

# LEVEL 8

LEARNING



# Addition and Subtraction

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## About the book

Vedic Math influenced math learning and activities. More than 1700% times faster than regular Math. It enhances in sharpening the mind, increases mental agility and intelligence. Increases speed and accuracy. It improves memory and boosts self-confidence. It helps in developing the left and right sides of the brain. Easy to master and apply.

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## Nearest 100's

**Explanation:** To find nearest hundreds, check tens place. If tens place is 5 or more than 5, add one to the hundreds place number and put 0 for tens and units place. Otherwise, put 0 for units and tens place and write the remaining digits as it is.

### Example :

Find nearest hundreds of 4286

Tens place is 8 which is more than 5, so add 1 to the hundreds place number (2+1) and put 0 for tens and units place.

Nearest hundreds of 4286 is 4300

Find nearest hundreds of 1729

Tens place is 2 which is less than 5, so put 0 for tens and units place and write the remaining digit as it is.

Nearest hundreds of 1729 is 1700.

## Exercise 8

### Write nearest 100's

1) 2362 -

2) 4737 -

3) 3581 -

4) 5617 -

5) 1296 -



## Below base addition

**Explanation :** To add below base number, first add the nearest base number using base number addition and then subtract the difference.

**Example :**  $3295 + 1999$

The nearest base of 1999 is 2000 and is 1 less than 2000. So first add 2000 and then subtract 1.

$$3295 + 2000 - 1 = 5294$$

$$4873 + 598$$

The nearest base of 598 is 600 and is 2 less than 600. So first add 600 and then subtract 2.

$$4873 + 600 - 2 = 5471$$

$$1597 + 87$$

The nearest base of 87 is 90 and is 3 less than 90. So first add 90 and then subtract 3.

$$1597 + 90 - 3 = 1684$$

## Exercise 16

### Below base addition

1)  $3248 + 37 =$

2)  $9328 + 59 =$

3)  $1827 + 28 =$

4)  $6354 + 79 =$

5)  $5879 + 19 =$



## Exercise 22

### Subtraction (same digits in between)

1)  $3456 - 1252$

2)  $5871 - 2275$

3)  $9354 - 3756$

4)  $4843 - 1820$

5)  $7286 - 2257$



### **Subtract from unity base numbers (lesser number of digits)**

**Explanation :** In this case, the minuend is the unity base number, but the number of zeros of the minuend is not equal to the number of digits of the subtrahend. If the subtrahend has lesser number of digits, put imaginary 0s in front of the subtrahend to make it equal to the number of zeros of the minuend, then apply “All from 9 and the last from 10” to get the answer. If the subtrahend end with 0s, don't apply the formula for the last 0s, the digit before 0 is like last digit and it should be subtracted from 10.

**Example:**  $1000 - 42$

The minuend has three 0s and the subtrahend has two digits, put imaginary 0 in front of the subtrahend to make it three digit number. Then, apply “All from 9 and the last from 10” to get the answer.

$$1000 - 042$$

$$9 - 0 = 9, 9 - 4 = 5, 10 - 2 = 8$$

$$\text{The answer is } 1000 - 42 = 958$$

$$10000 - 730$$

The minuend has four 0s and the subtrahend has three digits, put imaginary 0 in front of the subtrahend to make it four digits. Apply the formula “All from 9 and the last from 10”, the subtrahend end with 0, so the digit before 0 is like last digit and it should be subtracted from 10, write the answer with last 0s.

$$10000 - 0730$$

$$9 - 0 = 9, 9 - 7 = 2, 10 - 3 = 7$$

$$\text{The answer is } 10000 - 730 = 9270$$



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# LEVEL 9

## LEARNING



# Multiplication and Division

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### Exercise 3

#### 3-digit by 2-digit multiplication using moving multiplier

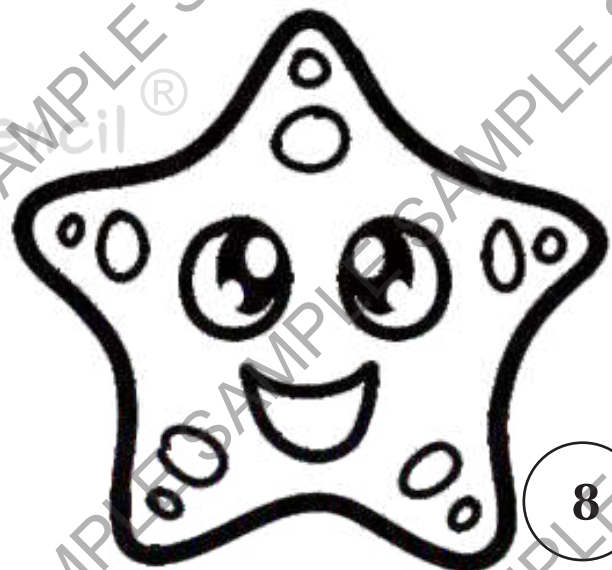
1)  $412 \times 23$

2)  $563 \times 18$

3)  $169 \times 59$

4)  $670 \times 15$

5)  $205 \times 64$



2) 33 x 56

3) 44 x 18

4) 72 x 55

5) 66 x 40



## Duplex

**Explanation :** Duplex is a special concept from ancient Indian Mathematics system which is used to find square and square roots. Duplex of single digit number is nothing but square of the number. Duplex of two digit number is product of the digits times 2.

### Example :

$$\text{Duplex of } 4 = 4 \times 4 = 16$$

$$\text{Duplex of } 37 = 3 \times 7 \times 2 = 42$$

## Exercise 14

### Find duplex

1) 6 -

2) 8 -

3) 9 -

4) 10 -

5) 17 -



## DIVISION

### Straight division – no remainder

**Explanation:** To divide a number by a single digit number, we can use straight division. In this method, divide the first digit by the divisor, write the quotient at the top and remainder before the next digit. Now move to the next number, repeat this division till the last digit. The number at the top is called quotient and the remainder from the last step is the final remainder.

**Example:**  $8735 \div 5$

$$\begin{array}{r} 1747 \\ 5 \overline{) 8735} \\ \underline{5} \phantom{00} \\ 37 \phantom{0} \\ \underline{35} \phantom{0} \\ 23 \phantom{0} \\ \underline{20} \phantom{0} \\ 35 \\ \underline{35} \\ 0 \end{array}$$

$$\text{Quotient} = 1747$$

$$8735 \div 5 = 1747$$

### Exercise 21

#### Find quotient

1)  $3578 \div 2$





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# LEVEL 10

## LEARNING



# Integers and Vinculum

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## Divisibility check for 2, 3, 4, 5, 6, 8, 9 and 10

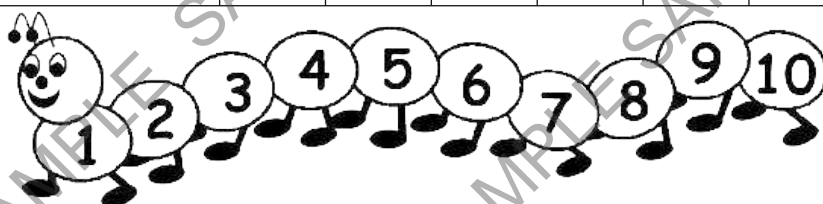
### Explanation:

- Divisibility check for 2 - The number ends with 0, 2, 4, 6 or 8
- Divisibility check for 3 - Digit sum is 3, 6 or 9
- Divisibility check for 4 - Divide last two digits by 2 two times or divide by 4 once, or end with two zeros
- Divisibility check for 5 - The number ends with 0 or 5
- Divisibility check for 6 -  $6 = 2 \times 3$ , it should satisfy divisibility check for 2 and 3
- Divisibility check for 8 - Divide last three digits by 2 three times or divide by 8 once or end with three zeros
- Divisibility check for 9 - Digit sum is 9
- Divisibility check for 10 - The number ends with 0

## Exercise 6

Check divisibility for 2, 3, 4, 5, 6, 8, 9 and 10, write Yes if the number is divisible or No if the number is not divisible

S.No.	Number	2	3	4	5	6	8	9	10
1	24								
2	35								
3	66								
4	81								
5	96								



## LCM and HCF of multiples

**Explanation:** This is a special method or shortcut method to find LCM and HCF. If the given numbers are multiples, the bigger number is a multiple of the smaller number, then LCM is the bigger number and HCF is the smaller number.

