SET No.A1_040316

This Chapter covers;

1. Type of Numbers and their definitions,
2. Imaginary Number problems Trick
3. Prime Number Tricks-2
4. Addition Tricks, Subtraction Tricks(cross method)
5. Multiplication Tricks 2x2 trick
6. Multiplication tricks 3x2 trick.
7. Multiplication tricks same unit digit trick.
8. Multiplication tricks same 10th digit trick.
9. Multiplication tricks (unit + 10th digit = 10) trick.
10. Multiplication tricks 3x3 trick.
11. Multiplication tricks 4x4 trick.
12. Square Tricks in 10 secs/Square tricks in 30 sec.
13. Cube Tricks
14. Square root tricks,
15. Cube root tricks
16. Fraction tricks
17. Sum of natural numbers/sum of squares of natural no. formulae
18. Sum of even no./odd numbers tricks
19. Division, Remainders related problems
20. BODMAS RULE

FUNDAMENTALS with exclusive tricks + Practice Questions

TYPE OF NUMBERS:

1. NATURAL NUMBER = Natural numbers means counting numbers.

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(1,2,3,4,5,6,7,8,9,10,.....5678,5679,.....)

2. WHOLE NUMBER (When '0' is invented by India, it was firstly introduced in the World and added it to natural number renamed the group as Whole Number. Before it, 10 was written as 'X')

eg. Of whole numbers are { 0,1,2,3,4,.....}

3. INTEGERS = { .....-3,-2,-1, 0, 1,2,3,.....}

4. REAL NUMBERS= contains all numbers in the real world. Real numbers are those numbers that can be represented by the points on a number line. Real numbers include both the rational and irrational numbers. When using the term number, it is normally assumed that the number is a real number.

These are of two types:

(i) **Rational Numbers** – Rational numbers are any number that can be represented by an integer "a" or the ratio of two integers, a/b, where the numerator, a, may be any whole number, and the denominator, b, may be any positive whole number greater than zero. If the denominator happens to be unity or b = 1, the ratio is an integer. If b is other than 1, a/b is a fraction. If "a" is smaller than "b" it is a proper fraction. If "a" is greater than "b" it is an improper fraction which can be broken up into an integer and a proper fraction. 3/5 is a proper fraction while 8/5 is an improper fraction equaling 1 +3/5. Any rational number can be expressed as a decimal. All decimal equivalents of a/b, other than those with b equal to 2 or 5, result in a repeating decimal. Decimals resulting from fractions with the denominator being powers of 2, 5, or both, i.e., denominators of 2, 4, 5, 8, 10, 16, 20, 25, 32, 40, 50, 64, and 80, etc., are terminating decimals. The group of numbers that are found to repeat in non-terminating decimals are referred to as the period of the repeating decimal. The number of digits in the repeating group is referred to as the length of the period. You will note that when a is divided by b, the remainders can only be 1, 2, 3,....(b - 1), meaning that after (b - 1) steps of division, the possible remainders must repeat themselves.

It contains natural numbers, whole numbers. ,integers, positive decimal no., negative decimal number, fractions (p/q, where q ≠0), non-ending but repeating (recurring) decimal numbers (e.g. 0.33333....., 0.454545..... etc.)

(ii) Irrational numbers- non-ending, non-recurring decimal numbers (e.g. e, π, √2, √3, √5 etc.)

e = 2.7182....., √2 = 1.41421356....., √3 = 1.73205080.....

5. Imaginary number := i = √-1

FT-1: Imaginary number Trick:

Q.1) Solve $\sqrt{3-4i}$ ans.2-i

SOLVE IT BY TRICKS ALSO:

Divide 4i by 2 , which will give answer as 2i; now factorise 2i = 2 x i it means answer will be 2-i., '-' sign is taken between 2 and I, because, in question, between 3 and 4i, sign is '-'. If this would have been '+' then we will take '+' sign and answer will be 2+i.

Practice Q.2)Solve $\sqrt{21-20i}$ ans. 5-2i

Practice Q.3)Solve $\sqrt{5+12i}$ ans. 3+2i

Some question is more hard, for e.g. Solve $\sqrt{5+12i}$; here when 12i is divided by 2, then we get 6i now factor of 6i are many,

We can take, 1x 6i or 2 x 3i or 3 x 2i, in such case, we solve $(2)^2 + (3i)^2 = -5$, but in question 5 is at first place. Then do this calculation $(3)^2 + (2i)^2 = 5$, hence the correct factor is 3 and 2i, then answer will be 3 + 2i.

Now Solve Q.4) Solve $\sqrt{32+24i}$

Ans. 6+2i

Practice Q.3)Solve $\sqrt{5-12i}$ ans. 3-2i

6.even numbers - divisible by 2 (e.g. 2,4,6,8,10,..... etc.)

7.Odd numbers - not divisible by 2 (e.g. 1,3,5,7,.....etc.)

8.Prime numbers – a number which has no factors except one and itself. Prime number starts from 2. (e.g. 2,3, 5,7,11,13,17.....etc.)

- 1 is neither prime nor composite number.
- Prime number always starts from 2.
- The only even prime no. is 2.
- **Composite number**- which have factors other than 1 and itself.(e.g. 12,16,20 ,....etc.)

Facts: Between 1 to 50, prime numbers are 15.

Between 51 to 100 , prime numbers are 10.

Between 1 to 100, number of prime numbers is 25.

Between 70 to 100, how many prime numbers are ? ans.6

FT-2: Prime number Trick:

SOLVE BY TRICK:

44-22-322-321 IS THE UNIVERSAL TRICK FOR GETTING NO. OF PRIME NUMBERS BETWEEN ANY NUMBER TO ANY NUMBER upto 100.

SOLVE BY TRICK: Remember **a tricky 10 digit number "4422322321"**

Between 1 to 10 there are 4 prime numbers (i.e. 2,3,5,7)

Between 11 to 20 there are 4 prime numbers (i.e. 11,13,17,19)

Between 21 to 30 there are 2 prime numbers (i.e. 23,29)

Between 31 to 40 there are 2 prime numbers (i.e. 31,37,)

Between 41 to 50 there are 3 prime numbers (i.e. 41,43,47)

Between 51 to 60 there are 2 prime numbers (i.e. 53,59)

Between 61 to 70 there are 2 prime numbers (i.e. 61,67)

Between 71 to 80 there are 3 prime numbers (i.e. 71,73,79)

Between 81 to 90 there are 2 prime numbers (i.e. 83,87)

Between 90 to 100 there are 2 prime numbers (i.e. 97)

Q.2: Between 30 to 70, how many prime numbers are ? ans.9

Since 30 is not a prime number, see prime numbers between 31 to 70 in following table.

No.of Prime numbers →	4	4	2	2	3	2	2	3	2	1
	1 to	11 to	21 to	31 to	41 to	51 to	61 to	71 to	81 to	91 to
	10	20	30	40	50	60	70	80	90	100

Ans. = 2 + 3 + 2 + 2 = 9 ans.

Prac. Q.) Between 20 to 70 how many prime numbers exist? **Ans.11**

Q.3) Whether the no. 223 is a prime?

Take nearest square number more than 223. That is 225. Now take root of this i.e. √225 = 15.

Now up to 15, how many prime numbers (i.e. 2,3,5,7,11,13)

Now divide 223 by all these prime numbers (i.e. 2,3,5,7,11,13)

If it is divisible then 223 is not a prime number.

If it is not divisible then 223 is a prime number.

In this case, 223 is not divisible by any of these prime numbers (i.e. 2,3,5,7,11,13)

So in this case 223 is a prime number . ans is "YES".

Prac. Q.) Whether the no. 191 is prime?

9. Composite number- which have factors other than 1 and itself.(e.g. 12,16,20 ,....etc.)

ADDITION QUESTIONS: SOLVE BY SHORT TRICKS:

Q.4) 25637 – 5252 + 3231 - 1989 = ? **ans.21627**

FAST Method: Use single digit method and solve in less than 20 secs.

Explanation: ***In single digit method (take unit digits of all numbers [7-2+1-9] if answer is positive then write that digit but if answer is negative,(i.e.*** between -***1 to*** -10 ***) then subtract it from 10. Suppose answer is -6 then you take at 1st place in answer keep 10-6=4, and if answer is -12 then subtract it from 20 and write 8 in place of answer.***

If answer comes between -11 ***to -19, then subtract it from 20 ; suppose answer is -12 , then at 2nd place from right in answer keep 20-12 =8***

7-2 +1-9= -3 now 10-3 = 7

2	1	6	2	7

In Answer unit digit is 7 , write in block 7

Now take (3-1) -5 +3 -8 = - 8 answer is 10 - 8 = 2

Now take (6-1) -2 + 2 – 9 = - 4 answer is 10 – 4 =6

Now take (5-1) -5 +3 -1 = 1

2 = 2

Ans. Will be 21627.

