[Date]

M Vijay

[company name]

MATHEMATICS BASICS

# MATHEMATICS BASICS

**Integers**

* Addition(**+**)
* Subtraction(**-**)
* Multiplication(**×**)
* Division(**÷**)
* LCM

**Fractions**

* Addition(**+**)
* Subtraction(**-**)
* Multiplication(**×**)
* Division(**÷**)

**Decimals**

* Addition(**+**)
* Subtraction(**-**)
* Multiplication(**×**)
* Division(**÷**)
* Addition of fractions(**+,F**)
* Subtraction of fractions(**-,F**)
* Multiplication of fractions(**×,F**)
* Division of fractions(**÷,F**)

**Variables**

* Addition(**+**)
* Subtraction(**-**)
* Multiplication(**×**)
* Division(**÷**)
* Addition of fractions(**+,F**)
* Subtraction of fractions(**-,F**)
* Multiplication of fractions(**×,F**)
* Division of fractions(**÷,F**)
* LCM

**Irrational numbers**

* Addition(**+**)
* Subtraction(**-**)
* Multiplication(**×**)
* Division(**÷**)
* Addition of fractions(**+,F**)
* Subtraction of fractions(**-,F**)
* Multiplication of fractions(**×,F**)
* Division of fractions(**÷,F**)
* LCM

**Cmparison**

**Cancellation**

**Convertion**

* Decimal to Fraction
* Fraction to Decimal

**VBODMAS Rule**

**Balancing of Equation**

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#

# 1.Indian Number System

|  |  |  |  |
| --- | --- | --- | --- |
| **Crore** | **Lakh** | **Thousand** | **One** |
| H | T | O |
| 7 | 9 | 5 | 4 | 6 | 8 | 2 | 8 | 3 |

Q.1. 795468283

Ans: C L Th O

79, 54, 68

79 Crore 54 Lakh 68 Thousand 283

**Seventy nine** crore **fifty four** lakh **sixty eight** thousand **two hundred and eighty three**

Q.2. 600008205

 Ans: C L Th O

 60, 00, 08, 205

 60 Crore 8 Thousand

 **Sixty** crore **eight** thousand **two** hundred and **five**

Q.3. 74003023

Ans: C L Th O

 7, 40, 03, 023

 7 Crore 40 lakh 3 thousand 23

 **Seven c**rore **forty** lakh **three** thousand **twenty three**

Q.4. 50000406

Ans: C L Th O

 5, 00, 00, 406

 5 Crore 406

 **Five c**rore **four** hundred and **six**

Q.5. 275083

Ans: L Th O

2, 75, 083

2 lakh 75 thousand 83

 Two lakh seventy five thousand eighty three

|  |  |  |
| --- | --- | --- |
| **S.no.** | **Question** | **Answer** |
| 1 | 1024 | **One** thousand **twenty** four |
| 2 | 1790056 | **Seventeen** lakh **ninety** thousand **fifty six** |
| 3 | 29345683 | **Two** crore **ninety t**hree lakh **forty five** thousand **six** hundred and **eighty three** |
| 4 | 485643000 | **Forty eight** crore **fifty six** lakh **forty three** thousand |
| 5 | 540007000 | **Fifty four** crore **seven** thousand |

# **2.Addition of Integers**

Q.1 27+405+3652+972+3

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Th | H | T | O |  |
|  | 2 | 1 | 1 |   |  |
|  |  |  | 2 | 7 |  |
|  |  | 4 | 0 | 5 |  |
|  | 3 | 6 | 5 | 2 |  |
|  |  | 9 | 7 | 2 |  |
|  |  |  |  | 3 |  |
|   | **5** | **0** | **5** | **9** |   |

Ans:

 27+405+3652+972+3 = 5059

|  |  |  |
| --- | --- | --- |
| **S.no.** | **Question** | **Answer** |
| 1 | 23+457+9052+36592 | 46124 |
| 2 | 209+4893+20+35+428 | 5585 |
| 3 | 1796+2794+405+32 | 5027 |
| 4 | 25+296+758+8034 | 9113 |
| 5 | 2000+105+2796 | 4901 |

# 3.Addition of Decimal numbers

Q.1 2.5+0.7+0.002+4.96+237.42

Ans:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |
|  | Th | H | T | O |  |  |  |
|  |  |  |  | 2 |  |  |  |
|  |  |  |  | 2 | 5 | 0 | 0 |
|  |  |  |  | 0 | 7 | 0 | 0 |
|  |  |  |  | 0 | 0 | 0 | 2 |
|  |  |  |  | 4 | 9 | 6 | 0 |
|  |  | 2 | 3 | 7 | 4 | 2 | 0 |
|   |  | **2** | **4** | **5** | **5** | **8** | **2** |

 2.5+0.7+0.002+4.96+237.42= **245.582**

Q.2 0.3+5.46+92+3

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| H | T | O |  |  |
|  | 1 |   |  |  |
|  |  | 0 | 3 | 0 |
|  |  | 5 | 4 | 6 |
|  | 9 | 2 | 0 | 0 |
|  |  | 3 | 0 | 0 |
| **1** | **0** | **0** | **7** | **6** |

|  |
| --- |
| 92=92.3=3.3=3.0 =3.0 =300 =3.000 =3.00000000 |

 0.3+5.46+92+3 = **100.76**

|  |  |  |
| --- | --- | --- |
| **S.no.** | **Question** | **Answer** |
| 1 | 0.2+4.3+24.72+2.254 | 31.474 |
| 2 | 24.36+4+2.3+7.62+2.456 | 40.736 |
| 3 | 2.8+8.2+3.44+24 | 38.44 |
| 4 | 0.05+0.005+0.02+3 | 3.075 |
| 5 | 4.7+2.724+0.756+9 | 17.18 |

# 4.Comparison of Integers & Decimals

|  |  |  |
| --- | --- | --- |
| Less than $<$ |  **Apple with solid fill** $<$ **Apple with solid fill** | 2$ <$ 52 is less than 5 |
| Greater than $ >$ | **Apple with solid fill**$ >$ **Apple with solid fill** | 7 $>$ 37 is greater than 3 |
| Equal to =  | **Apple with solid fill**$=$**Apple with solid fill** | 4 = 44 is equal to 4 |

|  |
| --- |
| 1. Count the digits before decimal point(Bigger number contain more number of digits)
2. Compare the digits from left to right(Bigger number contain big digit)
 |

|  |  |  |  |
| --- | --- | --- | --- |
| Q.1 | 275 |   | 23589 |

 Ans: Number of digits before decimal point in 275 is 3

 Number of digits before decimal point in 23589 is 5

|  |  |  |
| --- | --- | --- |
| 275 | $$<$$ | 23589 |

 Therefore 23589 is bigger than275

|  |  |  |  |
| --- | --- | --- | --- |
| Q.2 | 172.005 |   | 42.73 |

 Ans: Number of digits before decimal point in 172.005 is 3

 Number of digits before decimal point in 42.73 is 2

|  |  |  |
| --- | --- | --- |
| 172.005 | $$>$$ | 42.73 |

|  |  |  |  |
| --- | --- | --- | --- |
| Q.3 | 2053 |   | 2078 |

 Ans: Number of digits before decimal point in 2053 is 4

 Number of digits before decimal point in 2078 is 4

Number of digits are same in both the numbers ,hence go for 2nd condition, Compare the digits from left to right.

2=2

0=0

5<7

Therefore 2078 is bigger than 2053 because it contain big digit 7

|  |  |  |
| --- | --- | --- |
| 2053 | $$<$$ | 2078 |

|  |  |  |  |
| --- | --- | --- | --- |
| Q.4 | 458.534 |   | 459.23 |

 Ans: Number of digits before decimal point in 458.534 is 3

 Number of digits before decimal point in 459.23 is 3

Number of digits are same in both the numbers ,hence go for 2nd condition, Compare the digits from left to right.

4=4

5=5

8<9

Therefore 459.23 is bigger than 458.534 because it contain big digit 9

|  |  |  |
| --- | --- | --- |
| 458.534 | $$<$$ | 459.23 |

|  |  |  |  |
| --- | --- | --- | --- |
| Q.5 | 254.0562 |   | 254.053967 |

 Ans: Number of digits before decimal point in 254.0562 is 3

 Number of digits before decimal point in 254.053967 is 3

Number of digits are same in both the numbers ,hence go for 2nd condition, Compare the digits from left to right.

2=2

5=5

4=4

0=0

5=5

6>3

Therefore 254.0562 is bigger than 254.053967 because it contain big digit 6

|  |  |  |
| --- | --- | --- |
| 254.0562 | $$>$$ | 254.053967 |

|  |  |  |  |
| --- | --- | --- | --- |
| Q.6 | 3.4 |   | 3.400025 |

 Ans: Number of digits before decimal point in 3.4 is 1

 Number of digits before decimal point in 3.400025 is 1

Number of digits are same in both the numbers ,hence go for 2nd condition, Compare the digits from left to right.

|  |
| --- |
| 3.4=3.40 =3.400 =3.4000  =3.40000 =3.4000000000000 |

3=3

4=4

0=0

0=0

0=0

0<2

Therefore 3.400025 is bigger than 3.4 because it contain big digit 2

|  |  |  |
| --- | --- | --- |
| 3.4 | $$<$$ | 3.400025 |

|  |  |  |  |
| --- | --- | --- | --- |
| Q.7 | 45 |   | 45.00 |

 Ans: Number of digits before decimal point in 45 is 2

 Number of digits before decimal point in 45.00 is 2

Number of digits are same in both the numbers ,hence go for 2nd condition, Compare the digits from left to right.

|  |
| --- |
| 45=45.0 =45.00 =45.000  =45.0000 =45.000000000000 |

4=4

5=5

0=0

0=0

Therefore 45 is equal to 45.00

|  |  |  |
| --- | --- | --- |
| 45 | $$=$$ | 45.00 |

|  |  |  |
| --- | --- | --- |
| **S.no.** | **Question** | **Answer** |
| 1 |

|  |  |  |
| --- | --- | --- |
| 25987 |   | 435 |

 | $$>$$ |
| 2 |

|  |  |  |
| --- | --- | --- |
| 32.73 |   | 123.456 |

 | $$<$$ |
| 3 |

|  |  |  |
| --- | --- | --- |
| 57.468 |   | 25.89845 |

 | $$>$$ |
| 4 |

|  |  |  |
| --- | --- | --- |
| 245 |   | 245.023 |

 | $$<$$ |
| 5 |

|  |  |  |
| --- | --- | --- |
| 34.4700 |   | 34.47 |

 | $$=$$ |

# 5.Subtraction of Integers

Q.1 2736 ─ 2052

Ans: 2736 > 2052

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |   |  |
|  | Th | H |  | T | O |  |
|  |  | 6 |  |  |   |  |
| + | 2 | ~~7~~ | 1 | 3 | 6 |  |
| ─ | 2 | 0 |  | 5 | 2 |   |
|  | **0** | **6** |  | **8** | **4** |  |

2736 ─ 2052 = 684

Q.2 157 ─ 4206

Ans: 157 < 4206

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Th | H |  | T |  | O |
|  |  |  | 1 |  | 9 |  |   |  |
|  | ─ | 4 | ~~2~~ | ~~1~~ | ~~0~~ | 1 | 6 |  |
|  | **+** |   | 1 |  | 5 |  | 7 |   |
|  | ─ | **4** | **0** |  | **4** |  | **9** |  |

|  |  |  |
| --- | --- | --- |
| **S.no.** | **Question** | **Answer** |
| 1 | 2549 ─ 352 | 2197 |
| 2 | 1968 ─ 9732 | ─ 7764 |
| 3 | 24 ─ 1982 | ─ 1958 |
| 4 | ─ 205 + 1785 | 1580 |
| 5 | 452 ─ 2000 | ─ 1548 |

 157 ─ 4206 = ─**4049**

# 6.Subtraction of Decimal numbers

Q.1 524.362 ─ 216.32

Ans: 524.362 > 216.32

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | H | T |  | O |  |  |  |
|  |  | 1 |  |   |  |  |  |
| + | 5 | ~~2~~ | 1 | 4 | 3 | 6 | 2 |
|  ─ | 2 | 1 |  | 6 | 3 | 2 | 0 |
|  | **3** | **0** |  | **8** | **0** | **4** | **2** |

 524.362 ─ 216.32 = 308.042

Q.2 1 ─ 0.278

Ans: 1 > 0.278

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | O |  |  |  |  |  |  |
|  |  | 0 |  | 9 |  | 9 |  |  |
|  | + | ~~1~~ | ~~1~~ | ~~0~~ | ~~1~~ | ~~0~~ | 1 | 0 |
|  | ─ | 0 |  | 2 |   | 7 |  | 8 |
|  |  | **0** |  | **7** |  | **2** |  | **2** |

 1 ─ 0.278 = 0.722

|  |  |  |
| --- | --- | --- |
| **S.no.** | **Question** | **Answer** |
| 1 | 2 ─ 0.02 | 1.98 |
| 2 | 105.45 ─ 25.0985 | 80.3515 |
| 3 | ─ 2.5 + 47.23 | 44.73 |
| 4 | 2000.02 ─ 523.479 | 1476.541 |
| 5 | ─ 5.467 + 0.029 | ─ 5.438  |

# 7.Multiplication of Integers

|  |
| --- |
| * Multiplication of two same symbols is “+”
* Multiplication of two different symbols is “─”

**+ × + = +****─ × ─ = +****+ × ─ = ─****─ × + = ─****(─)even  = +****(+)odd  = ─**  |

Q.1 2052 **×** 258

Ans:

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | L | Tth | Th | H | T | O |  |  |  |  |  |  |
|  |  |  | 2 | 0 | 5 | 2 |  |  |  |  |  |  |
|  |   |   | × | 2 | 5 | 8 |  | ~~1~~ |  | ~~1~~ |  | ~~1~~ |
|  |  | 1 | 6 | 4 | 1 | 6 |  | ~~4~~ |  | ~~2~~ |  |  |
|  | 1 | 0 | 2 | 6 | 0 | × |  |  |  |  |  |  |
|  | 4 | 1 | 0 | 4 | × | × |  |  |  |  |  |  |
|  |   |   | 1 |   |   |   |  |  |  |  |  |  |
|  | **5** | **2** | **9** | **4** | **1** | **6** |  |  |  |  |  |  |

2052 **×** 258 = 529416

Q.2 (─2)3  =?

Ans: (─2)3  = (─)3 (2)3 [ (─)odd  = ─ , (2)3 =8 ]

  = ─8

Q.3 (─3)2  =?

Ans: (─3)2  = (─)2 (3)2 [ (─)even  = + , (3)2 =9 ]

  = +9

 =9

Q.4 (─2) × (─1) × (─5) × (─2) = ?