**Example :** Find LCM and HCF of 74 and 37

74 is a multiple of 37, so LCM is 74 and HCF is 37

## Exercise 12

Find LCM and HCF of multiples

S.No.	Numbers	LCM	HCF
1	4, 16		
2	27, 9		
3	80, 10		
4	11, 99		
5	75, 15		



## Descending order

**Explanation :** Descending order is arranging numbers from big to small.

**Example :**

$\overline{39}$	22	$\overline{71}$	65
65	22	$\overline{39}$	$\overline{71}$

## Exercise 20

Arrange in descending order

1)

14	7	17	8

2)

$\overline{21}$	15	$\overline{26}$	18

3)

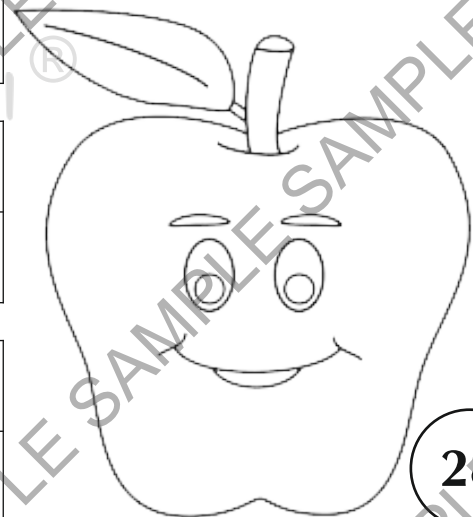
$\overline{83}$	46	$\overline{29}$	$\overline{31}$

4)

$\overline{12}$	$\overline{19}$	$\overline{7}$	$\overline{32}$

5)

$\overline{46}$	31	$\overline{52}$	$\overline{17}$



## Vinculum

**Explanation :** Vinculum numbers are partial negative numbers. In vinculum numbers, we can reduce the number into smaller size so that we can make the calculations fast. In this method, we convert 6, 7, 8 and 9 into negative numbers. If 6, 7, 8 or 9 at the first digit, we can increase or decrease it, but we can't change the sign. If number of digits are more, we can split the numbers to convert into vinculum numbers.

To convert to vinculum numbers, increase the digit before the bigger digit by 1 and write a pair of the bigger digit with bar to represent negative digit. If more than one digit is big, apply "All from 9 and the last from 10" and write with bar to represent negative digit.

**Example:** Convert to vinculum numbers

69

69 is close to 70 and is 1 less.

$$69 = 7\bar{1}$$

489

489 is close to 500 and is 11 less than 500.

$$489 = 5\bar{11}$$

592

Here, 9 in the middle, so split the number as 59 and 2, we can write 59 as  $6\bar{1}$ , and write 2 as it is.

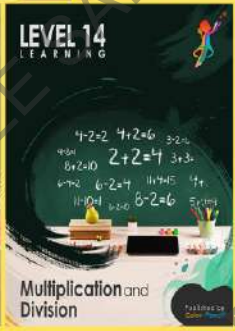
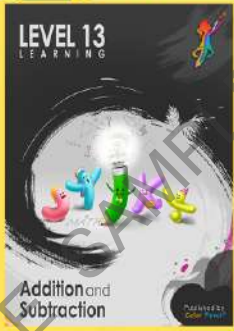
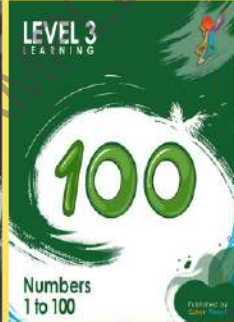
$$592 = 6\bar{1}2$$

538

538 is close to 540 and 2 less than 540.

$$538 = 54\bar{2}$$





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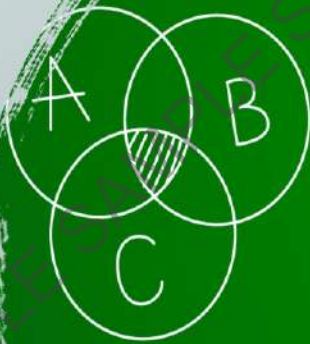
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9 781636 494494

# LEVEL 11

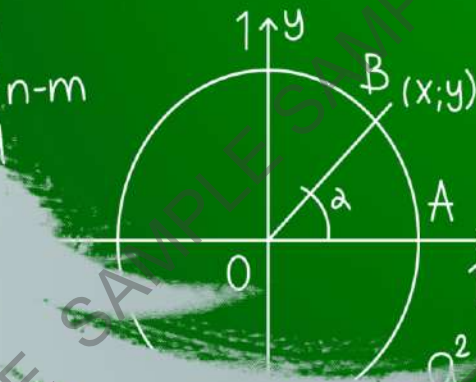
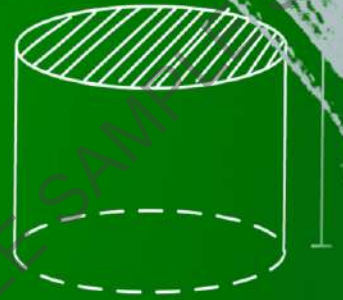
## LEARNING



$$\overline{\text{ctga}}$$

$$(x+y)^2 - (x-y)^2$$

$$AB = \sqrt{AB_x^2 + AB_y^2}$$



$$\frac{1}{\text{ctga}}$$

$$(x+y)^2 - (x-y)^2$$

$$\cos \alpha = x$$

$$A_x + B_y = C$$

$$a^2 + b^2 = c^2$$

$$\sin^2(\alpha) + \cos^2(\alpha) = 1$$

# Fractions and Decimals

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## Exercise 6

Circle the bigger fraction

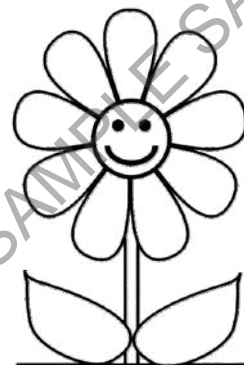
1)  $\frac{1}{2}$  ,  $\frac{1}{3}$  ,  $\frac{1}{4}$

2)  $\frac{2}{5}$  ,  $\frac{2}{3}$  ,  $\frac{1}{3}$

3)  $\frac{4}{5}$  ,  $\frac{1}{3}$  ,  $\frac{5}{6}$

4)  $\frac{2}{3}$  ,  $\frac{3}{4}$  ,  $\frac{2}{5}$

5)  $\frac{4}{7}$  ,  $\frac{2}{5}$  ,  $\frac{1}{6}$





## Fraction addition with same denominators

**Explanation :** To add fractions with same denominator, add numerators and write with the same denominator. Simplify the answer if possible and write the answer in proper or mixed fraction.

