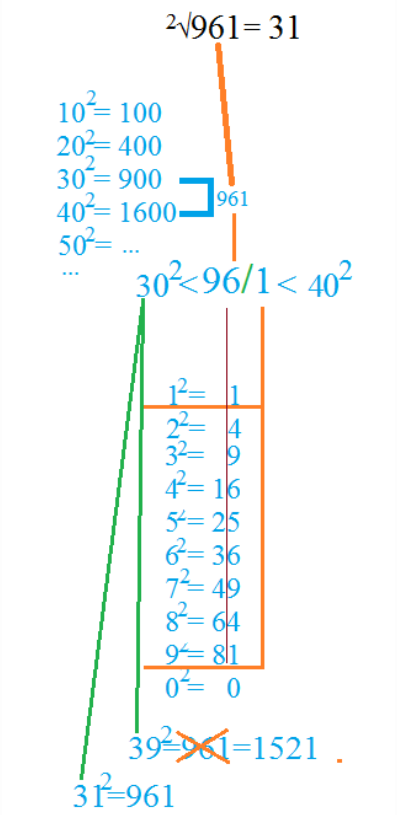


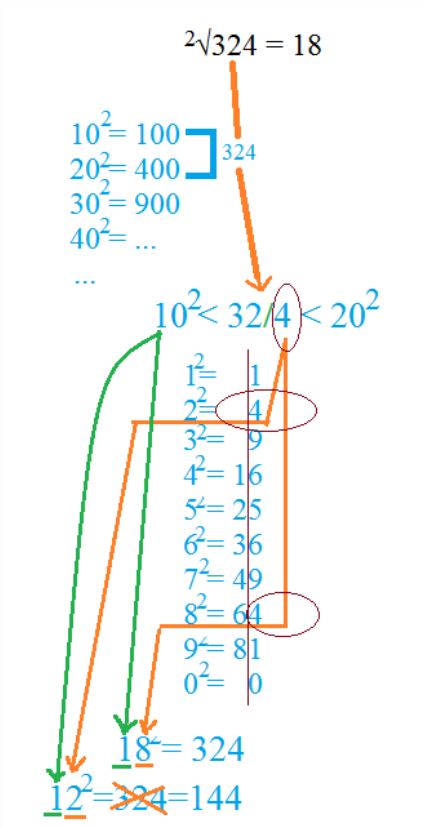




#NTH ROOT

SQUARE ROOT


$\sqrt[2]{961} = 31$
$10^2 = 100$
$20^2 = 400$
$30^2 = 900$
$40^2 = 1600$
$50^2 = \ldots$
$\ldots$
961
$30^2 < 96/1 < 40^2$
$1^2 = 1$
$2^2 = 4$
$3^2 = 9$
$4^2 = 16$
$5^2 = 25$
$6^2 = 36$
$7^2 = 49$
$8^2 = 64$
$9^2 = 81$
$0^2 = 0$
$39^2 = 961 = 1521$
$31^2 = 961$


$\sqrt[2]{324} = 18$
$10^2 = 100$
$20^2 = 400$
$30^2 = 900$
$40^2 = \ldots$
$\ldots$
324
$10^2 < 32/4 < 20^2$
$1^2 = 1$
$2^2 = 4$
$3^2 = 9$
$4^2 = 16$
$5^2 = 25$
$6^2 = 36$
$7^2 = 49$
$8^2 = 64$
$9^2 = 81$
$0^2 = 0$
$18^2 = 324$
$12^2 = 324 = 144$

SQUARING TECHNIQUE - FIND SQUARE OF ANY NUMBER UNDER 10 SECONDS

Simple technique to find square of a two digit or three digit number under 10 seconds.

Here we are going to use simple algebric formula that it

$[a+b]^2 = a^2 + 2ab + b^2$

By applying this formula, let's do some examples:-

Find 43^2
$\Rightarrow [43]^2$
$\Rightarrow [4|3]^2$
$\Rightarrow [4^2 \mid 2 \times 4 \times 3 \mid 3^2]$
$\Rightarrow [16 \mid 24 \mid 9]$
1849

More shortcut techniques

Find 114^2
$\Rightarrow [11| 4]^2$
$\Rightarrow [11^2 \mid 2 \times 11 \times 4 \mid 4^2]$
$\Rightarrow [121 \mid 88 \mid 16]$
$\Rightarrow [121| 88 + 1 \mid 6]$
$\Rightarrow [121 \mid 89 \mid 6]$
$\Rightarrow [129 \mid 9 \mid 6]$
12996

Find 253^2

⇒[25|3]²
⇒[25² | 2 × 25 × 3 | 3²]
⇒[625 | 150 | 9]
64009

TECHNIQUE

In case of two digit number deduct last digit and add it to another number and then add square of same.