Ans: (─2) × (─1) × (─5) × (─2) = (─)4 (2×1×5×2) [ (─)even  = + ]

 = + 20

 =20

|  |  |  |
| --- | --- | --- |
| **S.no.** | **Question** | **Answer** |
| 1 | 2354 × 201 | 473154 |
| 2 | 4002 ×2549 | 10201098 |
| 3 | 20 × 245 × 436 | 2136400 |
| 4 | (─3)4 | 81 |
| 5 | (─1)20203   | ─1 |

# 8.Multiplication of Decimal numbers

|  |
| --- |
| * Multiply the numbers with out decimal point
* Count the digits after decimal point in the question and write the decimal point after counted places from right to left in the answer
* Write zeroes in empty places
 |

Q.1 2.052 **×** 2.58

Ans: 2.052 **×** 2.58 3+2=5

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | L | Tth | Th | H | T | O |  |  |  |  |  |  |
|  |  |  | 2 | 0 | 5 | 2 |  |  |  |  |  |  |
|  |   |   | × | 2 | 5 | 8 |  | ~~1~~ |  | ~~1~~ |  | ~~1~~ |
|  |  | 1 | 6 | 4 | 1 | 6 |  | ~~4~~ |  | ~~2~~ |  |  |
|  | 1 | 0 | 2 | 6 | 0 | × |  |  |  |  |  |  |
|  | 4 | 1 | 0 | 4 | × | × |  |  |  |  |  |  |
|  |   |   |  1 |   |   |   |  |  |  |  |  |  |
|  | **5** | **2** | **9** | **4** | **1** | **6** |  |  |  |  |  |  |

|  |
| --- |
| 529416 =529416. |

2052 × 258 = 529416

 2.052 ×2.58 = 5. 2 9 4 1 6

 = 5.29416

Q.2 0.002 × 0.0006

Ans: 0.002 ×0.0006 3+4=7

 0002 ×00006

 2 × 6 =12

 0.002 × 0.0006 = 0.0 0 0 0 0 1 2

 = 0.0000012

|  |
| --- |
| There is no value for zeroes after decimal point without having any digit except zero after them  |

Q.3 2.125 × 100

Ans: 2.125 × 100 =3

1. 100 = 212500

2.125 × 100 = 2 1 2. 5 0 0

 = 212.500

 = 212.5

|  |  |  |
| --- | --- | --- |
| **S.no.** | **Question** | **Answer** |
| 1 | 1.25 × 3.2 | 4 |
| 2 | 2.496 × 100 | 249.6 |
| 3 | 0.002 × 0.009 | 0.000018 |
| 4 | 1.2 × 0.003 | 0.0036 |
| 5 | (─0.1) (─0.002) (0.03) (0.4) (─0.001) | ─ 0.0000000024 |

# 9.Division of Integers

|  |
| --- |
| Dividend ÷ DivisorDivisor ) Dividend ( Quotient \_\_\_\_\_\_\_\_\_\_\_ Remainder |

Q.1 2536 ÷ 4

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 4) | 2 | 5 | 3 | 6 | (0634 |
|  | 2 | 4 |   |   |  |
|  | 0 | 1 | 3 |  |  |
|  |  | 1 | 2 |   |  |
|  |  | 0 | 1 | 6 |  |
|  |  |  | 1 | 6 |  |
|  |  |  | 0 |  |

2536 ÷ 4 = 634

Q.2 21025 ÷ 3

Ans:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 3) | 2 | 1 | 0 | 2 | 5 | (07008.333.... |
|  | 2 | 1 |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |
|  | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |   | 0 |   |   |   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  | 0 | 2 | 5 |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  | 2 | 4 |   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  | 0 | 1 | 0 |   |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |   | 9 |   |   |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  | 1 | 0 |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |   | 9 |   |   |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  | 1 | 0 |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |   | 9 |   |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  | 1 |  |   |  |  |  |  |  |  |  |

 21025 ÷ 3 = 7008.333……

 =7008.$\overbar{3}$

Q.3 221 ÷ 11

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 11) | 2 | 2 | 1 | (20.0909…. |
|  |  | 2 | 2 |   |   |  |  |  |  |  |  |  |  |  |  |
|  |  | 0 | 0 | 1 | 0 | 0 |  |  |  |  |  |  |  |  |  |
|  |  |  |  |   | 9 | 9 |   |   |  |  |  |  |  |  |  |
|  |  |  |  |  |  | 1 | 0 | 0 |  |  |  |  |  |  |  |
|  |  |  |  |  |  |   | 9 | 9 |   |  |  |  |  |  |  |
|  |  |  |  |  |  |  | 1 |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

 221 ÷ 11 = 20.0909…

 = 20.$\overbar{09}$

|  |  |  |
| --- | --- | --- |
| **S.no.** | **Question** | **Answer** |
| 1 | 102 ÷ 4 | 25.5 |
| 2 | 28101 ÷ 11 | $$2554.\overbar{63}$$ |
| 3 | 1 ÷ 8 | 0.125 |
| 4 | 1 ÷ 6 | $$0.1\overbar{6}$$ |
| 5 | 4051 ÷ 5 | 810.2 |

# 10.Cancellation

Q.1 $\frac{2536}{4}$

Ans:

 0634

 $\frac{2536}{4}$ = $\frac{2536}{4}$ = $\frac{634}{1}$ = 634

 1

Q.2 $\frac{21025}{3}$

Ans:

 07008.333…

 $\frac{21025}{3}$ = $\frac{21025}{3}$ = $\frac{7008.333…}{1}$ = 7008.$\overbar{3}$

 1

Q.3 $\frac{221}{11}$

Ans:

 20.0909…

 $\frac{221}{11}$ = $\frac{221}{11}$ = $\frac{20.0909…}{1}$ = 20.$\overbar{09}$

 1

|  |
| --- |
|  |
|  |
|  |
|  |  |

Q.4 $\frac{1728}{144}$

Ans:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  | **12** |  |  |  |  |  |  |  |  |  |
|  |  |   |   |   |   |   |   | **~~24~~** |  |   |   |   |   |   |  |  |  |
|  |  |   |   |   |   |   |   | **~~48~~** |  |   |   |   |   |   |  |  |  |
|  |  |   |   |   |   |   |   | **~~96~~** |  |   |   |   |   |   |  |  |  |
|  |  |   |   |   |   |   |   | **~~288~~** |  |   |   |   |   |   |  |  |  |
|  |  |   |   |   |   |   |   | **~~864~~** |  |   |   |   |   |   |  |  |  |
| **1728** |  = |   |   |   |  |  |   | **~~1728~~** |  | 2 | 3 | 3 | 2 | 2 | 2 | = | **1728** |
| **144** |   |   |   |  |   | **~~144~~** |  | **144** |
|  |  |   |   |   |   |   |   | **~~72~~** |  |   |   |   |   |   |  |  |  |
|  |  |   |   |   |   |   |   | **~~24~~** |  |   |   |   |   |   |  |  |  |
|  |  |   |   |   |   |   |   | **~~8~~** |  |   |   |   |   |   |  |  |  |
|  |  |   |   |   |   |   |   | **~~4~~** |  |   |   |   |   |   |  |  |  |
|  |  |   |   |   |   |   |   | **~~2~~** |  |   |   |   |   |   |  |  |  |
|  |  |  |  |  |  |  |  | **1** |  |  |  |  |  |  |  |  |  |

|  |  |  |
| --- | --- | --- |
| **S.no.** | **Question** | **Answer** |
| 1 | $\frac{102}{4}$ | 25.5 |
| 2 | $\frac{28101}{11}$ | 2554.$\overbar{63}$ |
| 3 | $\frac{1}{8}$ | 0.125 |
| 4 | $\frac{1}{6}$ | 0.1$\overbar{6}$ |
| 5 | $\frac{6000}{48}$ | 125 |

# 11.Convertion

Decimal to fraction :

|  |
| --- |
| * Remove decimal point and write the number as it is in the place of **numerator**, write 1 is in the place of **denominator** and write zeros “0” after 1(Number of zeroes are equal to number of digits after decimal point)
* Remove decimal point and write the number as it is in the place of **denominator**, write 1 is in the place of **numerator** and write zeros “0” after 1(Number of zeroes are equal to number of digits after decimal point)
 |

05

Q.1 2.5 = $\frac{25}{10}$ = $\frac{5}{2}$

 02

 1

Q.2 0.002 = $\frac{0002}{1000}$ = $\frac{2}{1000}$ = $\frac{1}{500}$

 ~~0~~500

 ~~0~~64

 ~~128~~

Q.3 2.56 = $\frac{256}{100}$ = $\frac{64}{25}$

  ~~050~~

 25

 1 0500

Q.4 $\frac{2}{0.004}$ = $\frac{2 × 1000}{0004}$ = $\frac{2 × 1000}{4}$ = $\frac{1 × 500}{1}$ **=**500

 2 1

Fraction to decimal :

|  |
| --- |
| * If 10, 100, 1000, …….. are in the place of denominator, move the decimal point towards left in numerator
* If there is no decimal point in the number then decimal point is present after last digit in the number(Right side)
 |

Q.1 $\frac{2}{100}$= 0.0 2 = 0.02

Q.2 $\frac{24756}{100}$= 2 4.7 5 6 = 24.756

Q.3 $\frac{127.45}{100}$= 1 2 7 .4 5 = 1.2745

Q.4 $\frac{49862.052}{1000}$= 4 9 8 6 2.0 5 2 = 49.862052

|  |  |  |
| --- | --- | --- |
| **S.no.** | **Question** | **Answer** |
| 1 | 0.007 | $$\frac{7}{1000}$$ |
| 2 | 1.6 | $$\frac{8}{5}$$ |
| 3 | 6.25 | $$\frac{25}{4}$$ |
| 4 | $$\frac{2457.6}{100}$$ | 24.576 |
| 5 | $$\frac{3}{10000}$$ | 0.0003 |

# 12.Multiplication of Fraction

|  |
| --- |
| * Multiply all numerators and write as a numerator
* Multiply all denominators and write as a denominator
* Cancellation
 |

Q.1 $\frac{2}{5}$ ×$\frac{3}{8}$ ×$\frac{25}{9}$ ×$\frac{3}{10}$

Ans: = $\frac{2 × 3 × 25 × 3}{5 × 8 × 9 × 10}$

 = $\frac{\begin{array}{c} \\ 1\\1 1 5 1\\2 × 3 × 25 × 3\end{array}}{\begin{array}{c}5 × 8× 9 × 10 \\1 4 3 2\\ 1\end{array}}$

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

 = $\frac{\begin{array}{c} \\0.125\\1\end{array}}{\begin{array}{c} 8 \\1\end{array}}$

 = 0.125

 (or)

 $ \frac{2}{5}$ ×$\frac{3}{8}$ ×$\frac{25}{9}$ ×$\frac{3}{10}$

 = $\frac{2 × 3 × 25 × 3}{5 × 8 × 9 × 10}$

 = $\frac{\begin{array}{c} \\ \\1 1 5 1\\2 × 3 × 25 × 3\end{array}}{\begin{array}{c}5 × 8× 9 × 10 \\1 4 3 \\ 1\end{array}}$

 = $\frac{1 × 1 × 5 × 1}{1 × 4 × 1 × 10}$

 =$ \frac{\begin{array}{c} \\1.25\\ 5 \end{array}}{\begin{array}{c} 4 × 10\\1 \end{array} }$

 = $\frac{1.25}{10 }$

 = 1.25

 = 0.125

Q.2 $\frac{20}{3}$ ×$\frac{2}{45}$ ×$\frac{90}{4}$ × 6

= $\frac{20 × 2 × 90 × 6}{3 × 45 × 4}$

 = $\frac{\begin{array}{c} \\ 2 1 \\ 1 10 2\\ 20 × 2 × 90 × 6 \end{array}}{\begin{array}{c}3 × 45 × 4 \\1 5 2 \\ 1 1 \end{array}}$

 = $\frac{20 × 1 × 2 × 1}{1 × 1 × 1}$

 = $\frac{40}{1}$

 = 40

|  |  |  |
| --- | --- | --- |
| **S.no.** | **Question** | **Answer** |
| 1 | $\frac{2}{ 5 }$ ×$\frac{10}{8}$ ×6 | 3 |
| 2 | $\frac{40}{12}$ ×$\frac{7}{3}$ ×$\frac{9}{14} $×5 | 25 |
| 3 | $\frac{2}{3}$ × $\frac{3 }{5}$ × $\frac{5}{49}$ ×$ \frac{49 }{37}$ ×$\frac{37}{2}$ | 1 |
| 4 | $4$ ×$\frac{ 5 }{6}$ ×3 ×$\frac{ 2 }{10}$ | 2 |
| 5 | 24 ×$\frac{ 5 }{6}$ | 20 |

# 13.Multiplication of Fraction in Decimals

Q.1 $\frac{1.2}{0.09}$ ×$\frac{0.03}{0.02}$ × 0.5

 = $\frac{1.2 × 0.03 × 0.5}{0.09 × 0.02}$

 = $\frac{12 × 003 × 05 × 100 ×100}{10 ×100 ×10 × 009 × 002}$

 = $\frac{12 × 003 × 05 × 100 ×100}{10 ×100 ×10 × 009 × 002}$

 = $\frac{\begin{array}{c}2 1 \\ 4 1 10 1 \\12 × 3 × 5 × 100 ×100 \end{array}}{\begin{array}{c}10 × 100 ×10 × 9 × 2\\ 1 1 1 3 1 \\ 1 \end{array}}$

 = $\frac{2 × 1 × 5 × 1 × 1}{1 × 1 × 1 × 1 × 1}$

 = $\frac{10}{1}$

 = 10

|  |  |  |
| --- | --- | --- |
| **S.no.** | **Question** | **Answer** |
| 1 | $\frac{0.6}{ 0.5 }$ ×$\frac{1.25}{0.02}$ ×0.2 | 15 |
| 2 | $\frac{2.4}{3}$ ×$\frac{40}{0.005}$ × 0.01 | 64 |
| 3 | 3.618 × $\frac{1 }{0.006}$  | 603 |
| 4 | $\frac{0.1 }{0.2}$ ×$\frac{0.11 }{2.2}$ × 0.4 | 0.01 |
| 5 | 2 ×$\frac{1. 5 }{3}$ × 0.1 | 0.1 |

# 14.Division of Fraction

|  |
| --- |
| * Write first term as it is
* Write **×**(Multiplication symbol) instead of $÷$ (Division symbol)
* Write reciprocal of second term
* $\frac{a}{b} ÷ \frac{c}{d}$ (*or*) $\frac{\left(\frac{a}{b}\right)}{\left(\frac{c}{d}\right)}$ = $\frac{a}{b}$ × $\frac{d}{c}$
* $a ÷ \frac{b}{c}$ (*or*) $\frac{a}{\left(\frac{b}{c}\right)}$ = $a$ × $\frac{c}{b}$
* $\frac{a}{b} ÷ c$ (*or*) $\frac{\left(\frac{a}{b}\right)}{c}$ = $\frac{\left(\frac{a}{b}\right)}{\left(\frac{c}{1}\right)}$ = $\frac{a}{b}$ × $\frac{1}{c}$
 |

