Fraction

Proper Fractions

A proper fraction is a fraction that represents a part of a whole, that is, a fraction in which the numerator is lesser than the denominator.

E.g. 5/7, 3/4, 1/2, etc

Improper Fractions

An improper fraction is a combination of a whole & a proper fraction, that is, the numerator is greater than the denominator.

E.g. 7/4, 19/11, 13/5, etc

Mixed Fractions

Improper fractions can be written as mixed fractions.

E.g. 7/4 can be written as 1³/₄

It is represented by Q (R/D) Q Quotient R Reminder D Divisor

Equivalent Fractions

Equivalent fractions are obtained by multiplying the numerator & denominator with the same number such that the new fraction obtained will be a multiple of the previous fraction.

e.g.: 3/5 = (3x2) / (5x2) = 6/10

6 => multiple of 3

10 => multiple of 5

 $3/5 = (3 \times 3) / (5 \times 3) = 9/10$

Also, on reducing the new fraction, we get the original fraction.

Multiplication of Fractions

We adopt the following steps to multiply fractions:



- 1. Change any mixed numbers to improper fractions.
- 2. Cancel any factors common to both the numerator and denominator.
- 3. Multiply the remaining terms in the numerator and in the denominator.
- 4. Write the answer either as a proper fraction or as a mixed number as appropriate.

Example:

If the side of a square is 2 cm then finds the area of the square?

Solution:

Area = side x side

= 2cm x 2cm

= 4cm²

Example:

If the side of a square is 2 1/2 cm then finds the area of the square?

Solution:

Area = 2 ½ x 2 ½ = 5/2 x 5/2 = 25/4 cm2

That is Q (R/D).

Q is multiplied by D and added to $R \div (D)$.

E.g. $5 \frac{3}{4} = (5 \times 4 + 3)/3$

= 23/3

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E.g. 6 <sup>1</sup>/<sub>3</sub> = (6×3+1)/3
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= 19/3

Multiplication of a fraction by a whole number

Example 1:

Multiply 5 and 12/11

Solution:



Write whole number 5 as Fractional Number and we get;

Now divide; multiplication of numerators by multiplication of denominators and we get;

= $(5 \times 12) / (1 \times 11)$ solve the brackets and we get;

= 60/11

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Example 2: Solve (10 × 6/7)
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Solution:

Write whole number 10 as Fractional Number and we get;

= (10/1) × (6/7)

Now divide; multiplication of numerators by multiplication of denominators and we get;

= $(10 \times 6) / (1 \times 7)$ solve the brackets and we get;

= 60/7

Example 3: Multiply 10/12 and 8

Solution:

Write whole number 8 as Fractional Number and we get;

= (10/12) × (8/1)

Now divide; multiplication of numerators by multiplication of denominators and we get;

= (10×8) / (12×1) solve the brackets and we get;

= 80/12

Divide both numerator and denominator by 4 to convert fraction into lowest term and we get;

= 20/3



Multiplication of Fraction as an operator 'of '

To understand it let us look some examples given below:

Example:

(a) ½ of (i) 24 (ii) 46, (b) 2/3 of (i) 18 (ii) 27, (c) ¾ of (i) 16 (ii) 36

Solution:

- (i) 1/2 x 24/1
- = 24/2
- = 12

(ii) ½ x 46/1

= 46/2

= 23

(b) 2/3 of (i) 18 (ii) 27

(i) 2/3 x 18/3

= 36/9

= 4

(ii) 2/3 x 27

=54/3

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=18
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(c) ¾ of (i) 16 (ii) 36

(i) 3/4 x 16

= 48/4

=12

(ii) ¾ x 36



= 108/4

= 27

Multiplication of a Fraction by a Fraction

Here we multiply two fractions as Product of Numerators Divided by Product of Denominators or simply (Product of Numerators/ Product of Denominators)

Example 1:

Solve (10/2) × (5/7)

Solution:

Divide; multiplication of numerators by multiplication of denominators and we get;

= (10 × 5) / (2 × 7)

Solve the brackets and we get;

= 20/35

Divide both numerator and denominator by 5 to convert fraction into lowest term and we get;

= 4/7

Example 2:

Multiply 20/3 and 4/10

Solution:

Divide; multiplication of numerators by multiplication of denominators and we get;

= (20 × 4) / (3 × 10)

Solve the brackets and we get;

= 80/30

Divide both numerator and denominator by 10 to convert fraction into lowest term and we get;



= 8/3

Example 3: Multiply 7/11, 2/10 and 10/11

Solution:

Divide; multiplication of numerators by multiplication of denominators and we get;

= (7 × 2 × 10) / (11 × 10 × 11)

Solve the brackets and we get;

= 140/1210

Divide both numerator and denominator by 10 to convert fraction into lowest term and we get;

= 14/121

DIVISION OF FRACTIONS

Division of Whole Number by a Fraction

Under this division, we multiply Whole Number with Multiplicative Inverse of Fraction.