Q.) 5231-2876+4171-3868 ans. 2658

Q.)7654-2788+3423-1789 ans.6500

Q.) 87878-7878-6666-777-33= ? ans.72524

Prac.Q.) 34658 - 21541 – 2054 = ? ANS.11063

Prac.Q.) 412.12+326.26+102.02 = ? ANS.840.4

FT-1(FASTEST TRICK-1): Addition Trick:

Bank, PO, SSC आदि संबंधी कई परीक्षाओं में जोड(addition)संबंधी निम्न प्रश्न पूछे जाते हैं जिनको हल करने में काफी समय लगता है।

1) 5231-3487+7331 - 2896 + 2134 – 3728 = ?

साधारणतया हम उपर्युक्त सवाल को conventional method से बनाते हैं जिससे समय ज्यादा लगता है।

Conventional Method:

	+5231	- 3487
	+7331	- 2896
	+2134	- 3728
	+14696	-10111

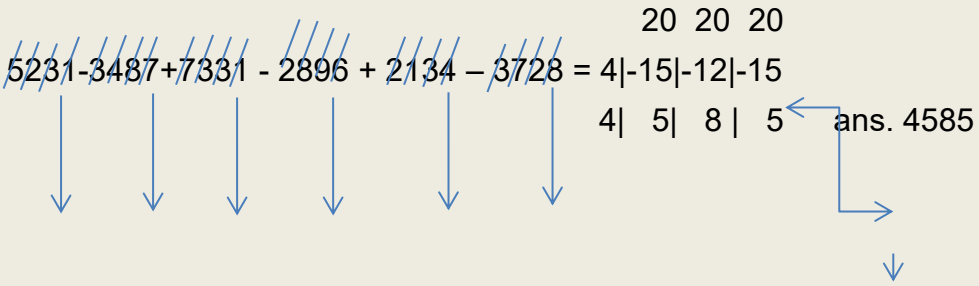
AGAIN 14696

- 10111

Ans. = 4585

SHORT TRICK METHOD (cross method):

अब निम्न मेथड अपनाएँ और काफी समय बचाएँ। एक बात का अवश्य ध्यान रखें। यदि आप निम्न शार्ट मेथड से प्रैक्टिस शुरू कर देंगे तो दूसरों से कई गुणा फास्ट हो जाएँगे। लेकिन अभ्यास से ही तेजी आएगी। और ऐसी तेजी कि आप खुद ही हैरान रह जाएँगे:



1 -7 +1 -6 +4 -8 = -15 ans. = 20-15=5

Similarly, first take unit digits of all numbers and calculate.

Unit digit calculation: पहले केवल इकाई अंक ले लें । और प्लस (+) चिन्ह वाले अंकों को जोडते जाएँ तथा माइनस (-) चिन्ह वाले अंकों को घटाते जाएँ। 1 -7 करने पर -6 आएगा। फिर -6 में +1 जोड दें । -5 आएगा। फिर इसमें -6 जोडने पर -11 आएगा। फिर -11 में +4 जोड दें । -7 आएगा। फिर इसमें -8 जोडने पर -15 आएगा। अब चूँकि उत्तर नेगेटिव आ रहा है। and -15 is immediate less than 20, इसे 20 से घटाकर 5 उत्तर लिख दें।

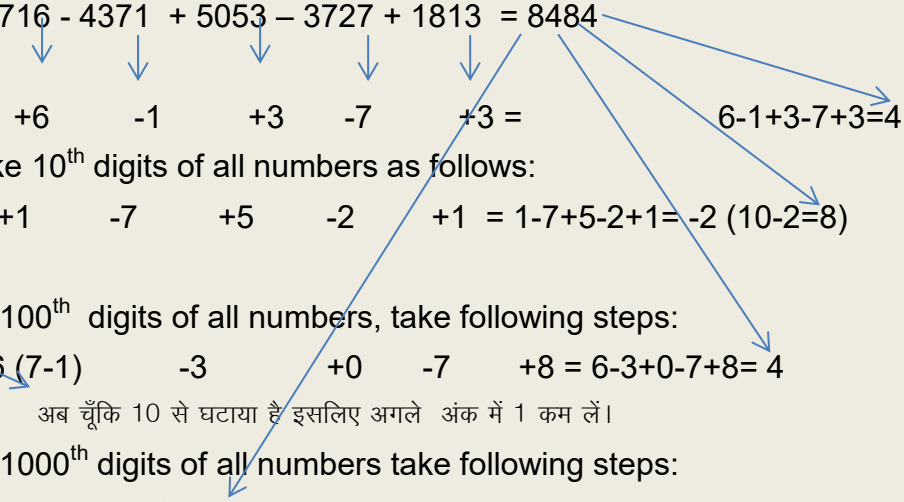
10th Digit calculation: अब अगले दहाइ अंक में 2 कम ले लें। अब चूँकि 20 से घटाया है इसलिए अगले दहाई अंक में 2 कम ले लें। यदि 10 से घटाते तो 1 कम लेते या यदि 30 से घटाते तो दहाई अंक को 3 कम लेते। यानि 5231 के 3 में 2 घटाकर 1 लेकर चलें। अब 1 माइनस 8 से -7मिलेगा। फिर माइनस 7 प्लस 3 से माइनस 4 मिलेगा जो आगे माइनस 9 से जुड कर माइनस 13 देगा। फिर माइनस 13 प्लस 3 से माइनस 10 मिलेगा जो आगे माइनस 2 से जुड कर माइनस 12 देगा।फिर इसे 20 में घटा दें। अब मिलेगा 8 जो उत्तर में दहाई स्थान पर लिख दें।

100th Digit calculation: अब अगले अंक 2 में 2 कम ले लें। अब चूँकि 20 से घटाया है इसलिए अगले अंक में 2 कम ले लें। यानि 5231 के 2 में 2 घटाकर 0 लेकर चलें। अब 0 माइनस 4 से -4 मिलेगा। फिर माइनस 4 प्लस 3 से माइनस 1 मिलेगा जो आगे माइनस 8 से जुड कर माइनस 9 देगा। फिर माइनस 9 प्लस 1 से माइनस 8 मिलेगा जो आगे माइनस 7 से जुड कर माइनस 15 देगा।फिर इसे 20 में घटा दें। अब मिलेगा 5 जो उत्तर में third स्थान पर लिख दें।

1000th Digit calculation: अब अगले अंक 5 में 2 कम ले लें। अब चूँकि 20 से घटाया है इसलिए अगले अंक में 2 कम ले लें। यानि 5231 के 5 में 2 घटाकर 3 लेकर चलें। 3-3+7-2+2-3 =4

Example No.2 (BY SHORT TRICK)

2) 9716 - 4371 + 5053 – 3727 + 1813 = 8484



+6 -1 +3 -7 +3 = 6-1+3-7+3=4

Take 10th digits of all numbers as follows:

+1 -7 +5 -2 +1 = 1-7+5-2+1= -2 (10-2=8)

For 100th digits of all numbers, take following steps:

+6 (7-1) -3 +0 -7 +8 = 6-3+0-7+8= 4

अब चूँकि 10 से घटाया है इसलिए अगले अंक में 1 कम लें।

For 1000th digits of all numbers take following steps:

+9 - 4 +5 -3 +1 = 8

Example No.3 (BY SHORT TRICK)

3) 3.3 - 13.33 +31.13 - 13.31 + 1.3 = ? ans. 9.09

First take equal decimal digits and then apply aforesaid method:

3.30 – 13.33 + 31.13 – 13.31 + 1.30 = 9.09

Take Unit digits of all numbers:

0 -3 +3 -1 +0 = -1 (10-1=9), write 9 at 1st place of answer from right side.

Take 10th digits of all numbers:

+2 (3-1) -3 +1-3+3= 0 write 0 at 2nd place of answer from right side.

इकाई अंकों के हल में उत्तर -1आया था। जिसे हमने 10 से घटाकर 9 लिखा था अतः अब हम अगले दहाई अंकों की गणना में पहले digit को 1 कम लेंगे।

(In solution of unit digits, we got the answer -1, then we subtracted it from 10 and write 9 as the answer. The effect of 10 will be taken as -1 from 10th digit.)

Take 100th digits of all numbers:3-3+1-3+1 = -1 (10-1= 9 will be taken at 3rd place of answer from right side.)

Take 1000th digits of all numbers:

(In solution of 100th digits, we got the answer -1, then we subtracted it from 10 and write 9 as the answer. The effect of 10 will be taken as -1 from 10th digit.)

-2+3-1 = -1 (10-1= 9 will be takenat 3rd place of answer from right side.)

Example 4:

4323 – 1676 + 3421 - 5678 = ? - 2369 ans. 2759

Bring 2369 at left side and treat it as + 2369 then start calculation as example no.2.