Q.1 $\frac{2}{5} ÷ \frac{8}{10}$ (*or*) $\frac{\left(\frac{2}{5}\right)}{\left(\frac{8}{10}\right)}$

Ans:

 =$ \frac{2}{ 5 }$ ×$\frac{10}{8}$

 = $\frac{\begin{array}{c} \\ 1 \\ 1 2 \\ 2 × 10 \end{array}}{\begin{array}{c}5 × 8 \\1 4 \\ 2 \end{array}}$

 = $\frac{ 1 × 1}{1 × 2}$

 = $\frac{\begin{array}{c} \\0.5\\1 \end{array}}{\begin{array}{c}2\\1\end{array}}$

 = $\frac{0.5}{1}$

 = 0.5

Q.2 $8÷ \frac{4}{5}$ (*or*) $\frac{8}{\left(\frac{4}{5}\right)}$

= $8$ × $\frac{5}{4}$

= $\frac{\begin{array}{c} \\ \\ 2 \\ 8 × 5\end{array}}{\begin{array}{c} 4 \\1\end{array}}$

= $\frac{ 2 × 5}{1}$

= $\frac{10}{1}$

= 10

Q.3 $\frac{25}{3} ÷ 5$ (*or*) $\frac{ \left(\frac{25}{3}\right)}{5}$ = $\frac{\left(\frac{25}{3}\right)}{\left(\frac{5}{1}\right)}$

Ans:

= $\frac{25}{3}$ × $\frac{1}{5}$

|  |  |  |
| --- | --- | --- |
| **S.no.** | **Question** | **Answer** |
| 1 | $$\frac{2}{3} ÷ \frac{4}{15}$$ | 2.5 |
| 2 | $\frac{14}{ \left(\frac{2}{7}\right) }$  | 49 |
| 3 | $$\frac{\left(\frac{6}{5}\right)}{2}$$ | 0.6 |
| 4 | $\frac{36}{2} ÷ 3$  | 6 |
| 5 | $$\frac{1}{2} ÷ \frac{2}{1}$$ | 0.25 |

=$\frac{\begin{array}{c} \\ \\ 5 \\ 25 × 1\end{array}}{\begin{array}{c} 3 × 5\\ 1\end{array}}$

 = $\frac{ 5 × 1}{3 × 1}$

= $\frac{\begin{array}{c} \\1.666….\\5 \end{array}}{\begin{array}{c}3\\1\end{array}}$

= $\frac{1.666…..}{1}$

= 1.$\overbar{6}$

# 15.Division of Fraction in Decimals

Q.1 $\frac{1.2}{0.3} ÷ \frac{0.6}{2.4}$ (*or*) $\frac{\left(\frac{1.2}{0.3}\right)}{\left(\frac{0.6}{2.4}\right)}$

Ans:

 =$ \frac{1.2}{ 0.3 }$ ×$\frac{2.4}{0.6}$

 = $\frac{ 1.2 × 2.4}{0.3 × 0.6}$

 = $\frac{ 12 × 24 ×10 ×10}{10 ×10 × 03 ×06}$

 = $\frac{\begin{array}{c} \\ \\ 4 4 1 1 \\ 12 × 24 ×10 ×10\end{array}}{\begin{array}{c} 10 × 10 × 03 × 06 \\1 1 1 1\end{array}}$

 = $\frac{ 4 × 4 × 1 × 1}{1 × 1 × 1 × 1}$

 = $\frac{16}{1}$

 = 16

Q.2 $1.6 ÷ \frac{0.2}{0.3}$ (*or*) $\frac{1.6}{\left(\frac{0.2}{0.3}\right)}$

Ans:

|  |  |  |
| --- | --- | --- |
| **S.no.** | **Question** | **Answer** |
| 1 | $$\frac{1.8}{2.4} ÷ \frac{0.6}{0.2}$$ | 0.25 |
| 2 | $$\frac{8.1}{ \left(\frac{0.09}{0.1}\right) }$$ | 9 |
| 3 | $$\frac{\left(\frac{3.5}{0.7}\right)}{0.05}$$ | 100 |
| 4 | $\frac{2.5}{0.1} ÷ $ $\frac{0.005}{0.2}$ | 1000 |
| 5 | $$\frac{0.003}{0.1} ÷ \frac{0.6}{0.09}$$ | 0.0045 |

 =$ 1.6$ ×$\frac{0.3}{0.2}$

 = $\frac{ 1.6 × 0.3}{0.2}$

 = $\frac{ 16 × 03 ×10}{10 ×10 × 02}$

 = $\frac{\begin{array}{c} \\ \\ 8 1 \\ 16 × 03 ×10\end{array}}{\begin{array}{c} 10 × 10 × 02 \\1 1\end{array}}$

 = $\frac{ 8 × 3 × 1}{1 × 10 × 1}$

 = $\frac{24}{10}$

 = 2.4

# 16.LCM of Integers

Q.1 What is the LCM of 8,10,16,6,15 ?

Ans:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |
|  | 2 | 8 , 10 , 16 , 6 ,15  |  |  |  |
|  | 2 | 4 , 5 , 8 , 3 , 15 |  |  |  |
|  | 2 | 2 , 5 , 4 , 3 , 15 |  |  |  |
|  | 3 | 1 , 5 , 2 , 3 , 15  |  |  |  |
|  | 5 | 1 , 5 , 2 , 1 , 5 |  |  |  |
|  |  | 1 , 1 , 2 , 1 , 1 |  |  |  |
|  LCM of 8, 10, 16, 6, 15 = 2 × 2 × 2 × 3 × 5 × 2 = 240 |
|  |
|  |
|  |

Q.2 What is the LCM of 24, 36, 42 ?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 3 | 24 , 36 , 42  |  |  |  |  |  |
| 2 | 8 , 12 , 14 |  |  |  |  |  |
| 2 | 4 , 6 , 7 |  |  |  |  |  |
|  | 2 , 3 , 7  |  |  |  |  |  |
|  LCM of 24, 36, 42 = 3 × 2 × 2 × 2 × 3 × 7

|  |  |  |
| --- | --- | --- |
| **S.no.** | **Question** | **Answer** |
| 1 | What is the LCM of 3, 9, 12, 6 | 36 |
| 2 | What is the LCM of 10, 1000, 100 | 1000 |
| 3 | What is the LCM of 2, 24, 6, 12, 3 | 24 |
| 4 | What is the LCM of 5, 2, 13 | 130 |
| 5 | What is the LCM of 16, 2, 8 | 16 |

 = 504 |
|  |

# 17.Addition of Fraction

|  |
| --- |
| * If they are like fractions write the numerators as it is and write denominator one time
* If they are unlike fractions(denominators are not same) find the LCM of denominators and make all the denominators as LCM(i.e. like fractions)
 |

Q.1 $\frac{2}{3}$ + $\frac{8}{3}$ + $\frac{5}{3}$

Ans:

 = $\frac{2}{3}$ + $\frac{8}{3}$ + $\frac{5}{3}$

 = $\frac{2 + 8 + 5 }{3}$

 = $\frac{\begin{array}{c}5\\15\end{array}}{\begin{array}{c}3\\1\end{array}}$

 = 5

Q.2 $\frac{3}{2}$ + $\frac{4}{6}$ + $\frac{2}{12}$

|  |  |  |
| --- | --- | --- |
| 2 | 2 , 6 , 12  |  |
| 3 | 1 , 3 , 6 |  |
|  | 1 , 1 , 2 |  |
|  LCM = 2 × 3 × 2 = 12 |

Ans: = $\frac{3 × 6 }{2 × 6}$ + $\frac{4 × 2}{6 ×2}$ + $\frac{2}{12}$

 = $\frac{18}{12}$ + $\frac{8}{12}$ + $\frac{2}{12}$

 = $\frac{18 + 8 + 2 }{12}$

 = $\frac{\begin{array}{c}7\\14\\28\end{array}}{\begin{array}{c}12\\6\\3\end{array}}$

 = $\frac{\begin{array}{c}2.33…\\7\end{array}}{\begin{array}{c}3\\1\end{array}}$

 = $\frac{2.33…}{1}$

 = 2.33…

 = 2.$\overbar{3}$

|  |  |  |
| --- | --- | --- |
| 5 | 5 , 10  |  |
|  | 1 , 2 |  |
|  LCM = 5 × 2 = 10 |

Q.2 $\frac{2}{5}$ + $\frac{4}{10}$ + 2

Ans: = $\frac{2}{5}$ + $\frac{4}{10}$ + $\frac{2}{1}$

 = $\frac{2 × 2 }{5 × 2}$ + $\frac{4}{10}$ + $\frac{2 × 10 }{1 × 10}$

 = $\frac{4}{10}$ + $\frac{4}{10}$ + $\frac{20}{10}$

 = $\frac{4 + 4 + 20 }{10}$

 = $\frac{28}{10}$

 = 2.8

 = 2.8

|  |  |  |
| --- | --- | --- |
| **S.no.** | **Question** | **Answer** |
| 1 | $\frac{2}{7}$ + $\frac{5}{7}$ + $\frac{10}{7}$ + $\frac{4}{7}$ | 3 |
| 2 | $\frac{2}{3}$ + $\frac{4}{6}$ + $\frac{3}{2}$ + 4 | 6.8$\overbar{3}$ |
| 3 | $\frac{7}{10}$ + $\frac{3}{5}$ + $\frac{5}{2}$ + 3 | 6.8 |
| 4 | $\frac{2}{5}$ + $\frac{3}{2}$ + $\frac{1}{3}$ | 2.2$\overbar{3}$ |
| 5 | $\frac{35}{49}$ + $\frac{2}{7}$ + 1 | 2 |

# 18.Addition of Fraction in Decimals

Q.1 $\frac{1.5}{0.2}$ + $\frac{4}{0.04}$ + $\frac{1.2}{8}$

Ans: = $\frac{1.5}{0.2}$ + $\frac{4}{0.04}$ + $\frac{1.2}{8}$

 = $\frac{15 × 10 }{10 × 02}$ + $\frac{4 × 100}{004}$ + $\frac{12}{10 × 8}$

 = $\frac{\begin{array}{c} 1\\15 × 10 \end{array}}{\begin{array}{c}10 × 2\\1 \end{array}}$ + $\frac{\begin{array}{c}1 \\ 4 × 100\end{array}}{\begin{array}{c} 4 \\1\end{array}}$ + $\frac{\begin{array}{c}3\\ 6 \\12\end{array}}{\begin{array}{c}10 × 8 \\ 4 \\ 2\end{array}}$

 = $\frac{15 × 1 }{1 × 2}$ + $\frac{1 × 100}{1}$ + $\frac{3}{10 × 2}$

|  |  |
| --- | --- |
| 2 | 2 , 20  |
|  | 1 , 10 |
|  LCM = 2 × 10 = 20 |

 = $\frac{15}{2}$ + $\frac{100}{1}$ + $\frac{3}{20}$

 = $\frac{15 × 10 }{2 × 10}$ + $\frac{100 × 20}{1 × 20}$ + $\frac{3}{20}$

 = $\frac{150}{20}$ + $\frac{2000}{20}$ + $\frac{3}{20}$

 = $\frac{150 + 2000 + 3 }{20}$

|  |  |  |
| --- | --- | --- |
| **S.no.** | **Question** | **Answer** |
| 1 | $\frac{2}{0.3}$ + $\frac{1.2}{0.2}$ + $\frac{1.6}{0.4}$ | 16.$\overbar{6}$ |
| 2 | 0.5 + $\frac{2}{0.5}$ + $\frac{3}{0.1}$ | 34.5 |
| 3 | $\frac{1.2}{2.4}$ + $\frac{1}{1.2}$ + $\frac{2.4}{0.6}$ + 0.1 | 5.4$\overbar{3}$ |
| 4 | 0.1 + $\frac{1}{0.1}$  | 10.1 |
| 5 | $\frac{1}{0.2}$ + $\frac{0.2}{1}$ + $\frac{2}{0.2}$ + 0.2 | 15.4 |

 = $\frac{\begin{array}{c}1076.5\\2153\end{array}}{\begin{array}{c}20\\10\end{array}}$

 = $\frac{1076.5}{10}$

 = 107.65

 = 107.65

# 19.Subtraction of Fraction

Q.1 $\frac{9}{5}$ $-$ $\frac{2}{5}$

Ans:

 = $\frac{9}{5}$ $-$ $\frac{2}{5}$

 = $\frac{9 - 2 }{3}$

 = $\frac{\begin{array}{c}1.4\\7\end{array}}{\begin{array}{c}5\\1\end{array}}$

 = $\frac{1.4}{1}$

 = 1.4

Q.2 $\frac{6}{5}$ $-$ $\frac{3}{10}$

|  |  |
| --- | --- |
| 2 | 2 , 20  |
|  | 1 , 10 |
|  LCM = 2 × 10 = 20 |

Ans: = $\frac{6}{5}$ $-$ $\frac{3}{10}$

 = $\frac{6 × 2 }{5 × 2}$ $-$ $\frac{3}{10}$

 = $\frac{12}{10}$ $-$ $\frac{3}{10}$

 = $\frac{12-3}{10}$

 = $\frac{9}{10}$

 = 0.9

 = 0.9

Q.3 $\frac{5}{12}$ $-$ $\frac{2}{6}$ + $\frac{3}{4}$ $-$ $\frac{2}{3}$

|  |  |  |
| --- | --- | --- |
| 2 | 12 , 6 , 4 , 3  |  |
| 2 | 6 , 3 , 2 , 3 |  |
| 3 | 3 , 3 , 1 , 3 |  |
|  | 1 , 1 , 1 , 1  |  |
| LCM = 2 × 2 × 3 = 12 |

Ans: = $\frac{5}{12}$ $-$ $\frac{2}{6}$ + $\frac{3}{4}$ $-$ $\frac{2}{3}$

 = $\frac{5 }{12}$ $-$ $\frac{2 × 2}{6 × 2}$ + $\frac{3 × 3}{4 × 3}-$ $\frac{2 × 4}{3 × 4}$

 = $\frac{5}{12}$ $-$ $\frac{4}{12}$ + $\frac{9}{12}$ $-$ $\frac{8}{12}$

|  |  |
| --- | --- |
| 2 | 2 , 20  |
|  | 1 , 10 |
|  LCM = 2 × 10 = 20 |

 = $\frac{5 - 4 + 9 – 8}{20}$

 = $\frac{5 + 9 - 4 - 8}{20}$

 = $\frac{14 - 12}{20}$

 = $\frac{\begin{array}{c}0.166…\\1\\2\end{array}}{\begin{array}{c}12\\ 6 \\1\end{array}}$