Example 1:

Solve 2 ÷ 3/5

Solution:

We have 2 ÷ 3/5

Multiply 2 with the Multiplicative inverse of 3/5 which is 5/3 and we get;

= 2 × 5/3

Multiply 2 with the numerator (5) and keep the denominator (3) same and we get;

= (2 × 5) / 3

Solve the bracket and we get;

= 10/3



Example 2: Solve 10 ÷ 77/86

Solution:

We have 10 ÷ 77/86

Multiply 10 with the Multiplicative inverse of 77/86 which is 86/77 and we get;

= 10 × 86/77

Multiply 10 with the numerator (86) and keep the denominator (77) same and we get;

= (10 × 86) / 77

Solve the bracket and we get;

= 860/77

Division of a Fraction by a Whole Number

Under this division, we multiply fraction with Multiplicative Inverse of Whole Number.

Example 1: Solve 15/4 ÷ 10

Solution:

We have 15/4 ÷ 10

Multiply 15/4 with the Multiplicative inverse of 10 which is 1/10 and we get;

= 15/4 × 1/10

Divide; multiplication of numerators by multiplication of denominators and we get;

= (15 × 1) / (4 × 10)

Solve the Brackets and we get;

= 15/40

Example 2:

Solve 53/10 ÷ 5

Solution:



 $= 53/10 \div 5$

Multiply 53/10 with the Multiplicative inverse of 5 which is 1/5 and we get;

= 53/10 × 1/5

Divide; multiplication of numerators by multiplication of denominators and we get;

= (53 × 1) / (10 × 5)

Solve the Brackets and we get;

= 53/50

Division of a Fraction by another Fraction

Under this division, we multiply one fraction number with multiplicative inverse of another fraction number.

Example 1:

Solve (5/8) ÷ (9/7)

Solution:

We have 5/8 ÷ 9/7

Multiply (5/8) with multiplicative inverse of (9/7) which is (7/9) and we get;

= 5/8 × 7/9

Divide; multiplication of numerators by multiplication of denominators and we get;

= (5 × 7) / (8 × 9)

Solve the brackets and we get;

= 35/72

Example 2:

Solve 25/5 ÷ 3/4

Solution:



We have 25/5 ÷ 3/4

Multiply 25/5 with multiplicative inverse of 3/4 which is 4/3 and we get;

= 25/5 × 4/3

Divide; multiplication of numerators by multiplication of denominators and we get;

= (25 × 4) / (5 × 3)

Solve the brackets and we get;

= 100/15

Example 3:

Solve 9/10 ÷ 6/7

Solution:

We have 9/10 ÷ 6/7

Multiply 9/10 with multiplicative inverse of 6/7 which is 7/6 and we get;

= 9/10 × 7/6

Divide; multiplication of numerators by multiplication of denominators and we get;

Solve the brackets and we get;

= 63/60

MULTIPLICATION OF DECIMAL NUMBERS

Multiplication of a Decimal Number by another Decimal Number

To multiply a decimal number by another decimal number:

1. Ignore the decimal points and multiply the digits;

2. Count the total number of decimal places in both decimal numbers being multiplied; and



3. Place a decimal point in the answer so that it has the same number of decimal places as the total number of decimal places in the two numbers being multiplied

Example:

Calculate 0.8×0.9 .

Solution:

0.8 1 decimal place × 0.9 1 decimal place 0.72 2 decimal places in the answer

Thus, $0.8 \times 0.9 = 0.72$

Note:

1. There is 1 decimal place in 0.8 and 1 decimal place in 0.9 and thus, 2 decimal places in the answer.

2. First ignore the decimal points and multiply 8 by 9. Then include the 2 decimal places in the answer.

Example:

Calculate 0.78×0.5 .

Solution:

Thus, $0.78 \times 0.5 = 0.39$

Note:

1. There are 2 decimal places in 0.78 and 1 decimal place in 0.5 and thus, 3 decimal places in the answer.

2. First ignore the decimal points and multiply 78 by 5. Then include the 3 decimal places in the answer.

Example:



Calculate 3.24×0.67 .

Solution:



Thus, $3.24 \times 0.67 = 2.1708$

Note:

1. There are 2 decimal places in 3.24 and 2 decimal places in 0.67 and thus, 4 decimal places in the answer.

2. First ignore the decimal points and multiply 324 by 67. Then include the 4 decimal places in the answer.

Multiplication of Decimal Numbers by 10, 100 and 1000

While multiplying the decimal numbers by 10, 100, 1000...... shift the decimal point to the right by counting the number of zeros in the number.

e.g.: 1.76 × 10 = 17.6

 $176.574 \times 100 = 17657.4$

DIVISION OF DECIMAL NUMBERS

Division by 10, 100 and 1000

While dividing a number by 10, 100, 1000......the digits of the number and the quotient are the same but the decimal point in the quotient shifts to the left by as many places as there are zeros over one.

 $31.5/10 = 0.315 \ 2.38/10 = 0.238$

Division of a Decimal Number by a Whole Number

To divide a decimal by a whole number, divide as you would for whole numbers; and place a decimal point in the answer so that it lines up with the decimal point in the dividend.

If after dividing you have a remainder, add a zero to the dividend and continue to divide until there is no remainder or the decimals recur (i.e. repeat).



Example: Calculate 9.6 ÷ 2.

Solution:

We can set out the solution as follows:



Thus, $9.6 \div 2 = 4.8$

Example:

Calculate 9.39 ÷ 4 to 4 decimal places.

Solution: We can set out the solution as follows:

	2.3475
4)	9. <mark>39</mark> 00
	8
	13
	12
	19
-	16
	30
	28
	2 <mark>0</mark>
	20
	0

Thus, $9.39 \div 4 = 2.3475$