4323 – 1676 + 3421 - 5678 + 2369 = ?

3 -6 +1 -8 +9 = -1

1 -7 +2 -7 +6 = -5

2 -6 +4 -6 + 3 = -3

3 -1 +3 -5 +2 = 2

PRACTICE QUESIONS : Solve the following questions by applying aforesaid short trick.

1) 5231-2786+4563-3875 = ? ans. 3133

2) 6723-3778+5221-4882 = ? ans. 3284

3) 5321-3897+4225 = ? + 2975 ans. 2674

4) 6821 - 4837 - 2895 = ? - 4425 ans. 3514

5) 6562-3998+5273-4867= ? ans. 2970

6) 56342-3768+457-39 =? Ans. 52992

7) 564.3-39.5+673.34-52.1+45.372 =? Ans.1191.412

8) 54.41 - 45.14+44.51 - 41.45+55.45 =? ans. 67.78

9) 5213.4-2734.67+3411.31-2963.53 =? ans. 2926.51

10) 4356 + 2398 – 4477 + 3322 = ? ans. 5599

If at the end last digit comes as -, then write it after nearest 10. and then subtract all from hundredth, thousandth as the case may be.

For example:

If we don't know answer is in + or - , then what to do?

2723-3778+5221-5882 = ? (-2) 284

when comes -2, then subtract 284 from 2000 = 1716 ans.

8 Multiplication Tricks:

FT-4(FASTEST TRICK-4):

General Trick: For any 2 digit- X 2 digit numbers Or 3 digit X 2 digit numbers: 45x67=? Or 68x 49 = ?, 127x 46 = ?, 167x 83 =?

Ex.2)45x67 =4 5 a b

6 7 X

c d

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ac | ad + bc | bd

4 X 6 (4x7) +(6x5) 5 X 7 Ans.

Carry	6	3
30	1	5

(Start calculation always from right side : Calculate 5X7 =35, Write 5 in first column and carry 3, Now do calculation of (4x7)+(6x5) =58 . Now add carrying digit 3 to it that will give 58+3=61, write 1 in middle in answer column and carry 6. Now 4x6 =24. Add carrying digit 6 , this will give 24+6=30. Write 30 in left column. Ans. Will be 3015.)

*(दाहिने तरफ से हल करना शुरू करें । गुणा करने के बाद सिर्फ इकाई अंक लिखें और बाकी carry कर लें। जैसे प्रस्तुत गुणनफल में पहले 5 और 7 का गुणनफल होगा 35, अतः सबसे दाहिने कालम में 5 लिखें और 3 carry करें। अब **(4x7)+(6x5) =58** अब इसमें carry वाला 3 जोडकर 61 आएगा। उत्तर में 1 लिखें और 6 carry करें। अब 4x6=24. अब इसमें carry वाला 6 जोडकर 30 आएगा ! 30 सबसे बायें लिखें।)*

Practice Questions:

1) **64 x 38 = ?**
2) **49 x 34 = ?**
3) **86 x 56 = ?**
4) **37 x 42 = ?**
5) **48 x 64 = ?**

Ans. 1) 2432; 2)1666; 3) 4816 ; 4) 1554;5)3072.

FT-5: 3 digit x 2 digit numbers: For eg. 127x 46 = ?. Take 12 as unit place and do same calculation.

127x46 = 12 7

4 6

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12 X 4 (12x6) +(4x7) 7 X 6 Ans. Carry 10 4

58	4	2

(Start calculation always from right side : Calculate 7x6 =42, Write 2 in first column and carry 4, Now do calculation of (12x6)+(4x7) =100. Now add carrying digit 4 to it that will give 100+4=104, write always unit digit i.e.4 in middle in answer column and

carry 10. Now 12x4 =48. Add carrying digit 10 , this will give 48+10=58. Write 58 in left column. Ans. Will be 5842.)

(सबसे महत्वपूर्ण सलाह: एक बार आप ट्रिक याद कर और अच्छी तरह समझ लें ।जब आप ट्रिक इस्तेमाल करें तो सारा गणना मन में करें और पेपर पर सिर्फ उत्तर लिखते जाएँ। उपर लिखित चित्र एवं कालम ट्रिक समझाने के लिए दिए गए हैं।)

Practice Questions:

1) 126 x 58 = ?
2) 143 x 78 = ?
3) 162 x 98 = ?
4) 137 x 64 = ?
5) 185 x 84 = ?

Ans. 1) 7308; 2) 11154; 3) 15876 ; 4) 8768; 5) 15540

FT-6: 2 digit x 2 same unit digit numbers: For eg. 87x 47 = ? or 58 x 98 = ?

Ex.1) 87 x 47 = 8 7

4 7

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8 X 4 (8+4)7 7 X 7 Ans.

Carry 8 4

40	8	9

(Start calculation from right side : Calculate 7X7 =49, Write 9 in first column and carry 4, Now do calculation of (8+4)7 =84 . Now 84 + 4 = 88, write 8 in middle in answer column and carry 8. Now 8x4 =32. Add carrying digit 8 , this will give 32+8=40. Write 40 in left column. Ans. Will be 4089.)

Practice Questions:

1) **58 x 98 = ?**
2) **67 x 47 = ?**
3) **105 x 45 = ?**
4) **183 x 53 = ?**
5) **176 x 86 = ?**

Ans. 1) 5684 ; 2) 3149 ; 3)4725; 4) 9699; 5) 15136

FT-7: 2 same 10th digit x 2 digit numbers: For eg. 87x 85 = ? or 52 x 59 = ?

Ex.1) 87 x 85 = 8 7

8 5

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8 X 8 8(7+5) 7 X 5 Ans.

Carry 9 3

73	9	5

Practice Questions:

1) **52 x 59 = ?**
2) **67 x 64 = ?**
3) **105 x 108 = ?**

4) **93 x 95 = ?**
5) **128 x 125 = ?**

Ans. 1) 3068 ; 2) 4288 ; 3)11340; 4) 8835; 5) 16000.

FT- 8: 2 digit x 2 digit numbers: but condition is sum of unit digits is 10, and 10th digits are same: e.g. 34x 36=?. 65x65 =?; 72x 78 = ?

Ex.1) 34x 36=3 4

3 6

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3 X (3+1) | 4 X 6

Ans.

12	24

x y

x z where y+z =10

x(x+1)| yz

(Start calculation from right side :

Rule: always write double digit in right side. Calculate 4X6 =24, write 24 in first right column. , Now do calculation of 3(3+1) =12 . Write 12 in left column. Ans. Will be 1224. Its very simple and user friendly)

(दाहिने तरफ से हल करना शुरू करें । दाहिने तरफ हमेशा दो अंकों में उत्तर लिखें । गुणा करने के बाद अंक लिखें जैसे प्रस्तुत गुणनफल में पहले **4** और **6** का गुणनफल होगा **24**, अत: **24** लिखें और अब **3** को उसी में एक बढाकर यानि **4** से गुणा कर दें । यानि **3(3+1)= 12**, **12** सबसे बायें लिखें। **Ans. Will be 1224.**

Ex.2) 72 x 78 = 7x (7+1) | 2x 8 = 5616 ans.

Ex.3) 81 x 89 = 8(8+1) | 1 x 9 = 7209

यदि दाहिने तरफ गणना करने पर इकाई अंक आ रहा हो तो उसके आगे **0** लगा दें। जैसे उपर्युक्त उदाहरण में **9** के बदलें उत्तर में **09** लिख दें।

Ex.2)121x129 = 12 1

12 9

---

12 (12 + 1) | 1 X 9 Ans.

156	09

Practice Questions:

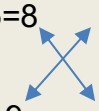
1) 45x45 = ?
2) 48x42 = ?
3) 76 x 74 = ?
4) 93 x 97 = ?
5) 124 x 126 =?

Ans. 1) 2025; 2) 2016; 3) 5624; 4) 9021; 5) 15624

FT- 9: If unit digits are 5 and difference of 10th digits is 1 (one).

e.g. 85x 95=?. 65x75 =?; 35x 45 = ?

Ex.1) 85 x 95=8 5 x5 x y5 = ? where y>x.



9 5 = x (y+1) | 75

---

lower X (higher+1) | 75 = 8 (9+1) | 75. Ans.

80	75

Practice Questions:

1) 65x75 = ?
2) 35 x 45 =?
3) 95 x 105 =? 4)105 x 115 = ? 5) 55 x 65 = ?

Ans. 1)4875; 2)1575; 3)9975; 4)12075; 5)3575.