In this technique we simplify the squaring method by making one unit's digit zero. It is far easy to multiply 50*24 than 54*24. So I used this technique. Try practice more to become expert in this technique.

LET'S TAKE SOME EXAMPLES

Find square of 53.
=(53*53)
= (53+3) * (53-3) + (3*3)
=(56*50) + 9
= (560*5) + 9
= 2800 + 9 = 2809

Let's take another example
Find square of 69
= (69*69)
= (69+1) * (69-1) + (1*1)
= (70*68) + 1
= (680*7) + 1
= 4761

Let's take one more example
Find square of 45
= (45*45)
= (45-5)*(45+5) + (5*5)
= (40*50) + 25
= 2000+25
= 2025

TRICKS TO FIND SQUARE ROOT AND CUBE ROOTS

$$\sqrt{16} = \sqrt{4 \times 4} = 4$$

$$\sqrt[3]{4} = \sqrt[3]{4 \times 4 \times 4} = 4$$

Division Method

- **Step 1.** Make Pair of digits of given number from left to right
- **Step 2.** Pick first pair, like here 6 find the square which is equals to 6 or less than it. Like 2
- **Step 3.** So Place it to in the section of Quotient as well as in the divisor.
- **Step 4:** then subtract from square of no which is equals to 6 or less than it with 6
- **Step 5.** Now comes to second pair bring it down like here 40, double the quotient like 2 = 4 and write the result on the left of 240 .It is just like division. Now repeat From Step 2 until you got the remainder zero.

$\sqrt{64009} = ?$

2	6 40 09	253 = Quotient
+ 2	4	
45	2 40	
+ 5	2 25	(since 45 × 5=225)
503	15 09	(since 503 × 3=1509)
	15 09	

$\sqrt{64009} = 253$ (i.e. Quotient)

Prime Factor Method

$\sqrt{11025} = ?$

3	11025
3	3675
5	1225
5	245
7	49
	7

$\sqrt{11025} = 3 \times 5 \times 7 = 105$

$$\sqrt{\frac{529}{900}} = ?$$

$$529 = 23^2$$
$$900 = 30^2$$

$$\sqrt{\frac{529}{900}} = \frac{23}{30}$$

Square Root of a Decimal Fraction

- Step 1. Make the pair of integer part first.
- Step 2. Now find whether the decimal part is odd or even if it is odd then make it odd by placing at the end of it zero.
- Now just find the square root by the division method as discussed above and don't forget to put the decimal point in the square root as the integer part is over.

$\sqrt{387.09126} = ?$

1 + 1	3 $\overline{87}$. $\overline{09}$ $\overline{12}$ $\overline{60}$ 1	19.674
29 + 9	2 $\overline{87}$ 261 (integer part is over)	since 29 × 9=261
386 6	26 $\overline{09}$ 23 16	since 386 × 6=2316
3927 7	2 93 $\overline{12}$ 2 7 4 8 9	since 3927 × 7=27489
39344	1 8 2 3 $\overline{60}$ 1 5 7 3 7 6	since 39344 × 4=157376

Method of Finding Cube Root of Perfect Cube

$\sqrt[3]{2744} = ?$

2	2744
2	1372
2	686
7	343
7	49
	7

$\sqrt[3]{2744} = 2^3 \times 7^3$

$\sqrt[3]{2744} = 2 \times 7 = 14$

$\sqrt[3]{\frac{64}{1331}} = ?$

$\frac{64}{1331} = \frac{4^3}{11^3}$

$\sqrt[3]{\frac{64}{1331}} = \frac{4}{11}$

APPROXIMATION

As the name suggests, if the given values are in points, then approximate the values to the nearest comfortable value so that there is not much effect on the final results.