**Example:**  $\frac{6}{7} + \frac{4}{7}$

$$\frac{6}{7} + \frac{4}{7} = \frac{6+4}{7} = \frac{10}{7}$$

$\frac{10}{7}$  is an improper fraction, convert into mixed fraction.

Divide 10 by 7 gives quotient 1 and the remainder 3.

$$\frac{10}{7} = 1 \frac{3}{7}$$

$$\frac{6}{7} + \frac{4}{7} = 1 \frac{3}{7}$$

### Exercise 13

Add the following fractions

1)  $\frac{1}{2} + \frac{1}{2}$

2)  $\frac{2}{3} + \frac{2}{3}$

3)  $\frac{1}{4} + \frac{2}{4}$

4)  $\frac{4}{5} + \frac{3}{5}$

5)  $\frac{4}{6} + \frac{5}{6}$



## Addition of whole number and fraction

**Explanation :** Addition of whole number and fraction is same as conversion of mixed number into improper fraction. Multiply the denominator with the whole number and add to the numerator, this is the numerator of the answer and write with the same denominator of the fraction.

**Example :**  $6 + \frac{5}{7}$

$$6 \times 7 + 5 = 42 + 5 = 47$$

$$6 + \frac{5}{7} = \frac{47}{7}$$

### Exercise 20

#### Add whole number and fraction

1)  $3 + \frac{1}{2}$

4)  $4 + \frac{3}{4}$

2)  $1 + \frac{1}{4}$

5)  $5 + \frac{1}{4}$

3)  $5 + \frac{2}{3}$



## Decimal standard form

**Explanation :** Powers of ten in the denominator represent the number is after the decimal point. 10 in the denominator represents the number is in tenths place and 100 in the denominator represents the number is in hundredths place.

**Example :** Convert into decimal

$$\frac{5}{10}$$

10 in the denominator represents the number is in tenths place.

$$\frac{5}{10} = 0.5$$

$$\frac{2}{100}$$

100 in the denominator represents the number is in hundredths place and put 0 for missing (tenth) places.

$$\frac{2}{100} = 0.02$$

## Exercise 29

Convert into decimal

1)  $\frac{3}{10} =$

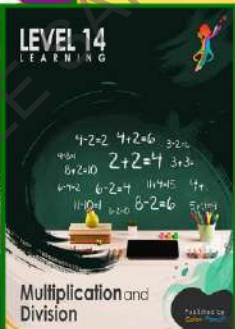
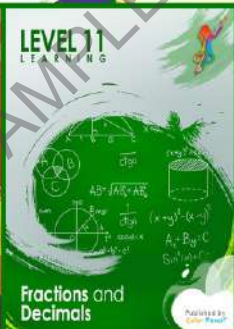
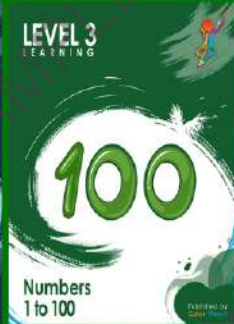
2)  $\frac{4}{100} =$

3)  $\frac{8}{10} =$

4)  $\frac{7}{100} =$

5)  $\frac{6}{100} =$





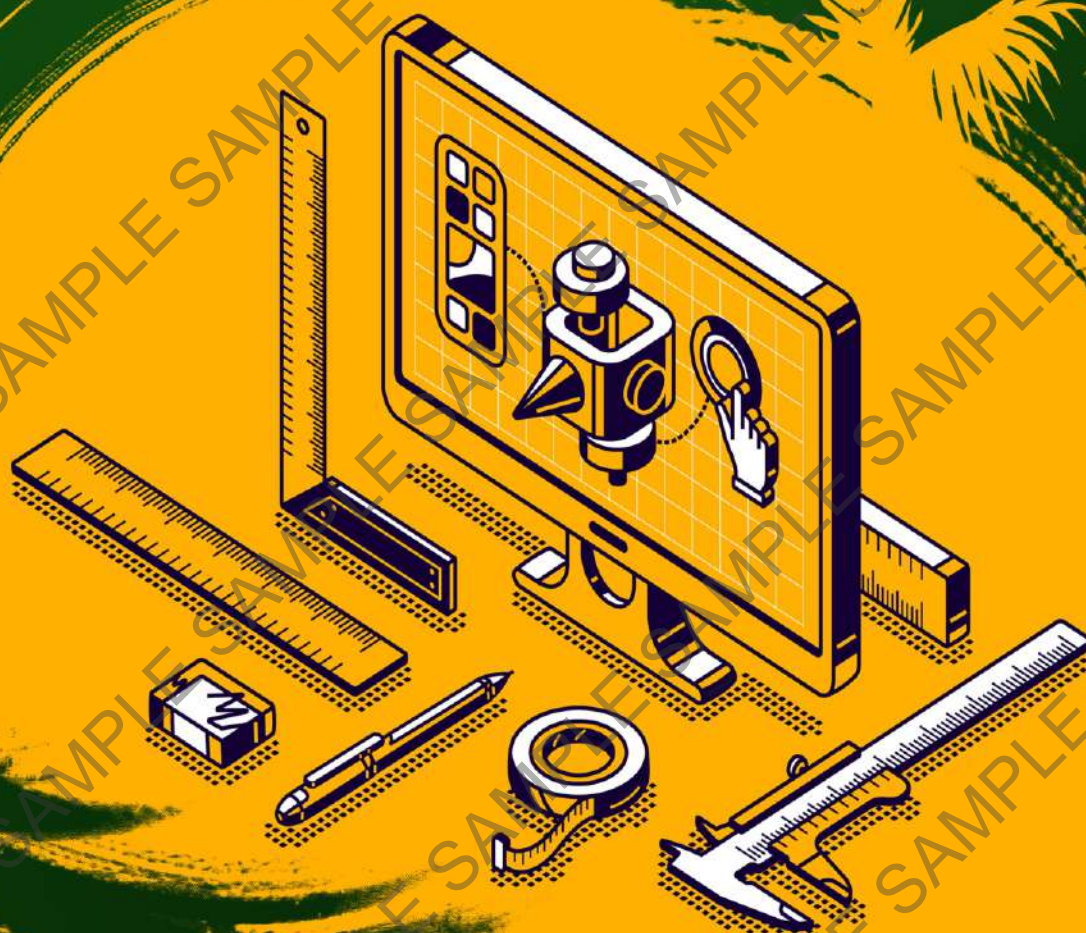
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# LEVEL 12