FT- 10: 3-digit x 3 digit General Trick: e.g. 385x 234=?. 432x654

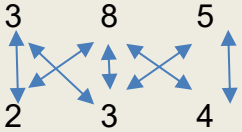
In all bank exams, following questions are asked.:

Q. 23.4% of 385 = ? 9009.0/100 = 90.09 ans.

Q. 67.3 % of 549 = ? = 369.477 ans.

Q. 56% of 874 = ? = 489.44 ans.

Ex.1) 385 x 234= 3 8 5 a b c



2 3 4 d e f

---

ad | ae+bd | cd+af+be|bf+ec|cf

3x2	3x3+2x8	3x4 + 2x5 + 8x3	8x4 + 3x5	5x4

Ans. = 90090

*(दाहिने तरफ से हल करना शुरू करें । गुणा करने के बाद सिर्फ इकाई अंक लिखें और बाकी **carry** कर लें। जैसे प्रस्तुत गुणनफल में पहले **5** और **4** का गुणनफल होगा **20**, अतः सबसे दाहिने कालम में **0** लिखें और **2 carry** करें। अब **8x4+5x3** करें जिससे **47** आएगा इसमें **carry** वाले **2** को जोड कर **49** आएगा । अब अगले कालम में **9** लिखें और **4 carry** करें । अब कोने कोने वाला गुणा करें और बीच वाला गुणा कर उसे जोडें। जैसे **3x4 + 5x2+8x3 = 46** आएगा।अब इसमें कैरी वाला **4** जोड कर **50** आएगा। अब **0** लिखें और **5** कैरी करें। अब **3x3+8x2= 25** , अब इसमें **carry** वाला **5** जोडकर **30** आएगा।उत्तर में **0** लिखें और **3 carry** करें। अब **3x2 + 3 =9** सबसे बायें लिखें।)*

9	**0**	**0**	**9**	**0**

*(**Start your calculation from right side always. Only write unit digit and carry rest digits. In multiplication of 385x234, multiply 5x4=20, write 0 in right end of column and carry 2. Now do calculation as 8x4+5x3 (multiply and add in mind) = 47 . add carrying digit 2 to it which will give 49,***

write 9 in 2nd right column and carry 4. Now do calculation 3x4 + 5x2+8x3 = 46 and add carrying digit 4 to it. Which will give 50, write 0 in third column 3 and carry 5. Now do calculation 3x3+8x2= 25. Add carrying digit 5 to it, which will give 30. Write 0 in 4th column, and carry 3. No do calculation 3x2 + 3 =9.)

Q.3) 56% of 874 = ? = 489.44 ans.

FT-11; Tricks for 3 digit x 2 digits Multiplication:

Ex.1) 874 x 56= 8 7 4 a b c

0 5 6 0 e f

---------- ax0 | ae+bx0 | cx0+af+be|bf+ec|cf

8x0	8x5+7x0	8x6 + 4x0 + 7x5	7x6 + 4x5	4x6

Ans. = 48944

*(दाहिने तरफ से हल करना शुरू करें । गुणा करने के बाद सिर्फ इकाई अंक लिखें और बाकी **carry** कर लें। जैसे प्रस्तुत गुणनफल में पहले **4** और **6** का गुणनफल होगा **24**, अतः सबसे दाहिने कालम में **4** लिखें और **2 carry** करें। अब **7x6+4x5** करें जिससे **62** आएगा इसमें **carry** वाले **2** को जोड कर **64** आएगा । अब अगले कालम में **4** लिखें और **6 carry** करें । अब कोने कोने वाला गुणा करें और बीच वाला गुणा कर उसे जोडें। जैसे **8x6+4x0+7x5 = 83** आएगा।अब इसमें कैरी वाला **6** जोड कर **89** आएगा। अब **9** लिखें और **8** कैरी करें। अब **8x5+7x0= 40** , अब इसमें **carry** वाला **8** जोडकर **48** आएगा।उत्तर में **8** लिखें और **4 carry** करें। अब **8x0 + 4 =4** सबसे बायें लिखें।)*

4	8	9	4	4

Practice Questions based on Tricks:

1) **123x 456 = ?**
2) **345x 632 = ?**
3) **786 x 456 =?**
4) **893 x 673 = ?**
5) **784 x 65 = ?**
6) **453 x 86 = ?**
7) **697 x 56 = ?**
8) **45% of 876 = ?**
9) **64.3% of 849 = ?**
10) **4.5 x 3.7 x 5.6 = ?**

Answers:

1) 56088 ; 2) 218040; 3) 358416; 4) 600989; 5)50960 ; 6) 38958; 7) 39032;

8) 394.20 ; 9) 545.907; 10) 93.24

Solution of Q.**10)First 4.5 x 3.7 = 16.65 (do it by 2 digit x 2 digit General Trick)**

Now 16.65 x 5.6
If problems of 4 digits x 2 digits come, then see the first two digit. If it is less then 20 or it you know the table of it (suppose it is 18, 25, 30, 10, 20, etc. in all such cases, you know the table) . In present case first two digit is 16 , so do calculation as follows:

16 6 5
0 5 6

Now apply Trick FT-9.

16x0	**16x5+6x0**	**16x6+5x0+6x5**	**6x6+5x5**	**5x6**

93240 in answer, put decimal (.) after 3 last digit.

Now answer will be 93.240. after applying decimal rule.

Decimal Rule: See in 6.4x 1.2 = 7.68

(12x4= 48 write 8 carry 4. Now 12x6=72 . add 4 to 72 and get 76. Put decimal after two digits because in question after one digit decimal come in 6.4 and also in 1.2 after one digit decimal come.)

But 6.4 x 0.12 = 0.768

FT-12: 4 digit X 4 digits Trick:

FT- 12: 4-digit x 4-digit General Trick: e.g. 7385x 6234=?.

In all bank exams, following questions are asked.:

Q. 23.45% of 6819 = ? ans. 1599.0555

Q. 764.3 % of 5492 = ? ans. 41975.356

.

2 3 4 5 a b c d

6 8 1 9 e f g h

---------- ae | af+be |ag+ce+bf|ah+ ed +bg+fc|bh+fg+cg |ch+dg|dh

2x6	2x8+3x6	2x1 + 6x4 + 8x3	2x9 + 6x5+3x1+4x8	3x9+8x5+4x1	4x9+1x5	5x9

Ans. = 1599.05.55

Practice Questions based on Tricks:

1. **5123x 3456 = ?**
2. **7345x 6312 = ?**
3. **7862 x 5416 =?**
4. **78.45% of 8761 = ?**
5. **64.32% of 8493 = ?**

Answers:

1)17705088 ; 2) 46361640; 3) 42580592; 4) 6873.0045; 5)5462.6976

FT- 13:

SQUARE TRICKS FOR 91 TO 99

91^2 = (91-9):$(100-91)^2$ = 8281

(First make 4 columns of answer. Now subtract 91 from 100. It will give 9. Now write 9^2 =81 in last two digits of column(suppose answer is unit digit such as 2^2=4 then write 04 . Now subtract 9 from 91, i.e. 91-9 = 82. Write it in first two columns of answer.)

(पहले उत्तर का चार कालम बनाएँ। यदि **91** से **99** तक का वर्ग निकालना हो तो : पहले **100** से **91** घटा दें । **9** आएगा । अब **9** का वर्ग **81** होगा (यदि ऐसा उत्तर इकाई संख्या में आए जैसे **2** का वर्ग तो **04** लिख दें) जिसे कॉलम के दाहिने तरफ के दो खानों में लिख दें। अब **91** में **9** घटाकर यानि **82** उत्तर कॉलम के बाएँ दो खानों में लिख दें।)

97^2=97-3 | 3^2

9	4	0	9

Practice Questions:

i) 92^2 =?
ii) 94^2 =?
iii) 99^2 =?
iv) 96^2 =?
v) 98^2 =?

Answers: i) 8464; ii) 8836; iii) 9801 ; iv) 9216 ;v) 9604

FT- 14:

SQUARE TRICKS FOR 51 TO 59

51^2 = (25+1):$(51-50)^2$ = 2601

2	6	0	1

(First make 4 columns of answer. Now subtract 50 from 51. It will give 1. Now write 1^2 =1 in last two digits of column(suppose answer is unit digit such as 2^2=4 then write 04 . Now add 1 to 25. 25+1 = 26. Write it in first two columns of answer.)

(पहले उत्तर का चार कालम बनाएँ। यदि **51** से **59** तक का वर्ग निकालना हो तो : पहले **51** से **50** घटा दें । **1** आएगा । अब **1** का वर्ग **1** होगा (यदि ऐसा उत्तर इकाई संख्या में आए जैसे **2**

का वर्ग तो **04** लिख दें) जिसे कॉलम के दाहिने तरफ के दो खानों में लिख दें। अब **25 + 1** यानि **26** उत्तर कॉलम के बाएँ दो खानों में लिख दें।)

57^2=25+7 | 3^2 = 3249

3	**2**	**4**	**9**

Practice Questions:

i) 52^2 =?
ii) 54^2 =?
iii) 59^2 =?
iv) 56^2 =?
v) 58^2 =?