 = $\frac{0.166…}{1}$

 = 0.166…

 = 0.1$\overbar{6}$

|  |  |  |
| --- | --- | --- |
| **S.no.** | **Question** | **Answer** |
| 1 | $\frac{3}{2}$ $-$ $\frac{5}{4}$  | 0.25 |
| 2 | 1 $-$ $\frac{7}{2}$ | $-$2.5 |
| 3 | $-\frac{7}{5}$ + $\frac{2}{5}$ | $$-1$$ |
| 4 | 1 $-$ $\frac{1}{2}$  | 0.5 |
| 5 | $\frac{1}{2}$ $-$ $\frac{3}{5}$ + $\frac{6}{10}$ $–$ 2 | $-1$.5 |

# 20.Subtraction of Fraction in Decimals

Q.1 $\frac{0.06}{4.8}$ $-$ $\frac{1.8}{0.09}$

Ans: = $\frac{0.06}{4.8}$ $-$ $\frac{1.8}{0.09}$

 = $\frac{006 × 10 }{100 × 48}$ $-$ $\frac{18 × 100}{10 × 009}$

 = $\frac{\begin{array}{c}1 1 \\ 6 × 10 \end{array}}{\begin{array}{c}100 × 48\\10 8\end{array}}$ $-$ $\frac{\begin{array}{c} 2 10\\18 × 100\end{array}}{\begin{array}{c}10 × 9 \\1 1\end{array}}$

 = $\frac{1 × 1 }{10 × 8}$ $-$ $\frac{2 × 10}{1 × 1}$

|  |  |
| --- | --- |
|  | 80 , 1 |
|  |  |
|  LCM = 80 × 1 = 80 |

 = $\frac{1}{80}$ $-$ $\frac{20}{1}$

 = $\frac{1 }{80}$ $-$ $\frac{20 × 80}{1 × 80}$

 = $\frac{1}{80}$ $-$ $\frac{1600}{80}$

 = $\frac{1 -1600 }{80}$

 = $\frac{\begin{array}{c}199.875\\- 1599 \end{array}}{\begin{array}{c}80\\10\end{array}}$

|  |  |  |
| --- | --- | --- |
| **S.no.** | **Question** | **Answer** |
| 1 | $\frac{0.3}{3}$ $-$ $\frac{3}{0.3}$  | $$-9.9$$ |
| 2 | 2.5 $-$ $\frac{1.5}{2.5}$ | 1.9 |
| 3 | $\frac{0.6}{0.3}$ $-$ $\frac{0.002}{0.008}$ | 1.75 |
| 4 | $\frac{2.7}{0.09}$ $-$ $\frac{0.027}{0.009}$ | 27 |
| 5 | $\frac{0.7}{4.9}$ $-$ $\frac{0.1}{0.7}$  | 0 |

 = $\frac{- 199.875}{10}$

 = 19.9875

 = 19.9875

# 21.Addition of Variables

|  |
| --- |
| $$x+x+x=3x$$$x×x ×x= x$3 |

Q.1 $2x+3x+4x$

Ans: $2x+3x+4x=$ $9x$

 (or)

 $2x+3x+4x=$ $x(2+3+4)$

 $=$ $x(9)$

 $=$ 9$x$

Q.2 $(2x+3y)+(4x+7y)$

Ans: $ \left(2x+3y\right)+\left(4x+7y\right)= 2x+3y+4x+7y$

 $= 2x+4x+3y+7y$

 $= 6x+10y$

Q.3 $x+x^{2}+9x+3x^{2}+2y+y^{3}+5y^{3}+3y$

 $= x+9x+x^{2}+3x^{2}+2y++3y+y^{3}+5y^{3}$

$=10x+4x^{2}+5y+6y^{3}$

|  |  |  |
| --- | --- | --- |
| **S.no.** | **Question** | **Answer** |
| 1 | $7x+3y+2x+5y$ | $$9x+8y$$ |
| 2 | $x+x^{5}+2x+6x^{5}+3y+2y^{2}+6y$ | $$3x+7x^{5}+9y+2y^{2}$$ |
| 3 | $$(2x+y)+(3x+4y)$$ | $$5x+5y$$ |
| 4 | $$(4x+3y+2)+(5y+2x+5)$$ | $$6x+8y+7$$ |
| 5 | $$(x^{2}+2x+5)+(3x^{2}+5x+3)$$ | $$4x^{2}+7x+8$$ |

# 22.Subtraction of Variables

|  |
| --- |
| $$x-x=0$$$$x^{2}-x^{2}=0$$$$y^{3}-y^{3}=0$$$$xy-xy=0$$ |

Q.1 $5x-3x$

Ans: $5x-3x=2x$

 (or)

 $5x-3x=x\left(5-3\right)$

 $=x(2)$

 $=2x$

Q.2 $\left(4x+3y\right)-(2x+7y)$

Ans: $=4x+3y-2x-7y$

 $=4x-2x+3y-7y$

 $=2x-4y$

Q.3 $\left(5x-2y+3\right)-(2x+3y-2)$

 $=5x-2y+3-2x-3y+2$

 $=5x-2x-2y-3y+3+2$

 $=3x-5y+5$

|  |  |  |
| --- | --- | --- |
| **S.no.** | **Question** | **Answer** |
| 1 | $$5x^{2}-2x^{2}$$ | $$3x^{2}$$ |
| 2 | $3x^{2}-4x-7x^{2}+3x$ | $$-4x^{2}-x$$ |
| 3 | $$\left(2x+3y\right)-(2x-3y)$$ | $$6y$$ |
| 4 | $$\left(x^{2}+2x-5\right)-(3x^{2}-5x-3)$$ | $$-2x^{2}+7x-2$$ |
| 5 | $$\left(4x-3y+2\right)-(5y-2x+5)$$ | $$6x-8y-3$$ |

# 23.Multiplication of Variables

|  |
| --- |
| $$x×x ×x= x^{3}$$$$x×y=xy=yx$$$$2×x=2x$$ |

Q.1 $2x×3x×5x$

 $=2×3×5×x^{3}$

$=30×x^{3}$

 $=30x^{3}$

Q.2 $3x× $5$x^{2}×2y^{2}×3y^{4}$

 $=3×5×2×3×x^{3}×y^{6}$

$=90×x^{3}×y^{6}$

$=3x^{3}y^{6}$

Q.3 $2x(3x+4y+5x^{2}+6)$

 $=6x^{2}+8xy+10x^{3}+12x$

 $=10x^{3}+6x^{2}+12x+8xy$

Q.4 $(3x+2y)(2x-3y+4)$

 $=3x\left(2x-3y+4\right)+2y(2x-3y+4)$

 $=6x^{2}-9xy+12x+4xy-6y^{2}+8y$

 $=6x^{2}-6y^{2}-9xy+4xy+12x+8y$

 $=6x^{2}-6y^{2}-5xy+12x+8y$

Q.5 $(x+2x^{2}+3x^{4})(2x-3y)$

 $=2x\left(x+2x^{2}+3x^{4}\right)-3y\left(x+2x^{2}+3x^{4}\right)$

 $=2x^{2}+4x^{3}+6x^{5}-3xy-6x^{2}y-9x^{4}y$

Q.5 $2xy^{2}z×3x^{2}y^{4}z^{2}×5x^{5}y^{2}z^{2}×4x$

 $=2×3×5×4×x^{9}y^{8}z^{5}$

 $=120×x^{9}y^{8}z^{5}$

$=120x^{9}y^{8}z^{5}$

|  |  |  |
| --- | --- | --- |
| **S.no.** | **Question** | **Answer** |
| 1 | $$3x×5xy×x^{2}y^{3}z^{2}$$ | $$15x^{4}y^{4}z^{2}$$ |
| 2 | $$\left(2x-3y\right)(2x+3y)$$ | $$4x^{2}-9y^{2}$$ |
| 3 | $$\left(x+2x^{2}+4x^{3}\right)(2x+y)$$ | $$2x^{2}+4x^{3}+8x^{4}+xy+2x^{2}y+4x^{3}y$$ |
| 4 | $$\left(2-3x+4y\right)(3xy-4x+5y)$$ | $$12x^{2}+20y^{2}-9x^{2}y+12xy^{2}-8x+10y-25xy$$ |
| 5 | $$2x^{3}y^{2}×5x^{2}y^{5}z×3x^{3}y^{2}z^{7}$$ | $$30x^{8}y^{9}z^{8}$$ |

# 24.Division of Variables

|  |
| --- |
| $x÷x \left(or\right) \frac{x}{ x }$ = 1 |

Q.1 $\frac{2x^{2}y}{xy}$ $ \left(or\right) $ $2x^{2}y÷xy $

Ans: $=\frac{\begin{array}{c} 1\\2x^{2}y\end{array}}{x y}$

 $=2x^{1}$

 $=2x$

Q.2 $\frac{5x^{3}y^{2}z^{5}}{10x^{2}y^{5}z^{3}}$ $ \left(or\right) $ $5x^{3}y^{2}z^{5}÷10x^{2}y^{5}z^{3}$

Ans:

 $=\frac{\begin{array}{c}1 \\5 x^{\begin{array}{c}1\\3 \end{array}}y^{2} z^{\begin{array}{c}2\\5\end{array}}\end{array}}{\begin{array}{c}10 x^{2} y^{\begin{array}{c}3\\5\end{array}} z^{3}\\2 \end{array}}$

 $=\frac{1x^{1}z^{2}}{2y^{3}}$

 $=\frac{xz^{2}}{2y^{3}}$

Q.3 $\frac{2x+4x^{3}+6xy}{8x^{3}+2x}$

Ans:

 $=\frac{2x(1+2x^{2}+3y)}{2x(4x^{2}+1)}$

 $=\frac{1+2x^{2}+3y}{4x^{2}+1}$

|  |  |  |
| --- | --- | --- |
| **S.no.** | **Question** | **Answer** |
| 1 | $$\frac{8x^{2}y^{2}z^{5}}{2xyz^{2}}$$ | $$4xyz^{3}$$ |
| 2 | $$\frac{20x^{2}y}{5xy}$$ | $$4x$$ |
| 3 | $$\frac{3x^{2}y^{3}z^{5}}{6xy^{2}z}$$ | $$\frac{ xyz^{4}}{2}$$ |
| 4 | $$\frac{2x^{2}y^{2}+4xy}{8xy}$$ | $$\frac{ xy+2}{4}$$ |
| 5 | $$\frac{6x^{3}y+3y^{2}}{3xy}$$ | $$\frac{ 2x^{3}+y}{x}$$ |

# 25.Multiplication of Fraction in Variables

Q.1 $\frac{2x}{3y}×\frac{4x^{3}y}{2x^{2}y^{2}}×6xy$

 $=\frac{\begin{array}{c}1 2 \\2 ×4 ×6 × x^{\begin{array}{c}3\\5\end{array}} y^{2} \end{array}}{\begin{array}{c}3 ×2 × x^{2} y^{\begin{array}{c}1\\3\end{array}}\\1 1 \end{array}}$

 $=\frac{1 × 4 × 2 × x^{3}}{1 × 1 × y^{1}}$

 $=\frac{8 × x^{3}}{1 × y}$

 $=\frac{8x^{3}}{y}$

|  |  |  |
| --- | --- | --- |
| **S.No.** | **Question** | **Answer** |
| 1 | $$\frac{8x^{3}y^{2}}{2xy}×\frac{3x^{2}y^{3}}{16x^{2}y}×\frac{4xy^{3}}{3y^{2}}$$ | $$x^{3}y^{4}$$ |
| 2 | $$\frac{2xy}{7xy^{2}}×\frac{49xy^{3}}{3x^{2}yz}×2xyz^{2}$$ | $$\frac{ 28y^{2}z}{3}$$ |
| 3 | $$\frac{6x}{3y}×\frac{4x^{2}y}{2z^{2}}×\frac{9xy}{y^{2}z}×3xy^{2}z^{3}$$ | $$108x^{5}y$$ |
| 4 | $$\frac{x}{y}×\frac{y}{z}×\frac{z}{x}×\frac{x^{3}}{x^{5}}×\frac{y^{3}}{z^{3}}×\frac{z^{2}}{x^{3}}×xyz$$ | $$\frac{ y^{4}}{x^{4}}$$ |
| 5 | $$\frac{2xyz}{3x^{2}y^{3}z}×\frac{5x^{2}}{2x^{2}yz}×3x^{5}y^{2}z$$ | $$\frac{ 5x^{4}}{y}$$ |

# 26.Division of Fraction in Variables

Q.1 $\frac{2xy^{2}z}{3x^{2}yz^{2}}÷\frac{8xy^{2}z^{3}}{9xyz} \left(or\right) \frac{\left(\frac{2xy^{2}z}{3x^{2}yz^{2}}\right)}{ \left(\frac{8xy^{2}z^{3}}{9xyz}\right) }$

Ans: $\frac{2xy^{2}z}{3x^{2}yz^{2}}÷\frac{8xy^{2}z^{3}}{9xyz}$

 $=\frac{2xy^{2}z}{3x^{2}yz^{2}}×\frac{9xyz}{8xy^{2}z^{3}}$

 $=\frac{\begin{array}{c}1 3 \\2 × 9 x^{2} y^{3} z^{2}\end{array}}{\begin{array}{c}3 × 8 x^{\begin{array}{c}1\\3\end{array}} y^{3} z^{\begin{array}{c}3\\5\end{array}}\\ 1 4 \end{array}}$

 $=\frac{1 × 3 }{1 × 4 × x^{1}z^{3}}$

|  |  |  |
| --- | --- | --- |
| **S.no.** | **Question** | **Answer** |
| 1 | $$\frac{49x^{3}y^{2}}{5x^{2}y}÷\frac{7x^{2}y}{25xy}$$ | $$35y$$ |
| 2 | $$\frac{2xy}{12xz}÷\frac{6xy^{2}z}{4xyz}$$ | $$\frac{1}{9z}$$ |
| 3 | $$\frac{x}{y}÷\frac{y}{x}$$ | $$\frac{ x^{2}}{y^{2}}$$ |
| 4 | $$\frac{\left(\frac{2x}{3y}\right)}{\left(\frac{4x^{2}}{9y}\right)}$$ | $$\frac{3}{2x}$$ |
| 5 | $$\frac{5x}{\left(\frac{15x^{2}y^{2}}{2x}\right)}$$ | $$\frac{2}{3y^{2}}$$ |

 $=\frac{3 }{4 × xz^{3}}$

 $=\frac{3 }{4xz^{3}}$

# 27.LCM of Variables

 Q.1 What is the LCM of $2x , 8xy , 10x^{2}y$?

Ans:

|  |  |  |  |
| --- | --- | --- | --- |
| $$2$$ | $2x , 8xy , 10x^{2}y$  |  |  |
| $$x$$ | $1x , 4xy , 5x^{2}y$  |  |  |
| $$y$$ | $1 , 4y , 5xy$  |  |  |
|  | $1 , 4 , 5x$  |  |  |
| LCM $=2×x×y×4×5x$  $=40x^{2}y$  |

Q.1 What is the LCM of $6xy^{3} , 3x^{2}y , 12xy$?