## LEARNING



# Percentages and Measurement

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## Halving in division

**Explanation:** Divide by 2 is nothing but half of the number and divide by 4 is nothing but half the number twice.

**Example:** Do division using halving

$$776 \div 2$$

$$\text{Halving of } 776 = 388$$

$$776 \div 2 = 388$$

$$3532 \div 4$$

$$\text{Halving of } 3532 = 1766$$

$$\text{Halving of } 1766 = 883$$

$$3532 \div 4 = 883$$

## Exercise 8

**Do division using halving**

1)  $28 \div 2$

2)  $156 \div 2$

3)  $492 \div 4$

4)  $700 \div 4$

5)  $962 \div 2$



### F) Kilo units to metric units

$$1 \text{ km} = 1000 \text{ m}$$

$$1 \text{ kg} = 1000 \text{ g}$$

$$1 \text{ kl} = 1000 \text{ l}$$

**Example :** Convert 9.4 kg into grams

$$9.4 \times 1000 = 9400$$

$$9.4 \text{ kg} = 9400 \text{ g}$$

### Exercise 13F

**Convert into metric units**

1) 4 km

2) 3.7 kl

3) 8.5 kg

### G) Yards to feet

$$1 \text{ yard} = 3 \text{ feet}$$

**Example:** Convert 31 yd into feet

$$31 \times 3 = 93$$

$$31 \text{ yd} = 93 \text{ ft}$$

### Exercise 13G

**Convert into feet**

1) 4 yd

2) 7 yd

3) 15 yd



## Measurement addition

**Explanation :** To add any two quantities, it must be in the same unit. First convert into same unit (convert to smaller unit is easier than convert to bigger unit), add, and write the answer with unit.

**Example :**  $3000 \text{ mm} + 5.5 \text{ m}$

Convert 5.5 m into mm

$$5.5 \times 1000 = 5500$$

$$3000 + 5500 = 8500$$

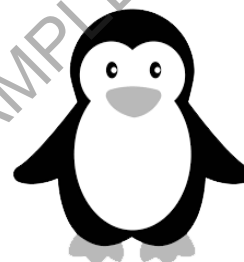
$$3000 \text{ mm} + 5.5 \text{ m} = 8500 \text{ mm}$$

## Exercise 16

### Convert into same unit and do addition

1)  $3 \text{ hrs} + 300 \text{ min}$       2)  $6 \text{ day} + 48 \text{ hrs}$       3)  $30 \text{ cm} + 80 \text{ mm}$

4)  $4 \text{ kg} + 5000 \text{ gm}$       5)  $12 \text{ lb} + 816 \text{ oz}$

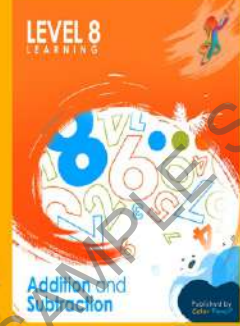


3)  $b = 56 \text{ cm}$   $h = 22 \text{ cm}$

4)  $b = 42 \text{ cm}$   $h = 99 \text{ cm}$

5)  $b = 83 \text{ m}$   $h = 62 \text{ m}$





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# LEVEL 8

## ACTIVITY



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## Exercise 6

Write O for odd numbers and E for even numbers

1) 68

2) 71

3) 90

4) 103

5) 211

6) 378

7) 444

8) 560

9) 617

10) 758

11) 889

12) 928

13) 1000

14) 1457

15) 2808

16) 3781

17) 4090

18) 5577

19) 6973

20) 7111

21) 7774

22) 8575

23) 8298

24) 9009

25) 9874



## Exercise 16

### Below base addition

1)  $3248 + 37 =$

11)  $7182 + 399 =$

2)  $9328 + 59 =$

12)  $1438 + 797 =$

3)  $1827 + 28 =$

13)  $9274 + 298 =$

4)  $6354 + 79 =$

14)  $6292 + 699 =$

5)  $5879 + 19 =$

15)  $8555 + 599 =$

6)  $2393 + 99 =$

16)  $3872 + 999 =$

7)  $7256 + 69 =$

17)  $1628 + 6997 =$

8)  $4085 + 498 =$

18)  $2657 + 2999 =$

9)  $8127 + 199 =$

19)  $3536 + 4997 =$

10)  $5256 + 597 =$

20)  $4586 + 3998 =$



9) 9156 - 3864

10) 2728 - 1953

11) 3482 - 2826

12) 8340 - 1726

13) 6183 - 3574

14) 5325 - 2794

15) 2051 - 1468

16) 7372 - 2594





## Exercise 26

### Below base subtraction

1)  $437 - 99$

2)  $859 - 298$

3)  $787 - 49$

4)  $603 - 79$

5)  $217 - 57$

6)  $5326 - 1998$

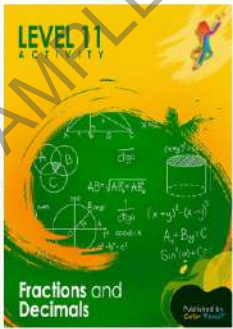
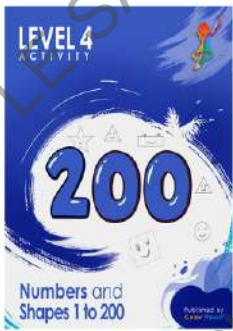
7)  $9087 - 4997$

8)  $6257 - 4999$

9)  $3486 - 599$

10)  $1756 - 298$





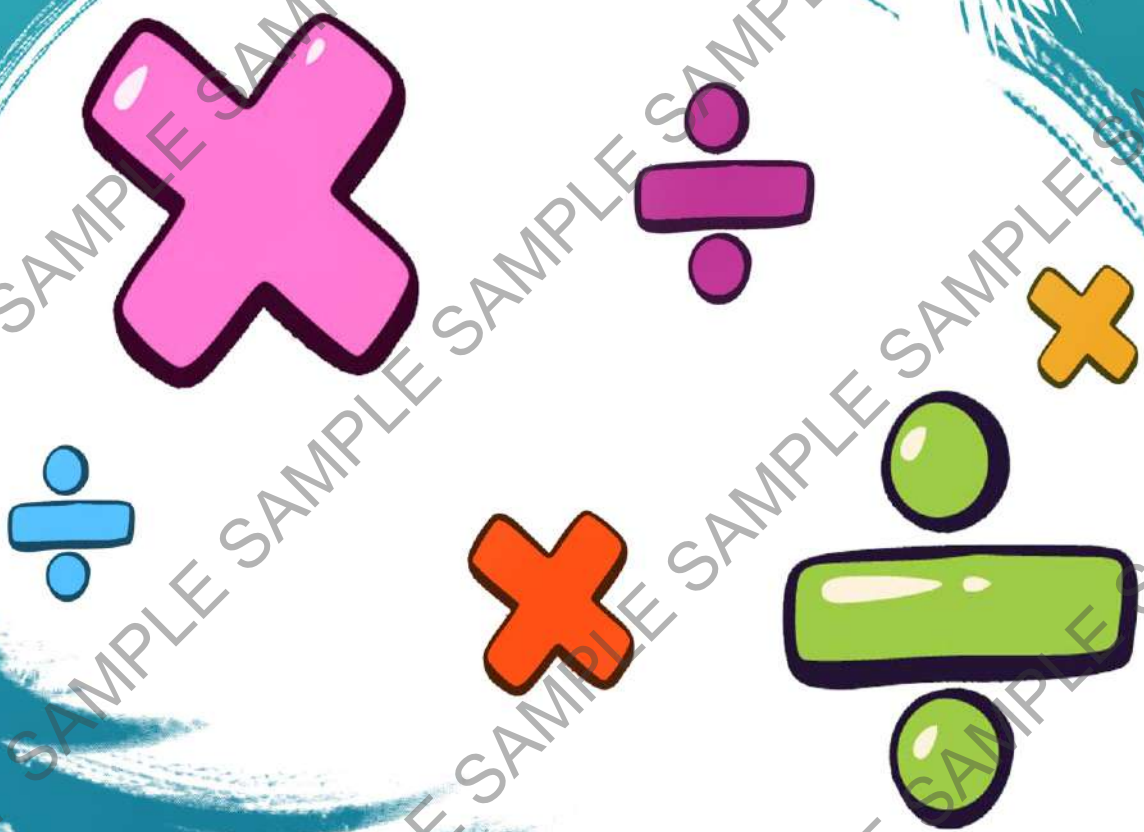
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# LEVEL 9