Answers: i) 2704; ii) 2916; iii) 3481 ; iv) 3136 ;v) 3316

FT- 15: (time 15 sec.)

SQUARE TRICKS FOR any Two digit number(38^2, 87^2 etc.

38^2 =

x^2	**2xy**	**y^2**

3^2 | 2x3x8 | 8^2 = 14 : 4 : 4= 1444 ans.

(First make 3 columns of answer. Now start calculation from right side.

8^2 will give 64. Write 4 carry 6. Now 2x3x8 = 48. Add 6 to 48 = 54. Wirte 4 in answer and carry 5. Now 3^2 = 9 . add 5 to it. 9+5=14. Write 14 at left.)

67^2= 6^2 : 2 x 6 x 7 : 7^2

Carry	**8**	**4**
44	**8**	**9**

(Now start calculation from right side.7^2 will give 49. Write 9 carry 4. Now 2x6x7 = 84. Add carrying number 4 to 84 = 88. Wirte 8 in answer and carry 8. Now 6^2 = 36 . add 8 to it. 36+8=44. Write 44 at left.)

Practice Questions:

i) 82^2 =?
ii) 64^2 =?
iii) 79^2 =?
iv) 36^2 =?
v) 48^2 =?

Answers: i) 6724; ii) 4096; iii) 6241 ; iv) 1296 ;v) 2304

FT- 16: (time 25 sec.)

SQUARE TRICKS FOR any THREE digits number(136^2, 117^2 etc. Apply same trick and take value of x=13, 11 etc.

136^2 = put x =

x^2	2xy	y^2

13 here.

= 13^2 | 2x13x6 | 6^2 = 184 | 9 | 6 = 18496 ans.

OTHER QUESTIONS RELATED TO SQUARE TRICKS:

Q.) $48^2 - 37^2$ = ? ANS.935

Q.) $78^2 - 67^2$ = ? ANS.1595

Q.) $124^2 - 102^2$ = ? ANS.4972

Q.)$143^2 + 182^2$ = ? ANS.53573

Q.) $47^2 + 53^2$ = ? ANS. 5018

Q.) $98^2 - 94^2$ = ? ANS.768

Q.) $47^2 - 15^2$ = ? ANS.1984

SBI ASSISTANT EXAM. 3.6.2014

Q.) 106X106 + 94X94 =? ANS.20072

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FT- 17: (time 30 sec.)

CUBE TRICK FOR any Two digit number(21^3, 24^3 etc.

21^3 =

x^3	x^2y X 3	xy^2X3	y^3

2^3 | 2^2x1x3 | 2x1^2x3 | 1^3 = 9261 ans.

(Illustration of Trick: start calculation from right side. 1^3=1, write 1 at right side, carry 0. 3x2x1^2=6 , write 6 carry 0. 3x2^2x1= 12, write 2 carry 1. 2^3 will give 8 and add 1 to it then answer will be 9.)

24^3 =

x^3	x^2yX3	xy^2X3	y^3

2^3 | 2^2x4x3 | 2x4^2x3 | 4^3 = 13824 ans.

Practice Questions:

i) 22^3 = ? **iii) 23^3 = ?**
ii) 31^3 = ? **iv) 18^3 = ?**
iv) 32^3 = ?

answers: i) 10648; ii) 29791 iii) 12167 iv) 5832 v) 32768

QUES. RELATED TO CUBE TRICKS

Q.29) $31^3 + 13^3$ =? ANS.31988

30) $41^3 - 21^3$ =? ANS.59660

31) $23^3 - 13^3$ =? ANS.9970

FT-18: Trick for getting square root in 15 secs (extremely fast trick)

In the following questions, we will learn , how to get square root of any number very fast by tricky approach:

Q.1) $\sqrt{54756}$ =

23	4
23	6

5 4 7 5 6 ans.234

(TRICK: पहले उत्तर का दो कालम बनाएँ। फिर प्रश्न में दिए गए संख्या को दाहिने तरफ से पहले दो अंकों को अंडरलाइन करे तथा शेष अंकों को एक साथ (चाहे वह दो अंक हो या तीन अंक) अंडरलाइन कर दें। 5 4 7 5 6 अब आप यह देखें कि 1 से लेकर 9 का वर्ग करने पर किस वर्ग के अंत में 6 आता है। निश्चित रूप से 4 या 6 का वर्ग करने पर 16 या 36 आता है जिसमें अंत में 6 है। अतः उत्तर 4 या 6 लिखें उत्तर कालम में । अब 547 के लिए यह देखें कि किसका वर्ग 547 से कम आता है । वह संख्या है 23 जिसका वर्ग 529 है। यदि 24 का वर्ग लेंगे तो 576 आएगा जो किस 547 से ज्यादा । अतः उत्तर कालम में 23 लिख दें । अब उत्तर या तो 234 होगा या 236 । सही उत्तर पाने के लिए यह देखें कि दी गई संख्या 547 किसके नजदीक है बडी संख्या 576 या छोटी संख्या 529 के । निश्चित रूप से यह अंतर निकालने पर पता लग जाएगा। 547 छोटी संख्या 529 के नजदीक है अतः दाहिने तरफ छोटा अंक लें यानि 4 या 6 में 4 सही अंक आएगा। अतः सही उत्तर होगा 234)

(Trick: underline 2 digits firstly and then underline all remaining digits as per given above. Now for see only 6. 4^2 = 16, and 6^2=36. In each case, last digit is 6.

Choose both digits 4 and 6 for answer block. Now 23^2=529, 24^2=576. Since 576 is larger than 547. Take 23 as answer. Now we have two options. 234 and 236. Now take difference of 547-529=18 and 576-529=47. It means 547 is nearer to 529. (Since 547 is nearer to smaller digit, take smaller digit 4 among 4 and 6 in right side. Answer will be 234.)

Q.2) $\sqrt{21609}$ =

14	3

14	7

Ans. 147

216 09

(TRICK: पहले उत्तर का दो कालम बनाएँ। फिर प्रश्न में दिए गए संख्या को दाहिने तरफ से पहले दो अंकों को अंडरलाइन करे तथा शेष अंकों को एक साथ (चाहे वह दो अंक हो या तीन अंक) अंडरलाइन कर दें। 2 1 6 0 9 अब आप यह देखें कि 1 से लेकर 9 का वर्ग करने पर किस वर्ग के अंत में 9 आता है। निश्चित रूप से 3 या 7 का वर्ग करने पर 9 या 49 आता है जिसमें अंत में 9 है। अतः उत्तर 3 या 7 लिखें उत्तर कालम में दाहिने तरफ । अब 216 के लिए यह देखें कि किसका वर्ग 216 से कम आता है । वह संख्या है 14 जिसका वर्ग 196 है। यदि 15 का वर्ग लेंगे तो 225 आएगा जो किस 216 से ज्यादा । अतः उत्तर कालम में 14 लिख दें । अब उत्तर या तो 143 होगा या 147 । सही उत्तर पाने के लिए यह देखें कि दी गई संख्या 216 किसके नजदीक है बडी संख्या 225 या छोटी संख्या 196 के । निश्चित रूप से यह अंतर निकालने पर पता लग जाएगा। 216 बडी संख्या 225 के नजदीक है अतः दाहिने तरफ बडा अंक लें यानि 3 या 7 में 7 सही अंक आएगा। अतः सही उत्तर होगा 147)

(Trick: underline 2 digits firstly and then underline all remaining digits as per given above. Now for see only 6. $4^2 = 16$, and $6^2=36$. In each case, last digit is 6.

Choose both digits 4 and 6 for answer block. Now $23^2=529$, $24^2=576$. Since 576 is larger than 547. Take 23 as answer. Now we have two options. 234 and 236. Now take difference of 547-529=18 and 576-529=47. It means 547 is nearer to 529. (Since 547 is nearer to smaller digit, take smaller digit 4 among 4 and 6 in right side. Answer will be 234.)