Ans:

|  |  |  |  |
| --- | --- | --- | --- |
| 3 | $6xy^{3} , 3x^{2}y , 12xy$ |  |  |
| 2 | $2xy^{3} , 1x^{2}y , 4xy$ |  |  |
| $$x$$ | $1xy^{3} , x^{2}y , 2xy$ |  |  |
| $$y$$ | $y^{3} , xy , 2y$ |  |  |
|  |  $y^{2} , x , 2$ |  |  |
| LCM $=3×2×x×y×y^{2}×x×2$  $=12x^{2}x^{3}$  |

|  |  |  |
| --- | --- | --- |
| **S.no.** | **Question** | **Answer** |
| 1 | $$4x^{2} , 2y^{2} , 10xy$$ | $$20x^{2}y^{2}$$ |
| 2 | $$5xy , 2x^{2}y , x^{3}y^{3}$$ | $$10x^{3}y^{3}$$ |
| 3 | $$xy , x^{2}y^{2} , x^{3}y^{3}$$ | $$x^{3}y^{3}$$ |
| 4 | $$x^{2} ,y^{3} , xy$$ | $$x^{2}y^{3}$$ |
| 5 | $$xy , yz , zx$$ | $$xyz$$ |

# 28.Addition of Fraction in Variables

Q.1 $\frac{x}{y}+\frac{y}{x}+\frac{2}{xy}$

Ans:

|  |  |  |  |
| --- | --- | --- | --- |
| $$x$$ | $y , x , xy$  |  |  |
| $$y$$ | $y , 1 , y$  |  |  |
|  | $1 , 1 , 1$  |  |  |
| LCM $=x×y$  $=xy$  |

 $= \frac{x}{y}+\frac{y}{x}+\frac{2}{xy}$

 $= \frac{x × x }{y × x}+\frac{y × y}{x × y}+\frac{2}{xy}$

 $= \frac{x^{2}}{xy}+\frac{y^{2}}{xy}+\frac{2}{xy}$

 $= \frac{x^{2} + y^{2} + 2}{xy}$

Q.1 $\frac{y}{2x}+\frac{x}{4x^{2}y}+\frac{1}{8xy^{2}}$

Ans:

|  |  |  |  |
| --- | --- | --- | --- |
| 2 | $2x , 4x^{2}y , 8xy^{2}$ |  |  |
| 2 | $1x , 2x^{2}y , 4xy^{2}$ |  |  |
| $$x$$ | $x , 1x^{2}y , 2xy^{2}$ |  |  |
| $$y$$ | $1 , xy , 2y^{2}$ |  |  |
|  | $1 , x , 2y$ |  |  |
| LCM $=2×2×x×y×x×2y$  $=8x^{2}y^{2}$  |

 $=\frac{y × 4xy^{2}}{2x × 4xy^{2}}+\frac{x ×2y }{4x^{2}y × 2y}+\frac{1 × x}{8xy^{2} × x}$

 $=\frac{4xy^{3}}{8x^{2}y^{2} }+\frac{2xy}{8x^{2}y^{2} }+\frac{x}{8x^{2}y^{2} }$

 $=\frac{4xy^{3} + 2xy + x}{8x^{2}y^{2}}$

 $=\frac{x(4y^{3} + 2y + 1)}{8x^{\begin{array}{c}1\\2\end{array}}y^{2}}$

 $=\frac{4y^{3} + 2y + 1}{8xy^{2}}$

|  |  |  |
| --- | --- | --- |
| **S.no.** | **Question** | **Answer** |
| 1 | $$\frac{1}{x}+\frac{1}{y}+\frac{1}{xy}$$ | $$\frac{y+x + 1}{xy}$$ |
| 2 | $$\frac{x}{y}+\frac{y}{x}$$ | $$\frac{x^{2} + y^{2}}{xy}$$ |
| 3 | $$\frac{x}{2y}+\frac{y}{3xy}+\frac{1}{6xy}$$ | $$\frac{3x^{2} + 2y + 1}{6xy}$$ |
| 4 | $$\frac{x}{2y^{2}}+\frac{y}{4x^{2}}+\frac{1}{x^{2}y^{2}}$$ | $$\frac{2x^{3}+y^{3}+4}{4x^{2}y^{2}}$$ |
| 5 | $$x+\frac{x}{y}$$ | $$\frac{xy+x}{y}$$ |

# 29.Subtraction of Fraction in Variables

Q.1 $\frac{x}{y^{2}}-\frac{y}{x^{2}}$

Ans: $\frac{x}{y^{2}}-\frac{y}{x^{2}}$

 $=\frac{x × x^{2}}{y^{2} × x^{2}}-\frac{y × y^{2}}{x^{2}× y^{2}}$

 $=\frac{x^{3}}{x^{2}y^{2}}-\frac{y^{3}}{x^{2}y^{2}}$

 $=\frac{ x^{3}- y^{3}}{ x^{2}y^{2}}$

|  |  |  |  |
| --- | --- | --- | --- |
| $$3$$ | $3y , 6xy^{2} , y^{3}$  |  |  |
| $$y$$ | $1y , 2xy^{2} , y^{3}$  |  |  |
| $$y$$ | $$1 , 2xy , y^{2}$$ |  |  |
|  | $1 , 2x , y$  |  |  |
|  |  |  |  |
| LCM $=3×y×y×2x×y$  $=6xy^{3}$  |

Q.2 $\frac{2x}{3y}-\frac{x}{6xy^{2}}+\frac{3}{y^{3}}-x$

Ans:

|  |  |  |  |
| --- | --- | --- | --- |
|  | $y^{2}$ , $x^{2}$  |  |  |
|  |  |  |  |
|  LCM $= y^{2}×$$x^{2}$ $=x^{2}y^{2}$ |

 $\frac{2x}{3y}-\frac{x}{6xy^{2}}+\frac{3}{y^{3}}-x$

 $=\frac{2x × 2x y^{2}}{3y × y^{2}}-\frac{x ×y}{6xy^{2} × y }+\frac{3 × 6x}{y^{3} × 6x}-\frac{x × 6xy^{3}}{6xy^{3}}$

 $=\frac{4x^{2}y^{2}}{6xy^{3}}-\frac{xy}{6xy^{3}}+\frac{18x}{6xy^{3}}-\frac{6x^{2}y^{3}}{6xy^{3}}$

 $=\frac{ 4x^{2}y^{2}-xy+18x-6x^{2}y^{3 }}{ 6xy^{3} }$

 $=\frac{ x\left(4xy^{2}-y+18-6xy^{3 }\right)}{ 6xy^{3} }$

 $=\frac{4xy^{2}-y+18-6xy^{3 }}{6y^{3} }$

|  |  |  |
| --- | --- | --- |
|  **S.No.** | **Question** | **Answer** |
| 1 | $$x-\frac{1}{x}$$ | $$\frac{x^{2}-1}{x}$$ |
| 2 | $$\frac{x}{xy}-\frac{y}{x}$$ | $$\frac{x- y^{2}}{xy}$$ |
| 3 | $$\frac{1}{x}-\frac{1}{y}+\frac{1}{xy}$$ | $$\frac{y-x + 1}{xy}$$ |
| 4 | $$\frac{x}{2y^{2}}+\frac{y}{4x^{2}}-\frac{1}{x^{2}y^{2}}$$ | $$\frac{2x^{3}+y^{3}-4}{4x^{2}y^{2}}$$ |
| 5 | $$2-\frac{1}{x}$$ | $$\frac{2x-1}{x}$$ |

# 30.Addition of Irrational numbers

|  |
| --- |
| * $\sqrt{a}=\sqrt[2]{a}$
* $\sqrt{a}+\sqrt{a}=2\sqrt{a}=2×\sqrt{a}$
* $\sqrt[n]{a}=a^{\frac{1}{n}}$
* $\sqrt[3]{a}\ne \sqrt[2]{a} \left(or\right) \sqrt[3]{a}\ne \sqrt{a}$
* $\sqrt[3]{a}\ne 3\sqrt{a} $
* $3\sqrt{a}=3×\sqrt{a}=\sqrt{a}+\sqrt{a}+\sqrt{a}$
* $\sqrt[3]{a}+\sqrt[3]{a}+2\sqrt[3]{a}=4\sqrt[3]{a}$
 |

Q.1 $\sqrt{2}+2\sqrt{2}+7\sqrt{2}$

Ans: $\sqrt{2}+2\sqrt{2}+7\sqrt{2}=10\sqrt{2}$

 (*or*)

 $\sqrt{2}+2\sqrt{2}+7\sqrt{2}$

 $=\sqrt{2}\left(1+2+7\right)$

 $=\sqrt{2}\left(10\right)$

 $=10\sqrt{2}$

Q.2 $2+5\sqrt{2}+3\sqrt{2}+4+3\sqrt{3}+4\sqrt{3}$

Ans: $2+5\sqrt{2}+3\sqrt{2}+4+3\sqrt{3}+4\sqrt{3}$

 $=2+4+5\sqrt{2}+3\sqrt{2}+3\sqrt{3}+4\sqrt{3}$

 $=6+8\sqrt{2}+7\sqrt{3}$

|  |  |
| --- | --- |
| 3 | 9 |
|  | 3 |

|  |  |
| --- | --- |
| 2 | 6 |
|  | 3 |

Q.3 $\sqrt[3]{8}+\sqrt[3]{4}+\sqrt{9}+\sqrt{6}+5\sqrt{6}+5\sqrt[3]{4}$

Ans: $\sqrt[3]{8}+\sqrt[3]{4}+\sqrt{9}+\sqrt{6}+5\sqrt{6}+5\sqrt[3]{4}$

 $=\sqrt[3]{2×2×2}+\sqrt[3]{2×2}+\sqrt{3×3}+\sqrt{2×3}+5\sqrt{2×3}+5\sqrt[3]{2×2}$

|  |  |
| --- | --- |
| 2 | 8 |
| 2 | 4 |
|  | 2 |

 $=2+\sqrt[3]{4}+3+\sqrt{6}+5\sqrt{6}+5\sqrt[3]{4}$

|  |  |
| --- | --- |
| 2 | 4 |
|  | 2 |

 $=2+3+\sqrt[3]{4}+5\sqrt[3]{4}++\sqrt{6}+5\sqrt{6}$

 $=5+6\sqrt[3]{4}+6\sqrt{6}$

|  |  |  |
| --- | --- | --- |
| S.no. | Question | Answer |
| 1 | $$7\sqrt{3}+3\sqrt{7}+5\sqrt{49}$$ | $$7\sqrt{3}+3\sqrt{7}+35$$ |
| 2 | $$\sqrt{2}+\sqrt[3]{2}+\sqrt[3]{64}+\sqrt[4]{32}$$ | $$\sqrt{2}+\sqrt[3]{2}+4+2\sqrt[4]{2}$$ |
| 3 | $$\sqrt[3]{5}+\sqrt[3]{125}+\sqrt[4]{625}+\sqrt{5}$$ | $$\sqrt[3]{5}+10+\sqrt{5}$$ |
| 4 | $$\sqrt{144}+\sqrt[3]{216}+\sqrt{1}$$ | $$19$$ |
| 5 | $$\sqrt[3]{5}+\sqrt{5}+2\sqrt{5}+2\sqrt[3]{5}$$ | $3\sqrt[3]{5}+$3$\sqrt{5}$ |

# 31.Subtraction of Irrational numbers

|  |
| --- |
| * $\sqrt{a}-\sqrt{a}=0$
* $\sqrt[3]{a}-\sqrt[3]{a}=0$
 |

Q.1 $8\sqrt{2}-3\sqrt{2}$

Ans: $8\sqrt{2}-3\sqrt{2}=5\sqrt{2}$

 (*or*)

 $8\sqrt{2}-3\sqrt{2}$

 $=\sqrt{2}\left(8-3\right)$

 $=\sqrt{2}\left(5\right)$

 $=5\sqrt{2}$

Q.2 $7\sqrt[3]{5}-8\sqrt[3]{5}$

Ans: $7\sqrt[3]{5}-8\sqrt[3]{5}=-1\sqrt[3]{5}=\sqrt[3]{5}$

 (or)

 $7\sqrt[3]{5}-8\sqrt[3]{5}$

 $=\sqrt[3]{5}\left(7-8\right)$

 $=\sqrt[3]{5}\left(-1\right)$

 $=-1\sqrt[3]{5}$

 $=-\sqrt[3]{5}$

|  |  |
| --- | --- |
| 2 | 8 |
| 2 | 4 |
|  | 2 |

Q.3 $\sqrt{8}-\sqrt[3]{8}+\sqrt[3]{27}-\sqrt[5]{244}$

Ans: $\sqrt{8}-\sqrt[3]{8}+\sqrt[3]{27}-\sqrt[5]{244}$

 $=\sqrt{2×2×2}-\sqrt[3]{2×2×2}+\sqrt[3]{3×3×3}-\sqrt[5]{2×2×61}$

|  |  |
| --- | --- |
| 2 | 244 |
| 2 | 122 |
|  | 61 |

 $=2\sqrt{2}-2+3-\sqrt[5]{244}$

|  |  |
| --- | --- |
| 3 | 27 |
| 3 | 9 |
|  | 3 |

 $=2\sqrt{2}+1-\sqrt[5]{244}$

|  |  |  |
| --- | --- | --- |
| S.no. | Question | Answer |
| 1 | $$7\sqrt{3}-3\sqrt{7}+5\sqrt{49}$$ | $$7\sqrt{3}-3\sqrt{7}+35$$ |
| 2 | $$\sqrt{2}-\sqrt[3]{2}+\sqrt[3]{64}-\sqrt[4]{32}$$ | $$\sqrt{2}-\sqrt[3]{2}+4-2\sqrt[4]{2}$$ |
| 3 | $$\sqrt[3]{5}-\sqrt[3]{125}+\sqrt[4]{625}-\sqrt{5}$$ | $$\sqrt[3]{5}-\sqrt{5}$$ |
| 4 | $$\sqrt{144}-\sqrt[3]{216}+\sqrt{1}$$ | $$7$$ |
| 5 | $$\sqrt[3]{5}-\sqrt{5}+2\sqrt{5}-2\sqrt[3]{5}$$ | $$-\sqrt[3]{5}+\sqrt{5}$$ |

# 32.Multiplication of Irrational numbers

|  |
| --- |
| * $\sqrt{a}×\sqrt{a}=\sqrt{a×a}=a$
* $\sqrt{a}×\sqrt{b}=\sqrt{a×b}=\sqrt{ab}$
* $\sqrt{a^{2}}=\left(\sqrt{a}\right)^{2}=a$
 |

Q.1 $\sqrt{2}×\sqrt{2}$

Ans: $\sqrt{2}×\sqrt{2}$

 $=\sqrt{2×2}$

 $=2$

 (*or*)