## ACTIVITY



# Multiplication and Division

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10) 4361 x 63

11) 5963 x 11

12) 3628 x 22

13) 6086 x 34

14) 1562 x 45

15) 7147 x 26

16) 2403 x 87

17) 8115 x 32

18) 3674 x 56

19) 9305 x 10

20) 4853 x 25



## Exercise 11

Multiply – Same tens and pairs in units

1)  $17 \times 13 =$

11)  $32 \times 38 =$

2)  $22 \times 28 =$

12)  $46 \times 44 =$

3)  $36 \times 34 =$

13)  $53 \times 57 =$

4)  $45 \times 45 =$

14)  $68 \times 62 =$

5)  $63 \times 67 =$

15)  $71 \times 79 =$

6)  $78 \times 72 =$

16)  $88 \times 82 =$

7)  $81 \times 89 =$

17)  $93 \times 97 =$

8)  $99 \times 91 =$

18)  $58 \times 52 =$

9)  $15 \times 15 =$

19)  $65 \times 65 =$

10)  $27 \times 23 =$

20)  $74 \times 76 =$



S. No	Numbers	Square	Digit sum	Units place
16	$16^2$			
17	$17^2$			
18	$18^2$			
19	$19^2$			
20	$20^2$			
21	$21^2$			
22	$22^2$			
23	$23^2$			
24	$24^2$			
25	$25^2$			

### Observation

Units place of the square numbers are \_\_\_\_\_

Digit sum of the square numbers are \_\_\_\_\_



## Exercise 24

### Straight division with 2 digit divisor

1)  $48 \div 12$

2)  $60 \div 15$

3)  $32 \div 16$

4)  $88 \div 11$

5)  $72 \div 24$

6)  $99 \div 33$

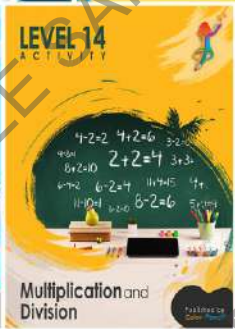
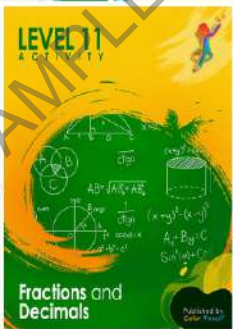
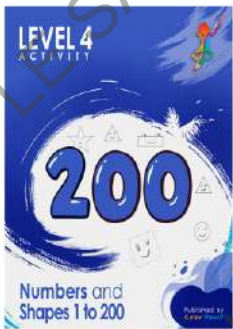
7)  $74 \div 37$

8)  $50 \div 25$

9)  $41 \div 41$

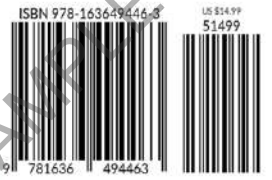






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# LEVEL 10

## ACTIVITY



# Integers and Vinculum

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## Exercise 6

Check divisibility for 2, 3, 4, 5, 6, 8, 9 and 10, write Yes if the number is divisible or No if the number is not divisible

S.No.	Number	2	3	4	5	6	8	9	10
1	24								
2	35								
3	66								
4	81								
5	96								
6	101								
7	273								
8	640								
9	911								
10	720								
11	896								
12	999								
13	1133								
14	3465								
15	4180								
16	5103								
17	5335								
18	6180								
19	8316								
20	7272								

11) 46, 39

12) 57, 38

13) 45, 65

14) 53, 23

15) 62, 31

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## Exercise 16

Circle the smaller number

1) 14    $\overline{36}$    81    $\overline{12}$

11)  $\overline{30}$     $\overline{20}$    10   40

2)  $\overline{43}$    7    $\overline{13}$     $\overline{78}$

12)  $\overline{22}$    88    $\overline{66}$    77

3) 26   38   12   51

13) 3    $\overline{16}$    12   4

4)  $\overline{10}$     $\overline{7}$    6   5

14) 42   43    $\overline{44}$     $\overline{45}$

5) 56    $\overline{56}$    65    $\overline{65}$

15)  $\overline{77}$     $\overline{80}$    39    $\overline{56}$

6) 10    $\overline{20}$    30    $\overline{40}$

16) 7    $\overline{17}$     $\overline{27}$    37

7)  $\overline{8}$    7   9    $\overline{6}$

17)  $\overline{26}$     $\overline{42}$     $\overline{59}$     $\overline{72}$

8) 36    $\overline{72}$     $\overline{40}$    80

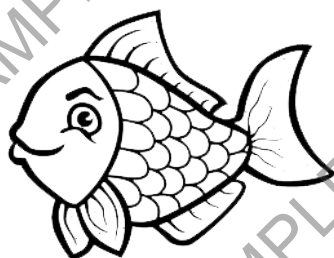
18)  $\overline{90}$    89    $\overline{88}$    5

9) 8   4   0   6

19) 63    $\overline{36}$     $\overline{96}$    69

10) 26   62    $\overline{51}$    15

20)  $\overline{24}$     $\overline{86}$     $\overline{68}$     $\overline{42}$



## Exercise 24

### Integer multiplication

1)  $3 \times 4 =$

2)  $\bar{6} \times 3 =$

3)  $2 \times \bar{8} =$

4)  $\bar{5} \times \bar{4} =$

5)  $\bar{9} \times \bar{6} =$

6)  $6 \times \bar{8} =$

7)  $7 \times 7 =$

8)  $\bar{8} \times \bar{9} =$

9)  $7 \times \bar{8} =$

10)  $9 \times 9 =$

11)  $\bar{10} \times \bar{2} =$

12)  $\bar{3} \times 9 =$

13)  $4 \times \bar{7} =$

14)  $5 \times 5 =$

15)  $\bar{6} \times 0 =$

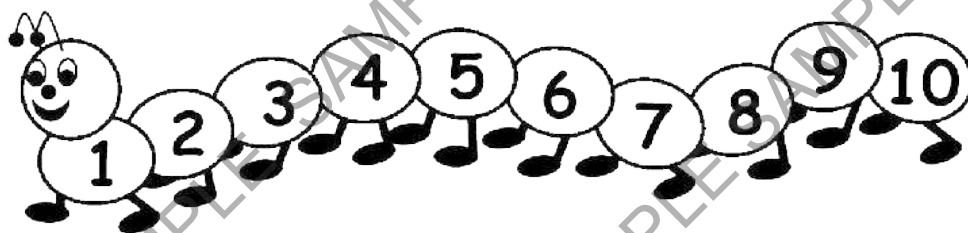
16)  $9 \times \bar{7} =$

17)  $\bar{8} \times \bar{8} =$

18)  $5 \times \bar{10} =$

19)  $\bar{10} \times \bar{4} =$

20)  $\bar{9} \times 4 =$





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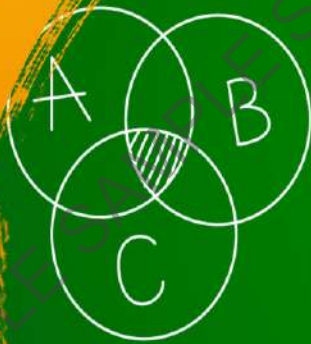
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# LEVEL 11