QUESTION RELATED TO SQUARE ROOT TRICKS:

32) $\sqrt{7744}$ = ? ANS.88

33) $\sqrt{2809}$ = ? ANS.53

34) $\sqrt{19321}$ = ? ANS.139

35.) $\sqrt{38416}$ = ? ANS.196

36) $\sqrt{\sqrt{42025} + \sqrt{55696}}$ = ? ANS.21

37.) $\sqrt{3969}$ = ? ANS.63

38.) $\sqrt{8649}$ = ? ANS.93

SBI ASSISTANT EXAM. 03.06.2013

FT-19: Trick for getting Cube Root in 15 secs

(Firstly you remember following cubes to apply this trick:

$1^3=1$; $2^3=8$; $3^3=27$; $4^3=64$; $5^3=125$; $6^3=216$; $7^3=343$; $8^3=512$; $9^3=729$

In the following questions, we will learn , how to get Cube root of any number very fast by tricky approach in only 10 sec:

1) $\sqrt[3]{12167}$ = ? ans.23

2	3

12 167

(TRICK: पहले उत्तर का दो कालम बनाएँ। फिर प्रश्न में दिए गए संख्या को दाहिने तरफ से पहले 3 अंकों को अंडरलाइन करे तथा शेष अंकों को एक साथ (चाहे वह दो अंक हो या तीन अंक) अंडरलाइन कर दें। 12 167 अब आप यह देखें कि 1 से लेकर 9 का Cube करने पर किस cube के अंत में 7 आता है। निश्चित रूप से 3 का cube करने पर 27 आता है जिसमें

अंत में 7 है। अतः उत्तर 7 लिखें उत्तर कालम में **बाएँ** तरफ अब 12 के लिए यह देखें कि किसका cube 12 से कम आता है । वह संख्या है 2 जिसका cube 8 है। अतः सही उत्तर होगा 23)

(Trick: underline 3 digits of right side firstly and then underline all remaining digits as per given above. Now for see only last digit 7. $3^3 = 27$, write answer 7 in answer column. Now see left two digit which is 12. Now think which cube will give less than 12. 2^3 will give 8 which is less than 12 . so write answer as 2 in left side of answer.

40) $\sqrt[3]{39304} = ?$ ans.34

QUES. RELATED TO CUBE ROOT TRICKS

41) $\sqrt[3]{103823} = ?$ ans.47

42) $\sqrt[3]{54872}$ X $(304 \div 8) = (?)^2$ ans.38

IBPS PO EXAM. 17.6.2014

43) $\sqrt[3]{2197} = ?$ ans.13

Fast Trick-20: Trick for solving addition of fractions:

TRICK NO.20). ADDITION OF FRACTIONS TRICK:

$$\text{Q. } 5\frac{2}{3} - 1\frac{1}{6} + 4\frac{5}{12} - 3\frac{7}{3} = ?$$

$$\text{SOLN. ANS.} = 5-1+4-3 + \left(\frac{2}{3} - \frac{1}{6} + \frac{5}{12} - \frac{7}{3}\right)$$

$$= 5 + \frac{13-30}{12}$$

$$= 5 - \frac{17}{12} = 3\frac{7}{12} \text{ ANS.}$$

Addition/Subtraction of fractions:

1) $3\frac{2}{3} + 1\frac{1}{6} + 6\frac{5}{4} = 10\frac{1}{4}$ ans.

2) $5\frac{1}{4} + 6\frac{2}{3} + 7\frac{1}{6} = ?$ ANS. $19\frac{1}{12}$

3) $\frac{3\sqrt{2}}{\sqrt{6}-\sqrt{3}} - \frac{4\sqrt{3}}{\sqrt{6}-\sqrt{2}} + \frac{6}{\sqrt{18}+\sqrt{12}} = ?$ ans. 0

Solution: To solve these type of question, we have to multiply conjugate pair of denominators.

For ex.

3) $\frac{3\sqrt{2}(\sqrt{6}+\sqrt{3})}{(\sqrt{6}-\sqrt{3})(\sqrt{6}-\sqrt{3})} - \frac{4\sqrt{3}}{\sqrt{6}-\sqrt{2}} + \frac{6}{\sqrt{18}+\sqrt{12}} = ?$ ans. 0

4) $\frac{2}{\sqrt{5}+\sqrt{3}} + \frac{3}{\sqrt{6}-\sqrt{3}} + \frac{1}{\sqrt{6}+\sqrt{5}} = ?$ ans. $2\sqrt{6}$

Formula -21: Formula for sum of first n natural numbers

Sum of first n natural numbers = $\frac{n(n+1)}{2}$

Q.1) 1+2+3+4+.....+ 24 = **?**

Solution: apply formula given above

So, Sum = $\frac{\mathbf{24(24+1)}}{\mathbf{2}}$ = **300** ans.

Q.2) 7 + 8+9+10+.....+119 = ?

Solution: here number does not start from 1. it starts from 7.

to solve this type of question, apply following formula

S = $\frac{\boldsymbol{n\{(last\ no.)+(first\ no.)\}}}{\mathbf{2}}$

Here last no. is 119 and first no. is 7, Now to find value of n, do the following ways:

n = 119-7 + 1 = 113

Now keep all values in the following formula

S = $\frac{\mathbf{113\{(119)+(7)\}}}{\mathbf{2}}$ **= 113 x 63 = 7119 ans.**

Q.3) 11+12+13+14+.....+ 54 = ?

since this question starts with 11, we cannot use the above formula. But we can write the question in following form and then solve it by above formula:

11+12+13+14+.....+ 54

= (1+2+3+4+.....+54) - (1+2+3+4+.....+ 10) = $\frac{\mathbf{54(54+1)}}{\mathbf{2}}$ **-** $\frac{\mathbf{10(10+1)}}{\mathbf{2}}$ **=1430**

Second Method is as follows:

S = $\frac{\boldsymbol{n\{(last\ no.)+(first\ no.)\}}}{\mathbf{2}}$

here last no. is 54 and first no. is 11, and n = 54-11 + 1= 44

S = $\frac{44\{(54)+(11)\}}{2}$ = 22 x 65 = 1430 ans. 1430

Solve Six Smart Questions by Trick:

Q.1) 1+2+3+4+5 +.....+150=?

Q.2) 1+2+3+4+5 +.....+ 210=?

Q.3) 41+42+43+44+45 +.....+200=?

Q.4) 21+22+23+24+25 +.....+100=?

Q.5) 1+2+3+4+5 +.....+100=?

Q.6) Find out the sum of all natural numbers between 1 to 300.

ans. 1) 11325; 2) 22155; 3) 19280 4) 4840; 5) 5050; 6) 45150

Formula-22: Formula for sum of square of first n natural numbers

Q.1) $1^2+2^2+3^2+4^2$ +.....+10^2 = ? ANS.385

S = $\frac{n(n+1)(2n+1)}{6}$; where n is the last number.

Here in ques. no. 3, value of n = 10, then S = $\frac{10(10+1)(20+1)}{6}$ = 385

Q.2) $8^2+9^2+10^2+11^2$ +.....+50^2 = ?

For solving this type of question, write it in the following form:

Q.3) $8^2+9^2+10^2+11^2$ +.....+50^2

= ($1^2+2^2+3^2+4^2$ +.....+50^2) - ($1^2+2^2+3^2+4^2$ +.....+7^2)

= $\frac{50(50+1)(2*50+1)}{6}$ - $\frac{7(7+1)(2*7+1)}{6}$ = 42925-140=42785 ans.

Practice Questions:

Q.1) $1^2+2^2+3^2+4^2$ +.....+50^2 = ?

Q.2) $1^2+2^2+3^2+4^2$ +.....+100^2 = ?

Q.3) $10^2+11^2+12^2+13^2$ +.....+50^2 = ?

Q.4) $21^2+22^2+23^2+24^2$ +.....+70^2 = ?

answers: 1) 42925; 2) 338350 ; 3) 42640 ; 4) 113925

Formula-23: Formula for sum of cube of first n natural numbers

Formula for sum of cube of first n natural numbers = $\left[\frac{n(n+1)}{2}\right]^2$

Q.1) $1^3+2^3+3^3+4^3$ +.....+10^3 = ? ANS. 3025

$S = \left[\frac{10(10+1)}{2}\right]^2 = 55^2 = 3025$ ans.

Q.2) $11^3+12^3+13^3+14^3$ +.....+20^3 = ?

Soln. $11^3+12^3+13^3+14^3$ +.....+20^3 =

$(1^3+2^3+3^3+4^3$ +.....+20^3) - ($1^3+2^3+3^3+4^3$ +.....+10^3) = $\left[\frac{20(20+1)}{2}\right]^2$ - $\left[\frac{10(10+1)}{2}\right]^2$ = 41075 ans.

Practice Questions:

Q.1) $1^3+2^3+3^3+4^3$ +.....+15^3 = ?

Q.2) $1^3+2^3+3^3+4^3$ +.....+25^3 = ?

Q.3) $8^3+9^3+10^3+11^3$ +.....+30^3 = ?

Q.4) $21^3+22^3+23^3+24^3$ +.....+30^3 = ?

Answers: 1) 14400; 2) 105625; 3) 215441; 4) 172125

Tricks For Sum of Even numbers Problems:

TRICK NO.24 Formula for Sum of first n even numbers = n(n+1)

where n is no. of even numbers.

Q.1) Find out the sum of first 20 even numbers.

soln. Here n = 20; then ans. is n (n+1) = 20 x 21 = 420

Ans.420

Q.2) Find out the sum of first 140 even numbers.

soln. Here n = 140; then ans. is n (n+1) = 140 x 141 = 19740

Ans.19740

Q. 3) Find out the sum of even numbers between 1 to 100.

Soln. Between any of two numbers, half is even and half is odd. So here no. of even numbers = 50. now we got value of n = 50 then Sum = 50 x (50+1) = 50x51 = 2550 ans.