 $\sqrt{2}×\sqrt{2}$

 $=\sqrt{2}×\sqrt{2}$

 $=\left(\sqrt{2}\right)^{2}$

 $=2$

Q.2 $\sqrt[3]{2}×\sqrt[3]{2}×\sqrt[3]{2}$

Ans: $\sqrt[3]{2}×\sqrt[3]{2}×\sqrt[3]{2}$

$=\sqrt[3]{2×2×2}$

 $=2$

 (*or*)

 $\sqrt[3]{2}×\sqrt[3]{2}×\sqrt[3]{2}$

 $=\left(\sqrt[3]{2}\right)^{3}$

 $=2$

Q.3 $\left(2+3\sqrt{5}\right)\left(2-3\sqrt{2}\right) $

Ans: $\left(2+3\sqrt{5}\right)\left(2-3\sqrt{2}\right)$

 $=2\left(2-3\sqrt{2}\right)+3\sqrt{5}\left(2-3\sqrt{2}\right)$

 $=4-6\sqrt{2}+6\sqrt{5}-9\sqrt{5×2}$

 $=4-6\sqrt{2}+6\sqrt{5}-9\sqrt{10}$

|  |  |  |
| --- | --- | --- |
| S.no. | Question | Answer |
| 1 | $$\sqrt{5}×\sqrt{5}$$ | $$5$$ |
| 2 | $$2\sqrt{3}×3\sqrt{2}×5\sqrt{2}$$ | $$60\sqrt{3}$$ |
| 3 | $$\sqrt[3]{2}×\sqrt[3]{8}×\sqrt{8}$$ | $4\sqrt[3]{2}×\sqrt{2} \left(or\right) 4\sqrt[6]{2^{5}}$  |
| 4 | $\left(2+2\sqrt{5}\right)\left(2\sqrt{2}-3\sqrt{5}\right) $  | $$4\sqrt{2}-6\sqrt{5}+4\sqrt{10}-30$$ |
| 5 | $\left(3\sqrt{2}-2\sqrt{3}\right)\left(3\sqrt{2}+2\sqrt{3}\right) $  | $$6$$ |

# 33.Division of Irrational numbers

|  |
| --- |
| * $\frac{\sqrt{a}}{\sqrt{a}}=1 (or)$ $\sqrt{a}÷\sqrt{a}=1$
 |

Q.1 $\frac{2\sqrt{3}}{\sqrt{6}}$

|  |  |
| --- | --- |
| 2 | 6 |
|  | 3 |

Ans: $\frac{2\sqrt{3}}{\sqrt{6}}$

 $=\frac{2\sqrt{3}}{\sqrt{2×3}}$

 $=\frac{2\sqrt{3}}{\sqrt{2 }× \sqrt{3}}$

 $=\frac{2}{\sqrt{2 }}$

 Rationalizing the denominator

|  |
| --- |
| * $\frac{1}{\sqrt{a}}$
* Root should not be there in the place of denominator
* Rationalize the denominator
 |

 $=\frac{2×\sqrt{2 }}{\sqrt{2 }×\sqrt{2 }}$

 $=\frac{\begin{array}{c}1 \\2\sqrt{2 }\end{array}}{\begin{array}{c}2\\1\end{array}}$

 $=\sqrt{2 }$

Q.2 $\frac{\sqrt{8}}{\sqrt{2}}$

Ans: $\frac{\sqrt{8}}{\sqrt{2}}$

 $=\frac{\sqrt{2×2×2}}{\sqrt{2}}$

 $=\frac{\begin{array}{c} 1\\2\sqrt{2}\end{array}}{\begin{array}{c}\sqrt{2}\\1\end{array}}$

 $=\frac{2×1}{1}$

 $=\frac{2}{1}$

 $=2$

Q.3 $\frac{15\sqrt{2}}{3\sqrt{8}}$

|  |  |
| --- | --- |
| 2 | 8 |
| 2 | 4 |
|  | 2 |

Ans: $\frac{15\sqrt{2}}{3\sqrt{8}}$

 $=\frac{15\sqrt{2}}{3\sqrt{2×2×2}}$

 $=\frac{\begin{array}{c} 5 1\\15 \sqrt{2}\end{array}}{\begin{array}{c}3×2\sqrt{2}\\1 1\end{array}}$

 $=\frac{5×1}{1×2}$

 $=\frac{\begin{array}{c}2.5\\5\end{array}}{\begin{array}{c}2\\1\end{array}}$

 $=\frac{2.5}{1}$

 $=2.5$

Q.4 $\frac{\sqrt[4]{81}}{\sqrt{27}}$

Ans: $\frac{\sqrt[4]{81}}{\sqrt{27}}$

|  |  |
| --- | --- |
| 3 | 27 |
| 3 | 9 |
|  | 3 |

|  |  |
| --- | --- |
| 3 | 81 |
| 3 | 27 |
| 3 | 9 |
|  | 3 |

 $=\frac{\sqrt[4]{3×3×3×3}}{\sqrt{3×3×3}}$

 $=\frac{\begin{array}{c}1\\3\end{array}}{\begin{array}{c}3\sqrt{3}\\1\end{array}}$

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

 Rationalizing the denominator

 $=\frac{1×\sqrt{3 }}{\sqrt{3 }×\sqrt{3 }}$

 $=\frac{\sqrt{3 }}{\sqrt{3×3}}$

 $=\frac{\sqrt{3 }}{3}$

|  |  |  |
| --- | --- | --- |
| S.no. | Question | Answer |
| 1 | $$\frac{\sqrt{12 }}{2\sqrt{27}} \left(or\right) \sqrt{12 }÷2\sqrt{27}$$ | $$0.\overbar{3}$$ |
| 2 | $$\frac{25\sqrt{125 }}{\sqrt{45}}$$ |  41.$\overbar{6}$ |
| 3 | $$\frac{\sqrt[3]{48}}{\sqrt[3]{24}}$$ | $$\sqrt[3]{2}$$ |
| 4 | $$\frac{4}{3\sqrt{2}}$$ | $$\frac{2\sqrt{2 }}{3} $$ |
| 5 | $$\frac{\sqrt[5]{729}}{\sqrt[5]{96}}$$ | $$1.5$$ |

# 34.Multiplication of Fraction in Irrational numbers

Q.1 $\frac{2\sqrt{2}}{3\sqrt{3}}×\frac{5\sqrt{6}}{2\sqrt{8}}×\sqrt{7}$

|  |  |
| --- | --- |
| 2 | 8 |
| 2 | 4 |
|  | 2 |

|  |  |
| --- | --- |
| 2 | 6 |
|  | 3 |

Ans: $\frac{2\sqrt{2}}{3\sqrt{3}}×\frac{5\sqrt{6}}{2\sqrt{8}}×\sqrt{7}$

 $=\frac{2\sqrt{2} × 5\sqrt{6 }× \sqrt{7}}{3\sqrt{3} × 2\sqrt{8}}$

 $=\frac{2\sqrt{2} × 5\sqrt{2×3 }× \sqrt{7}}{3\sqrt{3} × 2\sqrt{2×2×2}}$

 $=\frac{\begin{array}{c} 1 1 \\2\sqrt{2} × 5 \sqrt{2}×\sqrt{3 } × \sqrt{7}\end{array}}{\begin{array}{c}3\sqrt{3} × 2×2\sqrt{2}\\ 1 1 \end{array}}$

 $=\frac{1 × 5\sqrt{2} × 1 × \sqrt{7}}{3 × 2 × 1}$

 $=\frac{5\sqrt{2×7}}{3×2}$

|  |  |  |
| --- | --- | --- |
| S.no. | Question | Answer |
| 1 | $$\frac{\sqrt{2 }}{\sqrt{7}}×\frac{3\sqrt{5 }}{4\sqrt{2}}×\frac{4\sqrt{7 }}{3\sqrt{3}}×\frac{\sqrt{3 }}{\sqrt{5}}$$ | 1 |
| 2 | $$\frac{5\sqrt{6 }}{\sqrt{8}}×\frac{\sqrt[3]{64}}{\sqrt{27}}$$ | $$3.\overbar{3}$$ |
| 3 | $$\frac{\sqrt[3]{125}}{\sqrt[4]{625}}×\sqrt{144}$$ | $$12$$ |
| 4 | $$\frac{\sqrt{6 }}{\sqrt{4}}×\frac{\sqrt{3 }}{\sqrt{27}}×\frac{\sqrt{8 }}{\sqrt[3]{8}}×\frac{\sqrt[4]{32}}{3\sqrt{3}}$$ | $$\frac{2\sqrt[4]{2}}{9}$$ |
| 5 | $$\frac{\sqrt{7 }}{\sqrt{8}}×\frac{\sqrt{3 }}{\sqrt{14}}×\frac{\sqrt{2 }}{\sqrt{3 }}×\frac{2\sqrt{2 }}{3}×3\sqrt{16 }$$ | $$4$$ |

 $=\frac{5\sqrt{14}}{6}$

# 35.Division of Fraction in Irrational numbers

Q.1 $\frac{9\sqrt{5}}{\sqrt{27}}÷\frac{\sqrt{125}}{5\sqrt{12}} \left(or\right) \frac{\left(\frac{9\sqrt{5}}{\sqrt{27}}\right)}{\left(\frac{\sqrt{125}}{5\sqrt{12}}\right)}$

Ans: $\frac{9\sqrt{5}}{\sqrt{27}}÷\frac{\sqrt{125}}{5\sqrt{12}} \left(or\right) \frac{\left(\frac{9\sqrt{5}}{\sqrt{27}}\right)}{\left(\frac{\sqrt{125}}{5\sqrt{12}}\right)}$

|  |  |
| --- | --- |
| 2 | 12 |
| 2 | 6 |
|  | 3 |

|  |  |
| --- | --- |
| 3 | 27 |
| 3 | 9 |
|  | 3 |

 $=\frac{9\sqrt{5}}{\sqrt{27}}×\frac{5\sqrt{12}}{\sqrt{125}} $

 $=\frac{9\sqrt{5} × 5\sqrt{12}}{\sqrt{27}×\sqrt{125}}$

|  |  |
| --- | --- |
| 5 | 125 |
| 5 | 25 |
|  | 5 |

 $=\frac{9\sqrt{5} × 5\sqrt{2×2×3}}{\sqrt{3×3×3} × \sqrt{5×5×5}}$

 $=\frac{\begin{array}{c} 3 1 1 1 \\9 \sqrt{5} × 5×2 \sqrt{3}\end{array}}{\begin{array}{c}3 \sqrt{3}×5 \sqrt{5}\\ 1 1 1 1 \end{array}}$

 $=\frac{3×1×2×1}{1×1×1×1}$

 $=\frac{6}{1}$

 $=6$

Q.2 $6\sqrt{2}÷\frac{3\sqrt{25}}{5\sqrt{8}} \left(or\right) \frac{6\sqrt{2}}{\left(\frac{\sqrt{125}}{5\sqrt{12}}\right)}$

|  |  |
| --- | --- |
| 2 | 12 |
| 2 | 6 |
|  | 3 |

Ans: $6\sqrt{2}÷\frac{3\sqrt{25}}{5\sqrt{8}} \left(or\right) \frac{6\sqrt{2}}{\left(\frac{\sqrt{125}}{5\sqrt{12}}\right)}$

 $=6\sqrt{2}×\frac{5\sqrt{8}}{3\sqrt{25}} $

|  |  |
| --- | --- |
| 3 | 27 |
| 3 | 9 |
|  | 3 |

|  |  |
| --- | --- |
| 5 | 125 |
| 5 | 25 |
|  | 5 |

 $=\frac{6\sqrt{2} × 5\sqrt{8}}{3\sqrt{25}}$

 $=\frac{6\sqrt{2} × 5\sqrt{2×2×2}}{3\sqrt{5×5}}$

 $=\frac{\begin{array}{c}2 1 \\6\sqrt{2} × 5×2\sqrt{2}\end{array}}{\begin{array}{c}3×5\\1 1 \end{array}}$

 $=\frac{2×2\sqrt{2×2} }{1×1}$

 $=\frac{2×2×2}{1}$

 $=\frac{8}{1}$

 $=8$

Q.3 $\frac{\sqrt[3]{40}}{2}÷\sqrt[3]{5} \left(or\right) \frac{\left(\frac{\sqrt[3]{40}}{2}\right)}{\sqrt[3]{5}}$

Ans: $\frac{\sqrt[3]{40}}{2}÷\sqrt[3]{5} \left(or\right) \frac{\left(\frac{\sqrt[3]{40}}{2}\right)}{\sqrt[3]{5}}$

|  |  |
| --- | --- |
| 2 | 40 |
| 2 | 20 |
| 2 | 10 |
|  |  5 |

 $=\frac{\sqrt[3]{40}}{2}×\frac{1}{\sqrt[3]{5}} $

 $=\frac{\sqrt[3]{40} × 1}{2×\sqrt[3]{5}}$

 $=\frac{\sqrt[3]{2×2×2×5}}{2× \sqrt[3]{5}}$

 $=\frac{\begin{array}{c}1 1\\2×\sqrt[3]{5} \end{array}}{\begin{array}{c}2× \sqrt[3]{5}\\ 1 1\end{array}}$

 $=\frac{1×1}{1×1}$

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

|  |  |  |
| --- | --- | --- |
| **S.no.** | **Home Work** | **Answers** |
| 1 | $$\frac{\sqrt{2 }}{\sqrt{7}}×\frac{3\sqrt{5 }}{4\sqrt{2}}$$ | $$0.1\overbar{6}$$ |
| 2 | $$\frac{\sqrt[3]{625}}{\left(\frac{\sqrt[4]{32}}{\sqrt{25}}\right)}$$ | $$\frac{25 \sqrt[3]{5}}{2 \sqrt[4]{2}}$$ |
| 3 | $$\frac{\left(\frac{4\sqrt{3 }}{\sqrt{6}}\right)}{\sqrt{2 }}$$ | $$2$$ |
| 4 | $$\frac{2}{4\sqrt[3]{3}}÷\frac{1}{\sqrt[3]{24}}$$ | $$1$$ |
| 5 | $$\frac{2\sqrt{27}}{\sqrt{8}}÷\sqrt{6 }$$ | $$1.5$$ |