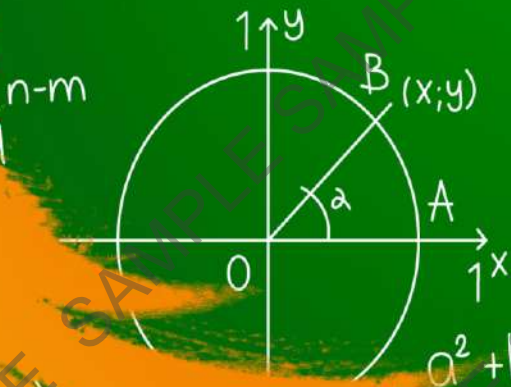
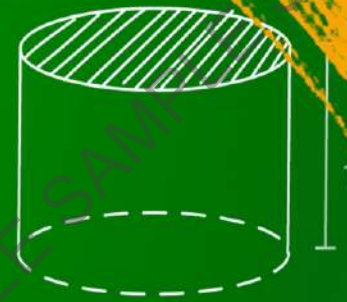
## ACTIVITY



$$\frac{1}{\text{ctg} \theta}$$

$$(x+y)^2 - (x-y)^2$$

$$AB = \sqrt{AB_x^2 + AB_y^2}$$



$$\frac{1}{\text{ctg} \theta}$$

$$(x+y)^2 - (x-y)^2$$

$$\cos \alpha = x$$

$$A_x + B_y = C$$

$$a^2 + b^2 = c^2$$

$$\sin^2(\alpha) + \cos^2(\alpha) = 1$$

# Fractions and Decimals

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11)  $\frac{2}{9}$ ,  $\frac{1}{2}$ ,  $\frac{3}{7}$

12)  $\frac{6}{8}$ ,  $\frac{5}{9}$ ,  $\frac{2}{7}$

13)  $\frac{1}{8}$ ,  $\frac{2}{3}$ ,  $\frac{5}{7}$

14)  $\frac{3}{9}$ ,  $\frac{4}{5}$ ,  $\frac{4}{7}$

15)  $\frac{1}{2}$ ,  $\frac{2}{9}$ ,  $\frac{3}{8}$

16)  $\frac{6}{7}$ ,  $\frac{3}{5}$ ,  $\frac{2}{6}$

17)  $\frac{3}{8}$ ,  $\frac{1}{5}$ ,  $\frac{2}{3}$

18)  $\frac{5}{7}$ ,  $\frac{8}{9}$ ,  $\frac{6}{8}$

19)  $\frac{7}{10}$ ,  $\frac{7}{9}$ ,  $\frac{7}{8}$

20)  $\frac{9}{10}$ ,  $\frac{3}{5}$ ,  $\frac{6}{8}$



## Exercise 12

Find answers

1)  $\frac{3}{3} =$

2)  $\frac{4}{1} =$

3)  $\frac{0}{5} =$

4)  $\frac{8}{8} =$

5)  $\frac{9}{0} =$

6)  $\frac{10}{1} =$

7)  $\frac{6}{6} =$

8)  $\frac{2}{1} =$

9)  $\frac{4}{0} =$

10)  $\frac{0}{6} =$

11)  $\frac{12}{12} =$

12)  $\frac{15}{1} =$

13)  $\frac{7}{7} =$

14)  $\frac{17}{0} =$

15)  $\frac{21}{1} =$

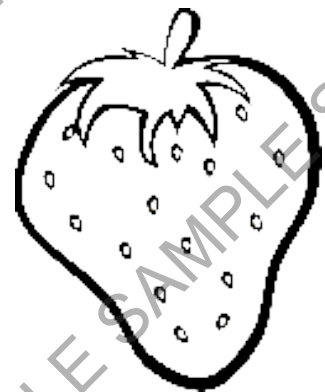
16)  $\frac{0}{25} =$

17)  $\frac{19}{19} =$

18)  $\frac{23}{1} =$

19)  $\frac{0}{16} =$

20)  $\frac{30}{0} =$



11)  $\square - \frac{3}{10} = \frac{4}{10}$

12)  $\square - \frac{4}{11} = \frac{5}{11}$

13)  $\square - \frac{6}{12} = \frac{6}{12}$

14)  $\square - \frac{7}{13} = \frac{3}{13}$

15)  $\square - \frac{5}{14} = \frac{7}{14}$

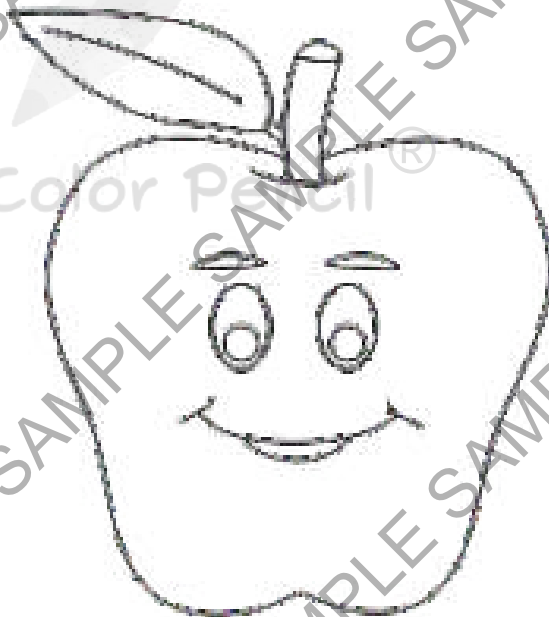
16)  $\square - \frac{1}{15} = \frac{3}{15}$