Q. 4) Find out the sum of even numbers between 1 to 101.

Soln. Obviously, 101 is not even. so here also between 1 to 100 half is even. So here no. of even numbers = 50. now we got value of n = 50 then Sum = 50 x (50+1) = 50x51 = 2550.

ans. 2550

Q. 5) Find out the sum of even numbers between 25 to 220.

Soln. here we have to find out no. of even numbers between 25 and 220.

First take 24 to 220 because 25 is odd. Now Divide 24 and 220 by 2, we get 12 and 110.

Now no. of even numbers n = 110-12 + 1 = 99.

Now apply the formula

$$\text{Sum} = \frac{n(\text{first even no.} + \text{last even no.})}{2} = \frac{99\ (\ 24\ +\ 220)}{2} = 1408$$

ans. 1408

Practice Questions:

Q.1) Find out the sum of first 40 even numbers.

Q.2) Find out the sum of first 35 even numbers.

Q.3) Find out the sum of even numbers between 1 to 200.

Q.4) Find out the sum of even numbers between 1 to 80.

Q.5) Find out the sum of even numbers between 1 to 91.

Q.6) Find out the sum of even numbers between 1 to 137.

Q.7) Find out the sum of even numbers between 45 to 120.

Q.8) Find out the sum of even numbers between 60 to 131.

Answers: 1)1640; 2) 1260 ; 3) 10100 ; 4) 1640 ; 5) 2070 ; 6) 4692; 7) 3154 ; 8) 3420

Tricks for Sum of Odd numbers related problems:

TRICK NO.25: Formula for Sum of first **n** odd numbers = n^2

where n is no. of even numbers.

Q.1) Find out the sum of first 20 odd numbers.

soln. Here n = 20; then ans. is $n^2 = 20^2 = 400$

Ans.400

Q.2) Find out the sum of first 125 odd numbers.

soln. Here n = 125; then ans. is $n^2 = 125^2 = 15625$

Ans.15625.

Q. 3) Find out the sum of odd numbers between 1 to 100.

Soln. Between any of two numbers, half is even and half is odd. So here no. of odd numbers = 50. now we got value of n = 50 then Sum = $50^2 = 2500$ ans.

Q. 4) Find out the sum of odd numbers between 1 to 101.

Soln. Obviously, 101 is odd. so here also between 1 to 100 half is odd. So here no. of odd numbers = 50 + 1. now we got value of n = 51 then Sum = $51^2 = 2601$

ans. 2601

Q. 5) Find out the sum of odd numbers between 25 to 220.

Soln. here we have to find out no. of odd numbers between 25 and 219 because 220 is even and should not be counted for solution.

Now Divide 25 and 219 by 2, we get 12.5 and 109.5;

Now no. of even numbers n = 109.5 - 12.5 + 1 = 98

Now apply the formula

$$\text{Sum} = \frac{n(\text{first odd no.} + \text{last odd no.})}{2} = \frac{98\ (\ 25\ +\ 119)}{2} = 1344$$

ans. 1344

Practice Questions:

Q.1) Find out the sum of first 160 odd numbers.

Q.2) Find out the sum of first 86 odd numbers.

Q.3) Find out the sum of odd numbers between 1 to 200.

Q.4) Find out the sum of odd numbers between 1 to 80.

Q.5) Find out the sum of odd numbers between 1 to 91.

Q.6) Find out the sum of odd numbers between 1 to 137.

Q.7) Find out the sum of odd numbers between 45 to 120.

Q.8) Find out the sum of odd numbers between 60 to 131.

Answers: 1)25600; 2) 7396 ; 3) 10000 ; 4) 1600 ; 5) 2116 ; 6) 4761; 7) 3116 ; 8) 3456

Division and Remainder related problems and BODMAS rule:

19) 78 (4
76
2

Here Dividend = 78; Divisor = 19; Quotient = 4; Remainder = 2

DIVIDEND = DIVISOR X QUOTIENT + REMAINDER

78 = 19 x 4 + 2

Q.1) 630÷18÷5= ?

Soln: First divide 630 by 18 you get 35. now divide 35 by 5, you get 7 .

ANS. 7

Q.2) 255÷17÷5= ?

Soln. You divide first 255 by 17 , you get 15, now divide 15 by 5, you get 3.

ans.3

Q.3) If a number is divided by 18 the quotient is 215 and remainder is 11, find out the number.

Soln. apply the formula; DIVIDEND = DIVISOR X QUOTIENT + REMAINDER

here number means dividend. So Dividend = 18x215 + 11 = 3881

ans.3881

Q.4) If a number is divided by 36 then remainder is 19. If that number is divided by 12, what will be the remainder?

Soln. let x is the number.

Now as per question, 36) x (y

19

So x = 36y + 19

Now when we divide x by 12 means : 12) 36y + 19 (3y + 1

36y + 12

7

ans.7

Q.5) A divisor is 35 times of quotient and 4 times of remainder. If quotient is 20, then find out the dividend.

Soln. quotient = 20, then divisor = 35x 20 = 700. and remainder = 700/4 = 175, then put up these values in equation: DIVIDEND = DIVISOR X QUOTIENT + REMAINDER

then Dividend = 700 x 20 + 175 = 14000+175 = 14175

ans. 14175

Q.6) If the difference of two numbers is 52. If larger is divided by smaller, quotient is 2 and remainder is 14. Find out the smaller number.

Soln. let x and y are two numbers. where x **>** y.

Now y) x (2 and x-y = 52 ---------- (i)

14

x = 2y + 14; from equation (i); put x = 52 + y

then 52 + y = 2y + 14; y = 52-14 = 38

ans.=38.

Practice Questions:

Q.1) 18÷6÷3= ?

Q.2) 25÷5÷5= ?

Q.3) If a number is divided by 21 the quotient is 5 and remainder is 9, find out the number.

Q.4) If a number is divided by 120 then remainder is 17. If that number is divided by 15, what will be the remainder?

Q.5) A divisor is 25 times of quotient and 3 times of remainder. If quotient is 18, then find out the dividend.

Q.6) If the difference of two numbers is 47. If larger is divided by smaller, quotient is 3 and remainder is 11. Find out the smaller number.

Ans. 1) 1; 2) 1 ; 3) 114 ; 4) 2 ; 5) 8250 ; 6) 18

BODMAS RELATED QUESTIONS:

Note:

(i) Start Divide/Multiply from left side to right side since they perform equally.

(ii) Start Add/Subtract from left side to right side since they perform equally.

Order of Solution :

Bracket → Of → Division → Multiplication → Addition → Subtraction

Order of Solution for brackets is given below:

$\overline{1-2}$ = BAR

(2+ 3) = SMALL bracket

{ 6X5 } = curly bracket

[8 ÷ 4] = big bracket

B → **B**rackets first (bar, small bracket, curly bracket, big bracket)

O → **O**f (orders i.e. Powers and Square Roots, Cube Roots, etc.)

DM → **D**ivision and **M**ultiplication (start from left to right)

AS → **A**ddition and **S**ubtraction (start from left to right)

Steps to simplify the order of operation using BODMAS rule:

First part of an equation is start solving inside the 'Brackets'.

For Example; (6 + 4) × 5
First solve inside 'brackets' 6 + 4 = 10, then 10 × 5 = 50.

Next solve the mathematical 'Of'.

For Example; 3 of 4 + 9
First solve 'of' 3 × 4 = 12, then 12 + 9 = 21.

Next, the part of the equation is to calculate 'Division' and 'Multiplication'.
We know that, when division and multiplication follow one another, then their order in that part of the equation is solved from left side to right side.

For Example; 15 ÷ 3 × 1 ÷ 5

'**Multiplication**' and '**Division**' perform equally, so calculate from left to right side. First solve 15 ÷ 3 = 5, then 5 × 1 = 5, then 5 ÷ 5 = 1.

In the last part of the equation is to calculate 'Addition' and 'Subtraction'. We know that, when addition and subtraction follow one another, then their order in that part of the equation is solved from left side to right side.

For Example; 7 + 19 - 11 + 13

'**Addition**' and '**Subtraction**' perform equally, so calculate from left to right side. First solve 7 + 19 = 26, then 26 - 11 = 15 and then 15 + 13 = 28.

*These are simple rules need to be followed for **simplifying or calculating** using BODMAS rule.*

In brief, after we perform "B" and "O", start from left side to right side by solving any "D"or "M" as we find them. Then start from left side to right side solving any "A" or "S" as we find them.

Practice Questions for BODMAS:

1) 2x6+3-4/2-5+20/5x3+50=?

2) (3+3-5)x(15-5)x10-99=?