Example: 150.4 × 5.876

Sol: 1500 × 6 =9000

FRACTIONS & DECIMALS

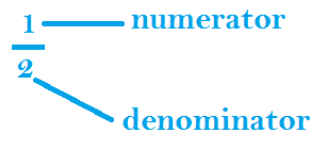
On Basis	Explanation
Decimal Fractions	A number with a denominator of power of 10 is a decimal fractions. $^1/_{10}$= 1 tenth; $^1/_{100}$= 0.1;$^{38}/_{100}$=0.38
Vulgar Fractions	Conversion of 0.64(decimal number) into a Vulgar Fraction.First of all write the numeric digit 1 in the denominator of a number (like here 0.64) and add as many numeric zeros as the digit in the

	number after decimal point.After that removes the decimal point from the given number.At last step just reduce the fraction to its lowest terms. So, 0.64 = $^{64}/_{100}$=$^{16}/_{25}$;25.025 = $^{25025}/_{1000}$ = $^{1001}/_{4}$
Operations	**Addition & Subtraction** To perform the addition and subtraction of a decimal fraction could be done through placing them right under each other that the decimal points lie in one column. 3.424+3.28+.4036+6.2+.8+4 3. 424 3. 28 . 4036 6. 2 . 8 +4 18. 1076 **Multiplication of a Decimal Fraction** To find the multiplication of decimal fraction , first of all you need to remove the decimal point from the given numbers and then perform the multiplication after that assign the decimal point as many places after the number as the sum of the number of the decimal places in the given number. Step 1. 0.06*0.3*0.40 Step 2. 6*3*40=720 Step 3. 0.00720 Multiplication of a decimal fraction by power of 10 A multiplication of a decimal fraction by a power of 10 can be perform through shifting the decimal point towards right as many places as is the power of 10. like 45.6288*100=45628.8, 0.00452*100=0.452 **Division**

	$\frac{0.0204}{17} = \frac{204}{17} = 12$ $= 0.0012$ $\frac{0.00066}{0.11} = \frac{0.00066 \times 100}{0.11 \times 100} = \frac{0.066}{11} = .0066$
Comparison of Fractions	To compare the set of fractions numbers,first of all you need to convert each fraction number or value into a equal decimal value and then it will be became easy for you to assign them (the numbers or value) in a particular way(ascending or descending order). $^3/5, ^4/7, ^8/9$ and $^9/11$ Arranging in Ascending Order $^3/5 = 0.6$, $^4/7 = 0.571$, $^8/9 = 0.88$, $^9/11 = 0.818$. Now, $0.88 > 0.818 > 0.6 > 0.571$ $^8/9 > ^9/11 > ^3/5 > ^4/7$
Recurring Decimal	**Recurring Decimal** A decimal number in which after a decimal point a number or set of number are repeated again and again are called recurring decimal numbers.It can be written in shorten form by placing a bar or line above the numbers which has repeated. $\frac{8}{3} = 2.666..... = 2.\bar{6}$ $\frac{1}{7} = 0.\ 142857142857142857$ $= 0.\overline{142857}$ **Pure Recurring Decimal** A decimal number in which all digits are repeated after a decimal point. $0.5 = \frac{5}{9};\ 0.\overline{53} = \frac{53}{99};\ 0.\overline{067} = \frac{67}{999}$ **Mixed Recurring Decimal** A decimal number in which certain digits are repeated only.

	$0.17333..... = 0.17\overline{3}$ $0.16 = \frac{16-1}{90} = \frac{15}{90} = \frac{1}{6}$ $0.22\overline{73} = \frac{2273-22}{9900} = \frac{2251}{9900}$

FRACTION - TECHNIQUES WITH PRACTICE QUESTIONS



Types

- Proper
- Improper
- Mixed Fraction

I. Proper Fraction: [when numerator < denominator]

Eg. $^{4}/_{5}$, $^{6}/_{8}$, $^{9}/_{7}$

II. Improper Fraction : [when numerator > denominator]

Eg. $^{4}/_{2}$, $^{5}/_{3}$, $^{6}/_{2}$

III. Mixed Fraction :

- Mixed with Proper Fraction
- Mixed with Improper fraction

a) Mixed with Proper Fraction: When a proper fraction is mixed with a whole number known as mixed with proper fraction.