# 36.LCM of Irrational numbers

Q.1 $2\sqrt{2} , 3\sqrt{5} , 8\sqrt{6} , 6\sqrt{10} , \sqrt{12}$

|  |  |
| --- | --- |
| 2 | 6 |
|  | 3 |

|  |  |
| --- | --- |
| 2 | 10 |
|  | 5 |

Ans: $2\sqrt{2} , 3\sqrt{5} , 8\sqrt{6} , 6\sqrt{10} , \sqrt{12}$

 $2\sqrt{2} , 3\sqrt{5} , 8\sqrt{2×3} , 6\sqrt{2×5} , \sqrt{2×2×3}$

 $2\sqrt{2} , 3\sqrt{5} , 8\sqrt{2}\sqrt{3} , 6\sqrt{2}\sqrt{5} , 2\sqrt{3}$

|  |  |  |  |
| --- | --- | --- | --- |
| 2 | $$2\sqrt{2} , 3\sqrt{5} , 8\sqrt{2}\sqrt{3} , 6\sqrt{2}\sqrt{5} , 2\sqrt{3}$$ |  |  |
| 3 | $$1\sqrt{2} , 3\sqrt{5} , 4\sqrt{2}\sqrt{3} , 3\sqrt{2}\sqrt{5} , 1\sqrt{3}$$ |  |  |
| $$\sqrt{2}$$ | $$1 , \sqrt{5} , 4\sqrt{3} , \sqrt{5} , \sqrt{3}$$ |  |  |
| $$\sqrt{3}$$ | $$1 , \sqrt{5} , 4 , \sqrt{5} , 1$$ |  |  |
| $$\sqrt{5}$$ | $$1 , \sqrt{5} , 4 , \sqrt{5} , 1$$ |  |  |
|  | 1 , 1 , 4 , 1 , 1 |  |  |
| LCM = $2×3×\sqrt{2}×\sqrt{3}×\sqrt{5}×4$ = 24$\sqrt{2×3×5}$ = 24$\sqrt{30}$ |
|  |

|  |  |
| --- | --- |
| 2 | 12 |
| 2 | 6 |
|  | 3 |

|  |  |
| --- | --- |
| 3 | 27 |
| 3 | 9 |
|  | 3 |

Q.2 $\sqrt{27} , \sqrt{125} , \sqrt{30} , \sqrt{45}$

Ans: $\sqrt{27} , \sqrt{125} , \sqrt{30} , \sqrt{45}$

 $\sqrt{3×3×3} , \sqrt{5×5×5} , \sqrt{2×3×5} , \sqrt{3×3×5}$

|  |  |
| --- | --- |
| 5 | 125 |
| 5 | 25 |
|  | 5 |
|  |  |
| 2 | 30 |
| 3 | 15 |
|  | 5 |
| 3 | 45 |
| 3 | 15 |
|  | 5 |

 $3\sqrt{3} , 5\sqrt{5} , \sqrt{2}\sqrt{3}\sqrt{5} , 3\sqrt{5}$

|  |  |
| --- | --- |
| 3 | $$3\sqrt{3} , 5\sqrt{5} , \sqrt{2}\sqrt{3}\sqrt{5} , 3\sqrt{5}$$ |
| $$\sqrt{3}$$ | $$1\sqrt{3} , 5\sqrt{5} , \sqrt{2}\sqrt{3}\sqrt{5} , 1\sqrt{5}$$ |
| $$\sqrt{5}$$ | $$1 , 5\sqrt{5} , \sqrt{2}\sqrt{5} , 1\sqrt{5}$$ |
|  | $$1 , 5 , \sqrt{2} , 1$$ |

 LCM = $3×\sqrt{3}×\sqrt{5}×5×\sqrt{2}$

 = 15$\sqrt{3×5×2}$

 = 15$\sqrt{30}$

|  |  |  |
| --- | --- | --- |
| **S.no.** | **Home Work** | **Answers** |
| 1 | $$4\sqrt{2} , 6\sqrt{2} , 2\sqrt{6} $$ | $$12\sqrt{6}$$ |
| 2 | $$\sqrt{27} , \sqrt{81} , \sqrt{25} $$ | $$45\sqrt{3}$$ |
| 3 | $$\sqrt{36} , \sqrt{6} , \sqrt[3]{216} , \sqrt{24} $$ | $$6\sqrt{6}$$ |
| 4 | $$\sqrt{3} , \sqrt{2} , \sqrt{5} , \sqrt{7} $$ | $$\sqrt{210}$$ |
| 5 | $$2\sqrt{5} , 5\sqrt{2} $$ | $$10\sqrt{10}$$ |

# 37.Addition of Fraction in Irrational numbers

Q.1 $\frac{\sqrt{2}}{\sqrt{7}}+\frac{2\sqrt{5}}{\sqrt{7}}+\frac{3\sqrt{2}}{\sqrt{7}}$

Ans: $=\frac{\sqrt{2}}{\sqrt{7}}+\frac{2\sqrt{5}}{\sqrt{7}}+\frac{3\sqrt{2}}{\sqrt{7}}$

 $=\frac{\sqrt{2 }+ 2\sqrt{5} + 3\sqrt{2}}{\sqrt{7}}$

 $=\frac{4\sqrt{2 }+ 2\sqrt{5} }{\sqrt{7}}$

Q.2 $\frac{\sqrt{2}}{\sqrt{27}}+\frac{\sqrt{8}}{\sqrt{12}}+\sqrt{12}$

|  |  |  |  |
| --- | --- | --- | --- |
| $$\sqrt{3}$$ | $$3\sqrt{3} , 2\sqrt{3}$$ |  |  |
|  | 3 , 2 |  |  |
| LCM = $\sqrt{3}×3×2$ = 6$\sqrt{3}$ |

Ans: $=\frac{\sqrt{2}}{\sqrt{27}}+\frac{\sqrt{8}}{\sqrt{12}}+\sqrt{12}$

 $=\frac{\sqrt{2}}{\sqrt{3×3×3}}+\frac{\sqrt{2×2×2}}{\sqrt{2×2×3}}+\sqrt{2×2×3}$

 $=\frac{\sqrt{2}}{3\sqrt{3}}+\frac{2\sqrt{2}}{2\sqrt{3}}+2\sqrt{3}$

 $=\frac{\sqrt{2}×2}{3\sqrt{3}×2}+\frac{2\sqrt{2}×3}{2\sqrt{3}×3}+\frac{2\sqrt{3}×6\sqrt{3}}{\sqrt{27}×6\sqrt{3}}$

 $=\frac{2\sqrt{2}}{6\sqrt{3}}+\frac{6\sqrt{2}}{6\sqrt{3}}+\frac{12\sqrt{3×3}}{6\sqrt{3}}$

 $=\frac{2\sqrt{2}}{6\sqrt{3}}+\frac{6\sqrt{2}}{6\sqrt{3}}+\frac{12×3}{6\sqrt{3}}$

 $=\frac{2\sqrt{2}}{6\sqrt{3}}+\frac{6\sqrt{2}}{6\sqrt{3}}+\frac{36}{6\sqrt{3}}$

$=\frac{2\sqrt{2} + 6\sqrt{2} + 36}{6\sqrt{3}}$

 $=\frac{8\sqrt{2} + 36}{6\sqrt{3}}$

 $=\frac{\begin{array}{c}1 \\2\left(4\sqrt{2} + 18\right)\end{array}}{\begin{array}{c}6\sqrt{3}\\3 \end{array}}$

 $=\frac{4\sqrt{2} + 18}{3\sqrt{3}}$

|  |  |  |
| --- | --- | --- |
| S.no. | Home Work | Answers |
| 1 | $$\frac{2\sqrt{5 }}{\sqrt{3}}+\frac{5\sqrt{2 }}{\sqrt{3}}+\frac{7\sqrt{5 }}{\sqrt{3}}+\frac{3\sqrt{2 }}{\sqrt{3}}$$ | $$\frac{9\sqrt{5 }+8\sqrt{2 }}{\sqrt{3}}$$ |
| 2 | $$\frac{\sqrt{25 }}{\sqrt{3}}+\frac{\sqrt{2 }}{\sqrt{27}}+\frac{2}{\sqrt{81}}$$ | $$\frac{45+3\sqrt{2}+2\sqrt{3 }}{9\sqrt{3}}$$ |
| 3 | $$\frac{\sqrt{50 }}{\sqrt{8}}+\frac{\sqrt{3 }}{\sqrt{16}}+\frac{4\sqrt{8 }}{\sqrt{2}}$$ | $$\frac{42+\sqrt{3 }}{4}$$ |
| 4 | $$\frac{\sqrt{2}}{\sqrt{3}}+\frac{\sqrt{3 }}{\sqrt{5}}+\frac{\sqrt{5 }}{\sqrt{2}}$$ | $$\frac{2\sqrt{5 }+3\sqrt{2 }+5\sqrt{3 }}{\sqrt{30}}$$ |
| 5 | $$\frac{\sqrt{5}}{\sqrt{125}}+\frac{\sqrt{2 }}{\sqrt{50}}+\frac{\sqrt{3 }}{\sqrt{15}}+\sqrt{2}$$ | $$\frac{2\sqrt{5 }+5+5\sqrt{10 }}{5\sqrt{5}}$$ |

# 38.Subtraction of Fraction in Irrational numbers

Q.1 $\frac{3\sqrt{2}}{\sqrt{15}}-\frac{2\sqrt{3}}{\sqrt{5}}$

|  |  |  |  |
| --- | --- | --- | --- |
| $$\sqrt{5}$$ | $$\sqrt{3}\sqrt{5} , \sqrt{5}$$ |  |  |
|  | $$\sqrt{3} , 1$$ |  |  |
| LCM = $\sqrt{5}×\sqrt{3}$ = $\sqrt{5×3}$ =$\sqrt{15}$ |

Ans: $=\frac{3\sqrt{2}}{\sqrt{15}}-\frac{2\sqrt{3}}{\sqrt{5}}$

 $=\frac{3\sqrt{2}}{\sqrt{3×5}}-\frac{2\sqrt{3}}{\sqrt{5}}$

 $=\frac{3\sqrt{2}}{\sqrt{3}\sqrt{5}}-\frac{2\sqrt{3}}{\sqrt{5}}$

 $=\frac{3\sqrt{2}}{\sqrt{3}\sqrt{5}}-\frac{2\sqrt{3}×\sqrt{3}}{\sqrt{5}×\sqrt{3}}$

|  |
| --- |
| $$\sqrt{3}\sqrt{5}=\sqrt{3}×\sqrt{5}$$ |

 $=\frac{3\sqrt{2}}{\sqrt{3}\sqrt{5}}-\frac{2\sqrt{3}×\sqrt{3}}{\sqrt{5}×\sqrt{3}}$

 $=\frac{3\sqrt{2}}{\sqrt{3}\sqrt{5}}-\frac{2\sqrt{3×3}}{\sqrt{3}\sqrt{5}}$

 $=\frac{3\sqrt{2}}{\sqrt{3}\sqrt{5}}-\frac{2×3}{\sqrt{3}\sqrt{5}}$

 $=\frac{3\sqrt{2}}{\sqrt{3}\sqrt{5}}-\frac{6}{\sqrt{3}\sqrt{5}}$

 $=\frac{3\sqrt{2}-6}{\sqrt{3}\sqrt{5}}$

 $=\frac{3\sqrt{2}-6}{\sqrt{15}}$

 *(or)*

|  |  |  |  |
| --- | --- | --- | --- |
|  | $$\sqrt{15} , \sqrt{5}$$$\sqrt{3×5} $ , $ \sqrt{5}$$$\sqrt{3}\sqrt{5} , \sqrt{5}$$ |  |  |
| $$\sqrt{5}$$ | $$\sqrt{3}\sqrt{5} , \sqrt{5}$$ |  |  |
|  | $$\sqrt{3} , 1$$ |  |  |
| LCM $=\sqrt{5}×\sqrt{3}$ $=\sqrt{5×3}$ |
|  $=\sqrt{15}$ |

 $\frac{3\sqrt{2}}{\sqrt{15}}-\frac{2\sqrt{3}}{\sqrt{5}}$

 $=\frac{3\sqrt{2}}{\sqrt{15}}-\frac{2\sqrt{3}×\sqrt{3}}{\sqrt{5}×\sqrt{3}}$

 $=\frac{3\sqrt{2}}{\sqrt{15}}-\frac{2\sqrt{3×3}}{\sqrt{5×3}}$

 $=\frac{3\sqrt{2}}{\sqrt{15}}-\frac{2×3}{\sqrt{15}}$

 $=\frac{3\sqrt{2}}{\sqrt{15}}-\frac{6}{\sqrt{15}}$

 $=\frac{3\sqrt{2}-6}{\sqrt{15}}$

|  |  |
| --- | --- |
| $$\sqrt{2}$$ | $5\sqrt{3} , 2\sqrt{2} , \sqrt{2}\sqrt{3}$  |
| $$\sqrt{3}$$ | $$5\sqrt{3} , 2 , \sqrt{3}$$ |
|  | $$5 , 2 , 1$$ |
| LCM $=\sqrt{2}×\sqrt{3}×5×2$  $=10\sqrt{2×3}$  $=10\sqrt{6}$ |

Q.2 $\frac{3\sqrt{5}}{5\sqrt{3}}-\frac{\sqrt{3}}{2\sqrt{2}}+\frac{3}{\sqrt{6}}-\sqrt{2}$

Ans: $\frac{3\sqrt{5}}{5\sqrt{3}}-\frac{\sqrt{3}}{2\sqrt{2}}+\frac{3}{\sqrt{6}}-\sqrt{2}$

 $=\frac{3\sqrt{5}}{5\sqrt{3}}-\frac{\sqrt{3}}{2\sqrt{2}}+\frac{3}{\sqrt{2×3}}-\sqrt{2}$

 $=\frac{3\sqrt{5}}{5\sqrt{3}}-\frac{\sqrt{3}}{2\sqrt{2}}+\frac{3}{\sqrt{2}\sqrt{3}}-\sqrt{2}$

 $=\frac{3\sqrt{5}×2\sqrt{2}}{5\sqrt{3}×2\sqrt{2}}-\frac{\sqrt{3}×5\sqrt{3}}{2\sqrt{2}×5\sqrt{3}} \frac{3×10}{\sqrt{2}\sqrt{3}×10}-\frac{\sqrt{2}×10\sqrt{6}}{10\sqrt{6}}$

 $=\frac{6\sqrt{5×2}}{10\sqrt{6}}-\frac{5\sqrt{3×3}}{10\sqrt{6}}+\frac{30}{10\sqrt{6}}-\frac{10\sqrt{2×6}}{10\sqrt{6}}$

 $=\frac{6\sqrt{5×2} - 5\sqrt{3×3} + 30 - 10\sqrt{2×2×3}}{10\sqrt{6}}$

 $=\frac{6\sqrt{10} - 5×3 + 30 - 10×2\sqrt{3}}{10\sqrt{6}}$

 $=\frac{6\sqrt{10} - 15 + 30 - 20\sqrt{3}}{10\sqrt{6}}$

 $=\frac{6\sqrt{10} + 15 - 20\sqrt{3}}{10\sqrt{6}}$

 *(or)*

 $\frac{3\sqrt{5}}{5\sqrt{3}}-\frac{\sqrt{3}}{2\sqrt{2}}+\frac{3}{\sqrt{6}}-\sqrt{2}$