3) 50/5-7x2+11+3x10/2-2+6x5 =?

4) 4+5-7+8x5-12x2/8+6-3+20/2 =?

5) 9x9-30/3+5-6+7-2+9x9 =?

6) (10x4-6+7-8/2+3x3+(4+5-6/3)+1)/2 =?

7) (3+4-6/2+2)+((9/3+6x5)/11)x((4+5-6)+(18-3x4)) =?

8)	((3+4-6/2+2)+((9/3+6x5)/11))x((4+5-6)+(18-3x4))/9	=?
9)	(2x2+2x2+4x4)/8+(5x5-3x3-2x2)/3	=?
10)	(5x5-25/5)+12-4+5+(9-3x2)	=?

ans. 1) 70; 2) 1; 3) 50; 4) 52 ; 5) 156; 6) 27 ; 7) 33; 8)9 ; 9) 7; 10) 36

SOME AVERAGE TRICKS

Trick-1)average of n continuous natural no.s =(n+1)/2
Trick - 2) for average of continuous odd or even no. = n (for odd), n+1 (for even no.)
Trick - 3) For average of continuous even numbers from a to b.
average = (first even no.+last even no.)/2 ; same in the case of odd numbers.
Trick -4)getting smallest and largest natural no. if average is given.
smallest natural no. = average-(n-1)/2
largest natural no. = average +(n-1)/2
Trick - 5)smallest even no. = average - (n-1)
largest even no.=average +(n-1)
Practice Questions:
Q.1) Find out the average of all natural numbers from 1 to 100.
Q.2) Find out average of all natural numbers between 20 to 40.
ans. average = 20+40/2
Q.3) Find out the average of first 30 even numbers.
Q.4). What will be the average of continuous even numbers from 1 to 40.
Q.5) What will be the average of continuous even numbers from 10 to 61.

Q.6) What will be the average of first 40 odd numbers.
: trick: ans. = n
Q.7) Find the average of all odd numbers upto 100. ans. n=100/2
Q.8) What will be the average of continuous odd numbers from 18 to 81.
Q.9. If average of 9 continuous natural numbers is 43, then find out the smallest and largest number.
Q.10). If average of 8 continuous even numbers is 19, then find out the smallest and largest even number.
Q.11) If average of 10 continuous odd numbers is 58, then find out the smallest and largest odd number.

answers are
1) 50.5; 2) 30; 3) 31; 4) 21; 5) 35 ; 6) 40 ; 7) 50 ; 8) 50 ; 9) 39, 47; 10) 12, 26; 11) 49,67

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Level - 1 test:

TEST NO.1

1)$156^2 + 182^2 = ?$

.2) $49^2 + 56^2 = ?$

3) 107x 107 + 93x93 =?

4) $24^3 - 15^3$ =?

5) $\sqrt{16641}$ = ?

6) $\sqrt{28224}$ = ?

7) $\sqrt{59049} + \sqrt{52441}$ = ?

8) $\sqrt[3]{19683} \times (189 \div 7) = (?)^2$

9) Find out the sum of first 23 even numbers.

10)Find out the sum of all even numbers between 31 to 81.

11)Find out the sum of all odd numbers between 1 to 200.

12) 36÷18÷2= ? ANS. 1

13) 266÷19÷2= ? ans.7

14) In a two digit number the sum of digits is 7. If 9 is subtracted from the number the digits are interchanged. find out the two digit number..

15) In a two digit number the sum of digits is 11. If 45 is subtracted from the number the digits are interchanged. find out the number.

16) How many numbers exists between 1 to 100 which are divisible by 5 but not by 3.

17) In an exam, 4 marks is given for a correct answer and 1 mark is subtracted for wrong answer. If a student solved 75 ques. and got 125 marks, how many ques. was solved correctly?

18) Find out the square root of $14 + 6\sqrt{5}$.

19) Find out the square root of $11 - 4\sqrt{7}$

20) $$\frac{0.0347 \times 0.0347 \times 0.0347 + (0.9653)^3}{(0.0347)^2 - (0.0347)(0.9653) + (0.9653)^2} = ?$$

Level - 2 test:

TEST NO.-2

1) Ramesh is in charge of buying bread rolls and buns for a party. There are 10 buns in each box of buns and 8 bread rolls in each box of bread rolls. Ramesh wants to buy exactly the same number of buns and bread rolls. What is the smallest number of boxes he should buy for buns alons?

(A) 8 (B) 4 (C)5 (D) 10

2) If $x + \frac{1}{x} = 1$, $(x \neq 0)$, then the value of $\frac{x^2+3x+1}{x^2+7x+1}$ is

(A) 1/2 (B) 4 (C)1/4 (D) 1

3) If $x + y = 4$, and $\frac{1}{x} + \frac{1}{y} = 4$, then the value of $x^3 + y^3$ is

(A) 64 (B) 4 (C)25 (D) 52

4) If $x = 3 + 2\sqrt{2}$, then the values of $x^3 + 1/x^3$ and $x^3 - 1/x^3$ are respectively

(A) 234 and 216 (B) 216, 234 (C)198, $140\sqrt{2}$ (D) $140\sqrt{2}$, 198

5)Given that $a+b+c = 2$ and $ab+bc+ca = 1$, then the value of $(a+b)^2 + (b+c)^2 + (c+a)^2$ is

(A) 16 (B) 6 (C)8 (D) 10

6) If $a = 2$, $b=3$, then $(a^b + b^a)^{-1}$ is

(A) 1/31 (B) 1/17 (C)1/21 (D) 1/13

7)The smallest positive integer which when multiplied by 392, gives a perfect square is

(A) 2 (B) 3 (C)5 (D) 7

8)The expression $x^4 - 2x^2 + k$ will be a perfect square when the value of k is

(A) 1 (B) 2 (C)1/2 (D) ¼

9) If $3x - \frac{1}{4y} = 6$, then the value of $4x - \frac{1}{3y}$ is

(A) 2 (B) 4 (C)6 (D) 8

10)If a+b+c = 0, find the value of $\frac{a+b}{c} - \frac{2b}{c+a} + \frac{b+c}{a}$.

(A) 0 (B) 1 (C)-1 (D) 2

11)The product of two numbers is 45 and their difference is 4. The sum squares of the two numbers is

(A) 135 (B) 240 (C)73 (D) 106

12) Simplify: $\frac{1}{\sqrt{3}+\sqrt{4}} + \frac{1}{\sqrt{4}+\sqrt{5}} + \frac{1}{\sqrt{5}+\sqrt{6}} + \frac{1}{\sqrt{6}+\sqrt{7}} + \frac{1}{\sqrt{7}+\sqrt{8}} + \frac{1}{\sqrt{8}+\sqrt{9}}$

(A) $2\sqrt{3}$ (B) $\sqrt{3}+\sqrt{4}$ (C) $3-\sqrt{3}$ (D) none of these.

13) If $2^{x+5} - 2^{x+2} = 56$, the find the value of x.

(A) 2 (B) 1 (C) 3 (D) none of these.

14) Find out the value of $\frac{\sqrt{43-12\sqrt{7}}}{\sqrt{16+6\sqrt{7}}}$.

United India Insurance AAO exam.

(A) 1 (B) 4 (C) 3 (D) None of these.

15) *एक परीक्षा में सही उत्तर के लिए 4 अंक दिए जाते हैं तथा गलत उत्तर के लिए 1 अंक काट लिए जाते हैं। यदि एक छात्र कुल 75 प्रश्न हल करके 125 अंक लाया तो उसने कितने प्रश्न गलत हल किए।* ***(In an exam 4 marks are allotted for correct answer and 1 mark is deducted for incorrect answer. If a student got 125 marks after solving 75 questions, how many questions are solved incorrectly.)***

(A) 35 (B) 20 (C) 40 (D) None of these.

16)) 1 से लेकर 299 तक की विषम संख्याओं का जोड निकालें।

(A) 10000 (B) 22500 (C) 20000 (D) None of these

17) What will be the remainder when 76^{177} is divided by 77 ?

(A) 76 (B) 1 (C) 74 (D) None of these

18) $2^{877} - 7^{143}$ में इकाई संख्या ज्ञात करें ।

(A) 7 (B) 8 (C) 9 (D) None of these

19) $3^{877} - 7^{143}$ में इकाई संख्या ज्ञात करें ।

(A) 0 (B) 8 (C) 9 (D) 1

Q. 20. A person ate 100 grapes in 5 days. He ate 6 grapes more of last day daily. Find out the number of grapes eaten by him on 1st day. .(**किसी आदमी ने** 100 **अंगूर** 5 **दिन मे खाए। उसने प्रत्येक दिन उससे पहले दिन की तुलना में** 6 **अंगूर अधिक खाए। उसने पहले दिन कितने अंगूर खाए।**

(A) 9 (B) 8 (C) 4 (D) None of these

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