Eg. $5^2/_3$, $6^3/_4$, $7^1/_4$

b) Mixed with Improper Fraction: When a proper fraction is mixed with a whole number known as mixed with Improper fraction.

Eg. $2^3/_2$, $4^4/_1$, $6^6/_1$

Rules

I. $4 + {}^3/_8 = 4\ {}^3/_8$

II. $4+{}^8/_3 = 4 + 2^2/_3$
$= 6^2/_3$
III. $4-{}^3/_8 = 3+(1-{}^3/_8) = 3+{}^5/_8 = 3^5/_8$

Q1. Arrange the fractions $a={}^3/_5$, $b={}^4/_7$, $c={}^8/_9$ and $d={}^9/_{11}$ in their descending order.
a) a,b,c,d
b)c,d,a,c
b) a,d,c,a,b
d) c,d,a,b
e) None of these
Q2.[0.00625 of 23/5], when expressed as a vulgar, fraction, equals:
a)23/80 b) 23/8000 c) 23/800 d) 125/23 e) None of these

Q3. Simplify : $\dfrac{1\frac{1}{2}}{1+\frac{1}{1+\frac{1}{4}}}$

a)5/6 b) 5/9 c) 15/18 d) 3/18 e) None of these

Q4.If 47.2506 = 4A +7/B+2C +5/D+6E, then the value of 5A + 3B + 6C + D + 3E is:

a) 153.6003 b)53.6003 c) 53.603 d) None of these e) 213.0003

Q5.4/15 of 5/7 of a number is greater than 4/9 of 2/5 of the same number by 8.What is half of that number?

a)215 b) 315 c) 305 d) 325 e)None of these

Q6. Find the value of $^{1}/_{2 \times 3} + {}^{1}/_{3 \times 4} + {}^{1}/_{4 \times 5} + {}^{1}/_{5 \times 6} + \ldots\ldots\ldots + {}^{1}/_{9 \times 10}$

a)$^{4}/_{10}$ b) $^{2}/10$ c) $^{2}/_{5}$ d) $^{4}/_{5}$ e) None of these

Solution

(1)
Sol: Option d
Clearly $^{3}/5=0.6$, $^{4}/7 = 0.571$, $^{8}/9 = 0.88$, $^{9}/11= 0.818$
Now, $0.88 > 0.818 > 0.6 > 0.571$

(2)
Sol: Option c
$[0.000625 \text{ of } {}^{23}/5]=[{}^{625}/100000 * {}^{23}/5]={}^{23}/800$

(3)
Sol: Option (a)

$$\frac{\frac{3}{2}}{1+\frac{1}{\frac{5}{4}}} = \frac{\frac{3}{2}}{\frac{9}{5}}$$

(4)
Sol: Option (a)
$4A + {}^{7}/B + 2C + {}^{5}/D + 6E = 47.2506$
$4A + {}^{7}/B + {}^{2}/C + {}^{5}/D + 6E = 40+7+0.2+0.05+0.0006$
Comparing the terms on both sides, we get
$4A=40$, $^{7}/B =7$, $2C = 0.2$, $^{5}/D=0.05$, $6E=0.0006$
or
$a=10$, $B=1$, $C=0.1$, $D = 100$, $E = 0.0001$
$5A+3B+6C+D+3E$
$=(5810)+(3*1)+(6*0.1)+100+(3*0.0001)$
$=50+3+0.6+100+0.0003=153.6003$

(5)
Sol: Option B
Let the number be x. Then,
$^4/_{15}$ of $^5/_7$ of x - $^4/_9$ of $^2/_5$ of x = 8
$^4/_{21}x-^8/_{45}x=8$
$[^4/_{21}-^8/_{45}]x=8$
$[^{60-56}/_{315}]x=8$
$^4/_{315}x=8$
$x=[^{8*315}/_4]=630$
$^1/_2$ x = 315

(6)
Sol: Option C
Given expression $[^1/_2-^1/_3]+[^1/3-^1/4]+[^1/4-^1/5]+[^1/5-^1/6]+.....+[^1/9-^1/10]$
$=[^1/2-^1/10]$
=4/10
=2/5

SURDS & INDICES

- Some Rules of Indices
- Some Rules of Surds