 $=\frac{3\sqrt{5}×2\sqrt{2}}{5\sqrt{3}×2\sqrt{2}}-\frac{\sqrt{3}×5\sqrt{3}}{2\sqrt{2}×5\sqrt{3}}+\frac{3×10}{\sqrt{6}×10}-\frac{\sqrt{2}×10\sqrt{6}}{10\sqrt{6}}$

|  |  |  |
| --- | --- | --- |
| $$5\sqrt{3} , 2\sqrt{2} , \sqrt{6}$$$$5\sqrt{3} , 2\sqrt{2} , \sqrt{2×3}$$$$5\sqrt{3} , 2\sqrt{2} , \sqrt{2}\sqrt{3}$$ |  |  |
| $$\sqrt{2}$$ | $5\sqrt{3} , 2\sqrt{2} , \sqrt{2}\sqrt{3}$  |  |  |
| $$\sqrt{3}$$ | $$5\sqrt{3} , 2 , \sqrt{3}$$ |  |  |
|  | $$5 , 2 , 1$$ |  |  |
| LCM $=\sqrt{2}×\sqrt{3}×5×2$  $=10\sqrt{2×3}$  $=10\sqrt{6}$ |

$=\frac{6\sqrt{5×2}}{10\sqrt{6}}-\frac{5\sqrt{3×3}}{10\sqrt{6}}+\frac{30}{10\sqrt{6}}-\frac{10\sqrt{2×6}}{10\sqrt{6}}$

$=\frac{6\sqrt{10} - 5×3 + 30 - 10×2\sqrt{2×2×3}}{10\sqrt{6}}$

 $=\frac{6\sqrt{10} - 15+ 30 - 10×2\sqrt{3}}{10\sqrt{6}}$

 $=\frac{6\sqrt{10} + 15 - 20\sqrt{3}}{10\sqrt{6}}$

|  |  |  |
| --- | --- | --- |
| **S.no.** | **Home Work** | **Answers** |
| 1 | $$\frac{8\sqrt{5 }}{2\sqrt{3}}-\frac{6\sqrt{7 }}{2\sqrt{3}}$$ | $$\frac{4\sqrt{5 }-3\sqrt{7 }}{\sqrt{3}}$$ |
| 2 | $$\frac{\sqrt{2 }}{\sqrt{6}}-\frac{\sqrt{8 }}{2\sqrt{3}}$$ | $$\frac{1-\sqrt{2}}{\sqrt{3}}$$ |
| 3 | $$\frac{\sqrt{12 }}{\sqrt{3}}-\frac{\sqrt{3 }}{\sqrt{12}}+\frac{\sqrt{2 }}{\sqrt{8}}-\frac{1}{\sqrt{2}}$$ | $$\frac{2\sqrt{2}-1}{\sqrt{2}}$$ |
| 4 | $$\frac{\sqrt{5}}{\sqrt{2}}-\frac{\sqrt{2 }}{\sqrt{125}}$$ | $$\frac{23}{5\sqrt{10}}$$ |
| 5 | $$\frac{\sqrt{16}}{\sqrt{18}}-\sqrt{2}$$ | $$\frac{-2 }{3\sqrt{2}}$$ |

# 39.VBODMAS rule

|  |
| --- |
| **VBODMAS*** **V** : Vinculum/Bar “$ ⎺⎺⎺ $”
* **B** : Bracket $\left( \right), \left\{ \right\} , [ ]$
* **O** : Of/Order $\\_( ) , \sqrt{ } ,$ $( )^{2}$
* **D** : Division $÷$
* **M** : Multiplication $×$
* **A** : Addition $+$
* **S** : Subtraction $-$

 |

Q.1 $12+\left[5+2+\left\{6+4-\left(5+24÷\overbar{2+4}\right)+1\right\}\right]-21$

Ans: $12+\left[5+2+\left\{6+4-\left(5+24÷\overbar{2+4}\right)+1\right\}\right]-21$

 $=12+\left[5+2+\left\{6+4-\left(5+24÷6\right)+1\right\}\right]-21$

 $=12+\left[5+2+\left\{6+4-\left(5+ ^{4}24÷6\right)+1\right\}\right]-21$

 $=12+\left[5+2+\left\{6+4-\left(5+4\right)+1\right\}\right]-21$

 $=12+\left[5+2+\left\{6+4-\left(9\right)+1\right\}\right]-21$

 $=12+\left[5+2+\left\{6+4-9+1\right\}\right]-21$

 $=12+\left[5+2+\left\{6+4+1-9\right\}\right]-21$

 $=12+\left[5+2+\left\{11-9\right\}\right]-21$

 $=12+\left[5+2+\left\{2\right\}\right]-21$

 $=12+\left[5+2+2\right]-21$

 $=12+\left[9\right]-21$

 $=12+9-21$

 $=21-21$

$=0$

Q.2 $\left[3+\sqrt{8+(3+5-28÷4)^{5}} \right]+2×50÷25$

Ans: $\left[3+\sqrt{8+(3+5-28÷4)^{5}} \right]+2×50÷25$

 $=\left[3+\sqrt{8+(3+5- ^{7}28÷ 4 )^{5}} \right]+2×50÷25$

 $=\left[3+\sqrt{8+(3+5-7)^{5}} \right]+2×50÷25$

$=\left[3+\sqrt{8+(8-7)^{5}} \right]+2×50÷25$

$=\left[3+\sqrt{8+(1)^{5}} \right]+2×50÷25$

$=\left[3+\sqrt{8+1} \right]+2×50÷25$

$=\left[3+\sqrt{9} \right]+2×50÷25$

$=\left[3+\sqrt{3×3} \right]+2×50÷25$

$=\left[3+3 \right]+2×50÷25$

$=\left[6 \right]+2×50÷25$

$=6+2×50÷25$

$=6+2× ^{2}50÷ 25 $

$=6+2×2$

$=6+4$

$=10$

Q.3 $4+2\left[9÷\overbar{7-4}×2-15 \right]$

Ans: $4+2\left[9÷\overbar{7-4}×2-15 \right]$

$=4+2\left[9÷3×2-15 \right]$

$=4+2\left[ ^{3}9 ÷ 3 ×2-15 \right]$

$=4+2\left[3×2-15 \right]$

$=4+2\left[6-15 \right]$

$=4+2\left[-9 \right]$

$=4-18$

$=-14$

Q.4 $\left[2+\left\{2\left(\frac{3}{2}+1\right)-\frac{5}{2}\right\}+\frac{1}{2}\right]-5$

**Ans:** $\left[2+\left\{2\left(\frac{3}{2}+1\right)-\frac{5}{2}\right\}+\frac{1}{2}\right]-5$

$=\left[2+\left\{2\left(\frac{3}{2}+\frac{1×2}{2}\right)-\frac{5}{2}\right\}+\frac{1}{2}\right]-5$

 $=\left[2+\left\{2\left(\frac{3}{2}+\frac{2}{2}\right)-\frac{5}{2}\right\}+\frac{1}{2}\right]-5$

 $=\left[2+\left\{2\left(\frac{3+2}{2}\right)-\frac{5}{2}\right\}+\frac{1}{2}\right]-5$

 $=\left[2+\left\{2\left(\frac{5}{2}\right)-\frac{5}{2}\right\}+\frac{1}{2}\right]-5$

 $=\left[2+\left\{\frac{10}{2}-\frac{5}{2}\right\}+\frac{1}{2}\right]-5$

 $=\left[2+\left\{\frac{10-5}{2}\right\}+\frac{1}{2}\right]-5$

 $=\left[2+\left\{\frac{5}{2}\right\}+\frac{1}{2}\right]-5$

 $=\left[2+\frac{5}{2}+\frac{1}{2}\right]-5$

 $=\left[\frac{2×2}{2}+\frac{5}{2}+\frac{1}{2}\right]-5$

 $=\left[\frac{4}{2}+\frac{5}{2}+\frac{1}{2}\right]-5$

 $=\left[\frac{4+5+1}{2}\right]-5$

 $=\left[\frac{10}{2}\right]-5$

 $=\frac{\begin{array}{c}5\\10\end{array}}{\begin{array}{c}2\\1\end{array}}-5$

 $=\frac{5}{1}-5$

 $=5-5$

 $=0$

|  |  |  |
| --- | --- | --- |
| **S.No.** | **Home Work** | **Answers** |
| 1 | $$2×5+9-6÷2$$ | $$16$$ |
| 2 | $$5+\left(20÷5×2-\overbar{3×2} \right)÷2×3$$ | $$8$$ |
| 3 | $$4\left[2\left(1-\frac{1}{2}\right)-1\right]+5$$ | $$5$$ |
| 4 | $$2\left[2+\sqrt[3]{\left(2^{3}-3×4÷2\right)^{2}×2} \right]-3$$ | $$5$$ |
| 5 | $$2\left[2+2\left(\frac{1}{2}-5÷5×2\right)\right]+4$$ | $$2$$ |

# 40.Balance of Equation

|  |
| --- |
| * $+ or -$ Represents different terms

Example: $ x+y-$7 (3 terms) Example:* $× or ÷ $ Represents single term

Example: $\frac{2×y}{3}$ (single term)* If we send complete term to other side the symbol will change $+ ⇔ -$
* If we send part of a single term to other side the position will change $ × ⇔ ÷ $
* First we have to send complete term to other side
 |

Q.1 $2x-3=9$

|  |
| --- |
| * $2x=2×x$
* $2x$ and $-3$ are different terms
* send $-3$ to other side, that will become $+3$
* $2x$ is a single term and $2$ is a part in $2x $
* Here $2$ is multiplying with $x$in LHS, If we send $2$ to other side(RHS) $2$ will divide
 |

Ans: $2x-3=9$

 $2x=9+3$

 $2x=12$

 $x=\frac{\begin{array}{c}6\\12\end{array}}{\begin{array}{c}2\\1\end{array}}$

 $x=\frac{6}{1}$

 $x=6$

Q.2 $4y=2y-8$

Ans: $4y=2y-8$

 $4y-2y=-8$

 $2y=-8$

 $y=\frac{\begin{array}{c} 4\\- 8 \end{array} }{ \begin{array}{c}2\\1\end{array} }$

 $y=-4$

Q.3 $\frac{3x}{2}+4=7$

Ans: $\frac{3x}{2}+4=7$

 $\frac{3x}{2}=7-4$

 $\frac{3x}{2}=3$

 $3x=3×2$

 $3x=6$

 $x=\frac{\begin{array}{c} 2\\ 6\end{array}}{\begin{array}{c} 3 \\ 1\end{array}}$

 $x=2$

Q.4 $9x+4=6x+7$

Ans: $9x+4=6x+7$

 $9x-6x=-4+7$

 $3x=3$

 $x=\frac{\begin{array}{c}1\\ 3 \end{array}}{\begin{array}{c} 3 \\1\end{array}}$

 $x=\frac{1}{1}$

 $x=1$

Q.5 $3x+8=5x-3$

Ans: $3x+8=5x-3$

 $3x-5x=-8-3$

 $-2x=-11$

 Multiplying by $-$ on both sides

 $-\left(-2x\right)=-(-11)$

 $ 2x=11$

 $x=\frac{\begin{array}{c}5.5\\ 11 \end{array}}{\begin{array}{c} 2 \\ 1\end{array}}$

 $x=\frac{5.5}{1}$

 $x=5.5$

Q.6 $\frac{2x}{5}+\frac{5}{ 2 }=\frac{3}{ 2 }+\frac{x}{ 5 }$

Ans: $\frac{2x}{5}+\frac{5}{ 2 }=\frac{3}{ 2 }+\frac{x}{ 5 }$

 $\frac{2x}{5}-\frac{x}{ 5 }=\frac{3}{ 2 }-\frac{5}{ 2 }$

 $\frac{2x-x}{5}=\frac{3-5}{ 2 }$

 $\frac{x}{5}=\frac{-2 }{ 2 }$

 $\frac{x}{5}=\frac{\begin{array}{c}1\\-2 \end{array}}{\begin{array}{c} 2 \\1\end{array}}$

 $\frac{x}{5}=\frac{-1 }{ 1 }$

 $\frac{x}{5}=-1$

 $x=-1×5$

 $x=-5$

Q.7 $\frac{4x}{3}-5=\frac{7x}{ 2 }+3$

Ans: $\frac{4x}{3}-5=\frac{7x}{ 2 }+3$

 $\frac{4x}{3}-\frac{7x}{ 2 }=5+3$

 $\frac{4x×2}{3×2}-\frac{7x×3}{ 2×3}=8$

 $\frac{8x}{6}-\frac{21x}{6}=8$

 $\frac{-13x}{6}=8$

 $-13x=8×6$

 $-13x=48$

 $-x=\frac{\begin{array}{c}3.6923\\- 48\end{array}}{\begin{array}{c}\begin{array}{c} 13\\ \end{array}\\1\end{array}}$

 $-x=\frac{3.6923}{ 1 }$

 $-x=3.6923$

 Multiplying by $-$ on both sides

 $-\left(-x\right)=-3.6923$

 $x=-3.6923$

 $\frac{2x-x}{5}=\frac{3-5}{ 2 }$

Q.8 $\frac{8x}{5}-\frac{3}{ 2 }=4+2x$

Ans: $\frac{8x}{5}-\frac{3}{ 2 }=4+2x$

 $\frac{8x}{5}-2x=4+\frac{3}{ 2 }$

 $\frac{8x}{5}-\frac{2x×5}{ 5}=\frac{4×2}{ 2}+\frac{3}{ 2 }$

 $\frac{8x}{5}-\frac{10x}{ 5}=\frac{8}{ 2}+\frac{3}{ 2 }$

 $\frac{8x-10x}{5}=\frac{8+3}{ 2}$

 $\frac{-2x}{5}=\frac{11}{ 2}$

 $-2x=\frac{11×5}{ 2}$

 $-x=\frac{11×5}{ 2×2}$

 $-x=\frac{55}{ 4}$

 $-x=\frac{\begin{array}{c}13.75\\ 55 \end{array}}{\begin{array}{c} 4 \\1\end{array}}$

 $-x=\frac{13.75}{ 1}$

 $-x=13.75$

 Multiplying by $-$ on both sides

 $-\left(-x\right)=-13.75$

 $x=-13.75$

|  |  |  |
| --- | --- | --- |
| **S.No.** | **Home Work** | **Answers** |
| 1 | $$4x+5=21$$ | $$4$$ |
| 2 | $$\frac{4}{5}+2x=3$$ | $$1.1$$ |
| 3 | $$\frac{2x}{3}-\frac{3}{ 2 }=\frac{4x}{3 }+\frac{5}{ 2 }$$ | $$-6$$ |
| 4 | $$3x-\frac{4}{ 5 }=\frac{3}{ 2 }-2x$$ | $$0.46$$ |
| 5 | $$\frac{2x}{5}+\frac{3}{ 2 }=\frac{2}{ 5 }$$ | $$-2.75$$ |