17)  $\square - \frac{9}{16} = \frac{6}{16}$

18)  $\square - \frac{2}{17} = \frac{15}{17}$

19)  $\square - \frac{7}{18} = \frac{10}{18}$

20)  $\square - \frac{5}{19} = \frac{11}{19}$



## Exercise 25

Write place value for the underlined number

1) 3.14 -

11) 1.83 -

2) 46.27 -

12) 48.67 -

3) 7.83 -

13) 39.15 -

4) 29.5 -

14) 76.01 -

5) 86.03 -

15) 25.47 -

6) 75.62 -

16) 53.16 -

7) 80.09 -

17) 18.92 -

8) 6.66 -

18) 37.46 -

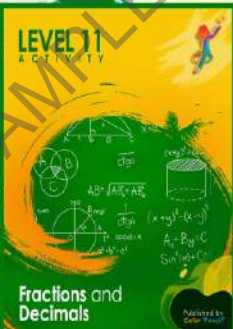
9) 92.47 -

19) 7.21 -

10) 0.49 -

20) 0.83 -





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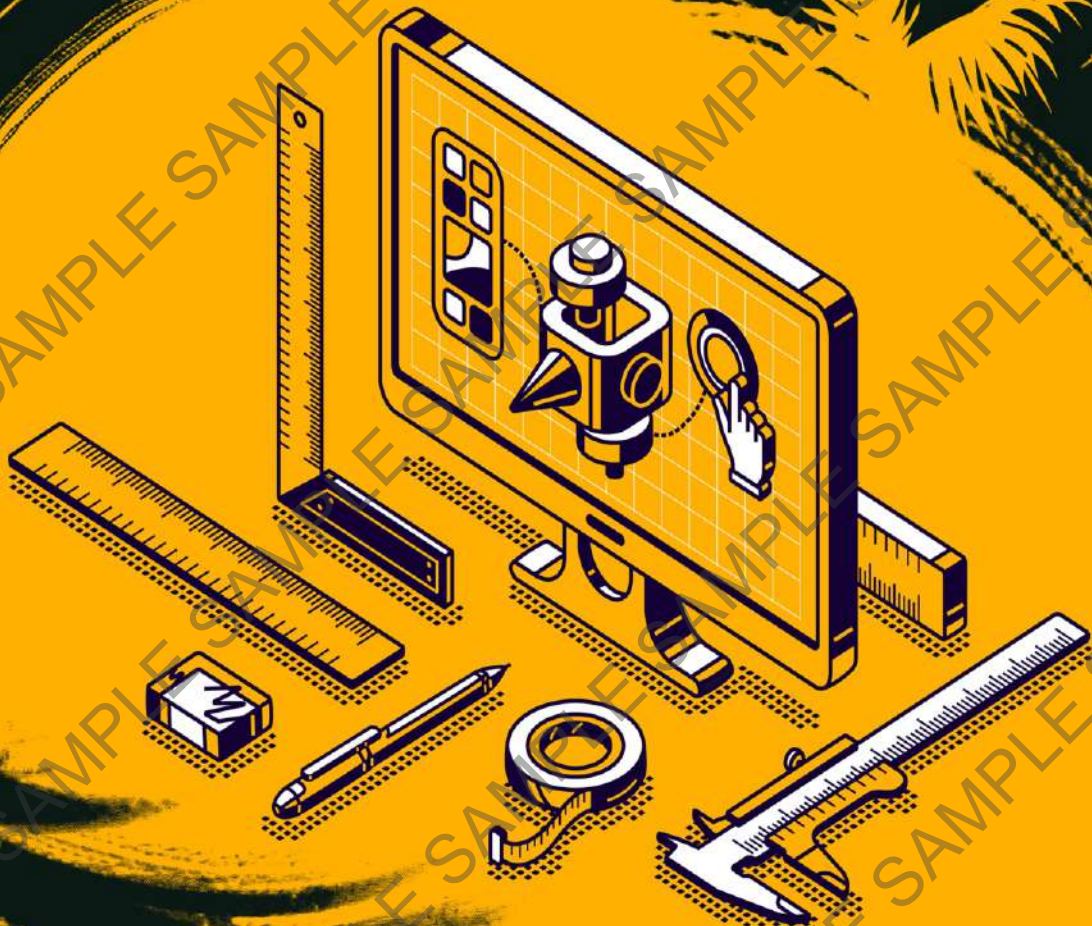
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# LEVEL 12

## ACTIVITY



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## Exercise 7

Do multiplication using doubling

1)  $35 \times 2$

2)  $246 \times 4$

3)  $87 \times 2$

4)  $190 \times 4$

5)  $95 \times 2$

6)  $250 \times 4$

7)  $319 \times 2$

8)  $555 \times 4$

9)  $653 \times 2$

10)  $714 \times 4$

11)  $825 \times 2$

12)  $900 \times 4$

## Exercise 13A

Convert into minutes

1) 3 hrs

2) 12 hrs

3) 56 hrs

4) 60 hrs

5) 18 hrs

6) 20 hrs

7) 43 hrs

8) 48 hrs

9) 35 hrs

10) 29 hrs



## Exercise 14A

### Convert into hours

1) 60 min

2) 360 min

3) 420 min

4) 660 min

5) 780 min

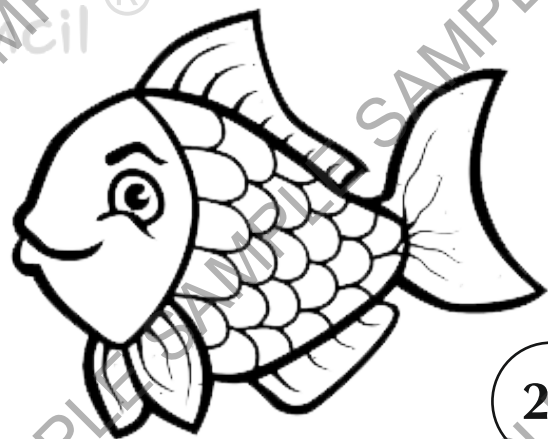
6) 1500 min

7) 2040 min

8) 2460 min

9) 3840 min

10) 4620 min



## Exercise 15

Put appropriate sign  $<$ ,  $>$ , or  $=$

1) 6 hrs  240 min

11) 5 kg  7000 gm

2) 240 hrs  12 days

12) 300 ft  90 yd

3) 4 cm  40 mm

13) Rs. 5.65  700 pa

4) 750 gm  1 kg

14) 16 lb  256 oz

5) 12 lb  160 oz

15) 3000 mm  3 m

6) ₪ 475  \$ 2.25

16) 5 hrs  360 min

7) 0.4 m  4000 mm

17) 72 in  5 ft

8) 420 in  35 ft

18) 5 days  120 hrs

9) 4.5 km  6750 m

19) 6 kl  7250 l

10) 950 pa  Rs. 8

20) 170 mm  2.5 cm



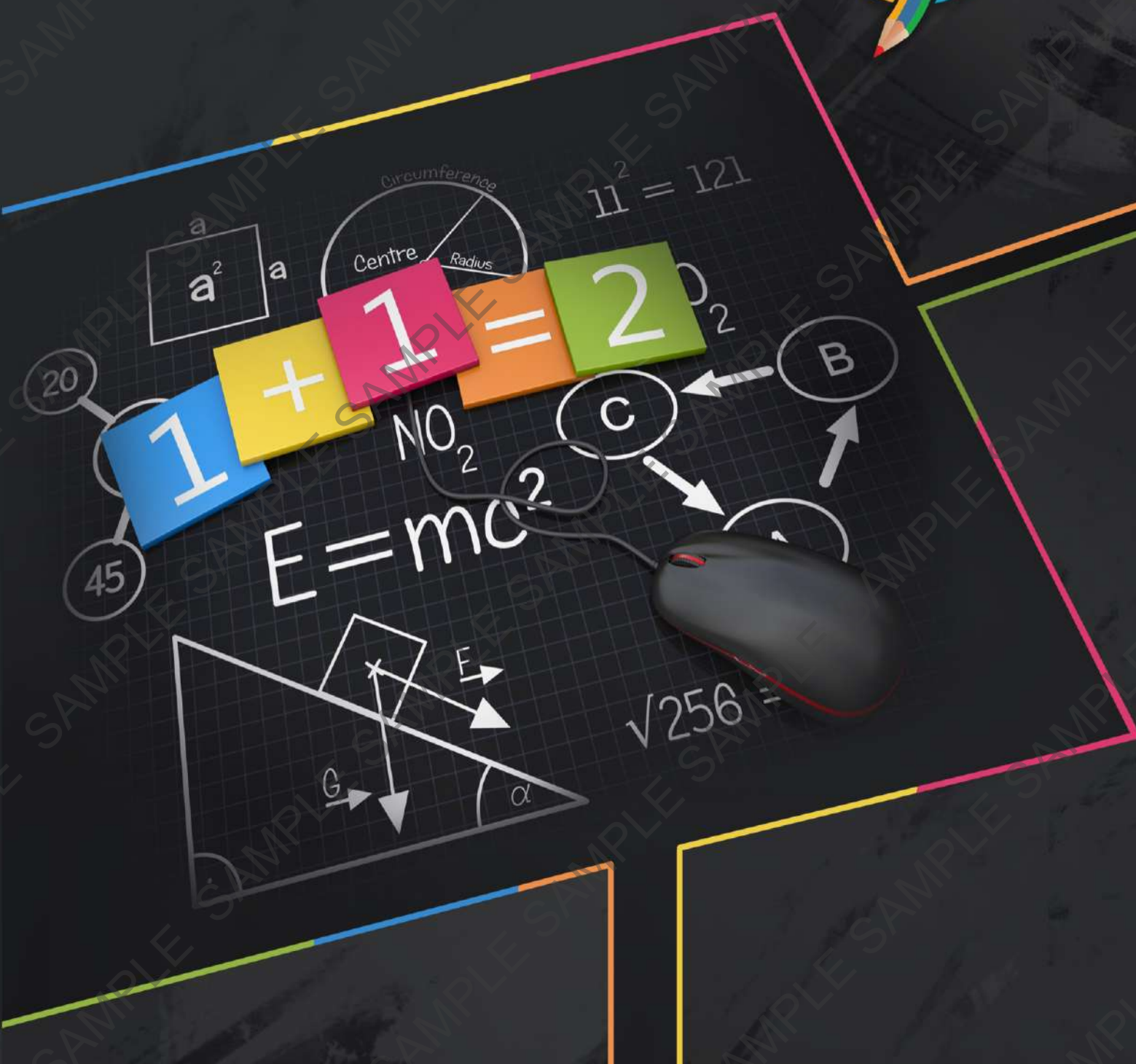


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# TRAINING GUIDE



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LEVEL 1~17**

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8	अन्त्ययोर्दशकेऽपि Antyayordasake'pi	<i>Last Totalling 10</i>
9	अन्त्ययोरेव Antyayoreva	<i>Only the Last Terms</i>
10	समुच्चयगुणितः Samuccayagunitah	<i>The Sum of the Products</i>
11	लोपनस्थापनाभ्यां Lopanasthāpanābhyām	<i>By Alternate Elimination and Retention</i>
12	विलोकनं Vilokanam	<i>By Mere Observation</i>
13	गुणितसमच्चयः समुच्चयगुणितः Gunitsamuccayah Samuccayagunitah	<i>The Product of the Sum is the Sum of the Products</i>
14	ध्वजाङ्क Dhvajāṅka	<i>On the Flag</i>

Every concept in Math is under any one of the sutras. More than one sutra is applicable to some methods. In this book, some sutras are mentioned under some methods. It just shows how the sutras are related to concepts. It does not mean that the particular sutra is only applicable to that particular method.

## NUMBERS

Sutra: "By one more than the one before"

Our number system is based on decimal number system. 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 are called digits. Combination of digits are called numbers. Formation of number is under sutra "By one more than the one before".

For example, 32, 33, 34, 35, and so on.

Number 33 is one more than the before number 32, 34 is one more than the before number 33 and so on.

Add units place  $7 + 8 = 15$  in which 1 is already added to tens place so the units place answer is 5.

$$3817 + 2958 = 6775$$

$$385 + 246$$

Hundreds sum  $3 + 2 = 5$ , tens sum is more than 10 so hundreds sum is  $5 + 1 = 6$

Tens sum  $8 + 4 = 12$  in which 1 is already added to hundreds place, tens sum is 2 but units sum is more than 10, so tens sum becomes  $2 + 1 = 3$

Units sum  $5 + 6 = 11$  in which 1 is already added to tens place so units sum is 1.

$$385 + 246 = 631$$

Observe the sum of next digit and write the answer

## Exercise 10

### Add from left to right

1)  $46 + 23$

2)  $73 + 58$

3)  $88 + 44$

4)  $835 + 127$

5)  $585 + 375$

6)  $482 + 129$

7)  $3826 + 1425$

8)  $2857 + 4894$

9)  $7361 + 1299$

10)  $5237 + 3488$

### 11) Sum of 9 in between

Sutra: "By addition"

Type: General

When we add two numbers from left to right, sometimes there is a sum of 9 in between. Every time before we write the answer, check the next place sum. If the sum is 9, don't write the previous place answer, keep the answer in mind, check the sum of next place. If it is less than 10, write the answers as it is. If it is 10 or more than 10, we should increase the answer in our mind by 1 and write the remaining digits in the next place.

## 5) Subtracting base numbers

Sutra: "By mere observation"

Type: Special

Here the subtrahend is the base number. Split zeros of the subtrahend and split as many digits in the minuend. Subtract the remaining digits using backward counting or splitting and write the answer with split digit of the minuend.

### Examples :

$$4329 - 800$$

The subtrahend has two zeros and split it. Split last two digits of the minuend, do  $43 - 8$  using splitting which gives 35 and write it with 29.

$$43 | 29 - 8 | 00 = 43 - 8 | 29 = 3529$$

$$4329 - 800 = 3529$$

$$471 - 20$$

Here the subtrahend has one zero, split it and split last digit of the minuend.

$$47 | 1 - 2 | 0 = 47 - 2 | 1 = 451$$

$$471 - 20 = 451$$

Observe the numbers and do mind calculation

### Exercise 19

#### Subtract base number

1)  $74 - 30$

2)  $98 - 50$

3)  $482 - 40$

4)  $928 - 70$

5)  $693 - 400$

6)  $847 - 500$

7)  $2957 - 80$

8)  $2504 - 70$

9)  $3295 - 500$

10)  $8275 - 7000$

## 12) Subtract from unity base numbers

Sutra: "All from 9 and the last from 10"

Type: Special

Unity base numbers are powers of 10, they are 10, 100, 1000, 10000 and so on. There is a special method to subtract any numbers from base numbers using the sutra "All from 9 and the last from 10". The method of subtraction from right to left from unity base number is given below.

$$\begin{array}{r} \begin{array}{ccccccc} & 9 & 9 & 9 & 10 & & \\ \cancel{1} & \cancel{0} & \cancel{0} & \cancel{0} & \cancel{0} & & \\ 3 & 8 & 4 & 9 & - & & \\ \hline 6 & 1 & 5 & 1 & & & \\ \hline \end{array} \end{array}$$

This is the method using the concept of borrowing or regrouping. Here we subtracted all the digits from 9 and the last digit from 10 which is in the sutra form in Vedic Math. To subtract any number from unity base number with number of zeros of the base number equal to number of digits in the subtrahend, we can use the sutra "All from 9 and the last from 10" which means subtract all digits from 9 and the last digit from 10. We can get the answer just by observation using this sutra.

### Examples:

$$1000 - 328$$

Before using the sutra, check two conditions. First, minuend should be a base number. Next number of zeros of the minuend is equal to number of digits of the subtrahend. Both are satisfied, so we can use the sutra "All from 9 and the last from 10".



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