ST. LAWRENCE HIGH SCHOOL

A JESUIT CHRISTIAN MINORITY INSTITUTION

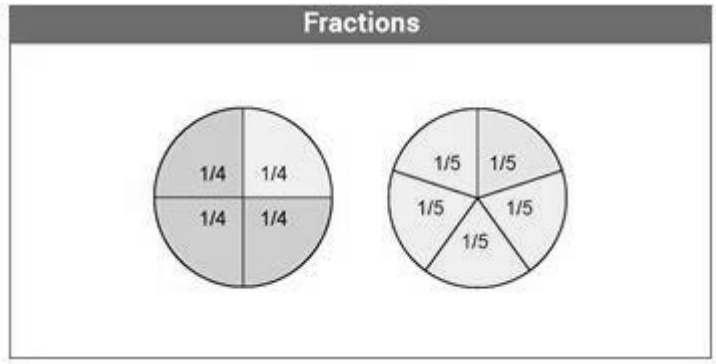
Sub: Arithmetic **Class: 7** **Date: 09.05.20**

STUDY MATERIAL: FRACTIONS AND DECIMALS

Important Formulae and Concepts

Introduction: Fractions

The word **fraction** derives from the Latin word **"Fractus"** meaning **broken**. It represents a **part of a whole**, consisting of a number of equal parts out of a whole.
E.g : slices of a pizza.

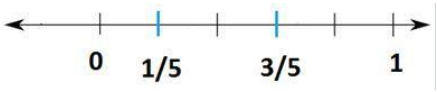


Representation of Fractions

A **fraction** is represented by 2 numbers on top of each other, separated by a line. The **number on top is the numerator** and the **number below is the denominator**. Example :34 which basically means 3 parts out of 4 equal divisions.

Fractions on the Number Line

In order to represent a fraction on a number line, we divide the line segment between **two whole numbers into n equal parts**, where n is the denominator.
Example: To represent 15or35 , we divide the line between 0 and 1 in 5 equal parts. Then the **numerator gives the number of divisions** to mark.



Multiplication of Fractions

Multiplication of Fractions

Multiplication of a **fraction by a whole number** :
Example 1: 7×13=7×13=73
Example 2 : 5×745=3545, Dividing numerator and denominator by 5, we get79

Multiplication of a **fraction by a fraction** is basically product of numeratorsproduct of denominators
Example 1: $35×1213=3×125×13=3665$
Example 2 : Multiplication of mixed fractions $423×117$
First convert mixed fractions to improper fractions and then multiply
$143×87=14×83×7=163$

Fraction as an Operator 'Of'

The **'of'** operator basically implies **multiplication**.

Example :16 of $18=16×18=186=3$
or,12 of $11=12×11=112=512$

Division of Fractions

Reciprocal of a Fraction

Reciprocal of any number n is written as$1n$
Reciprocal of a fraction is obtained by **interchanging the numerator and denominator.**
Example : Reciprocal of 25 is 52
Although zero divided by any number means zero itself, we cannot find reciprocals for them, as a **number divided by 0 is undefined**.
Example : Reciprocal of $07≠70$

Division of Fractions

Division of a **whole number** by a **fraction** : we multiply the whole number with the reciprocal of the fraction.
Example: $63÷75=63×57=9×5=45$

Division of a **fraction** by a **whole number**: we multiply the fraction with the reciprocal of the whole number.
Example : $811÷4=811×14=211$

Division of a **fraction** by another **fraction** : We multiply the dividend with the reciprocal of the divisor.
Example : $27÷521=27×215=65$

Types of Fractions

Types of Fractions

Proper fractions represent a part of a whole. The numerator is smaller than the denominator.
Example: $14,79,5051$. Proper fractions are greater than 0 and less than 1

Improper fractions have a numerator that is greater than or equal to the denominator.
Example : $456,65$. Improper fractions are greater than 1 or equal to 1.

Mixed fractions are a combination of a whole number and a proper fraction.
Example : 435 can be written as 835.

Conversion of fractions : An improper fraction can be represented as mixed fraction and a mixed fraction can represented as improper.
In the above case, if you multiply the denominator 5 with the whole number 8 add the numerator 3 to it, you get back 435

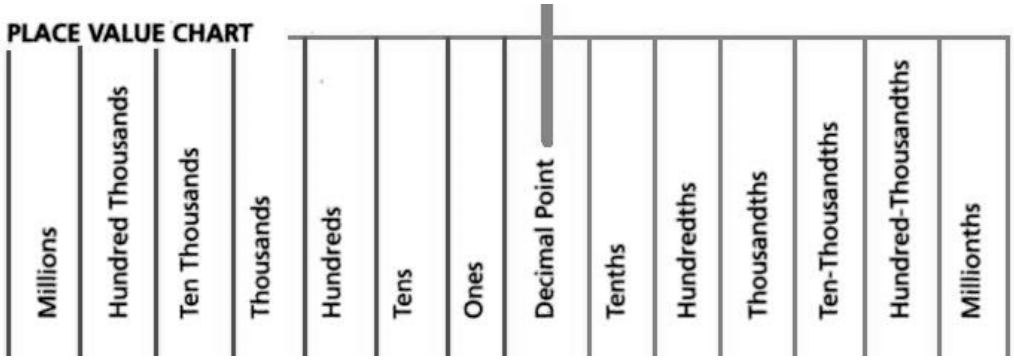
Like fractions : Fractions with the same denominator are called like fractions.
Example : $57,37$. Here we can compare them as $57>37$

Unlike fractions : Fractions with different denominators are called unlike fractions.
Example : 53,92. To compare them, we find the L.C.M of the denominator.
Here the L.C.M is 6 So, 5×23×2,9×32×3
⇒106,276
⇒276>106

Decimals

Introduction: Decimal

Decimal numbers are used to represent numbers that are **smaller than the unit 1**. Decimal number system is also known as **base 10 system** since each place value is denoted by a power of 10.



A decimal number refers to a number consisting of the following **two parts:**
(i) **Integral part** (before the decimal point) (ii) **Fractional Part** (after the decimal point). These both are separated by a **decimal separator(.)** called the **decimal point**.
A decimal number is written as follows : Example 564.8 or 23.97.
The numbers to the left of the decimal point increase with the order of 10, while the numbers to the right of the point increase with the decrease order of 10.
The above example 564.8 can be read as 'five hundred and sixty four and eight tenths'
⇒5×100+6×10+4×1+8×110

A **fraction** can be written **as a decimal** and vice-versa. Example32=1.5 or 1.5=1510=32

Multiplication of Decimals

Multiplication of **decimal numbers** with **whole numbers** :
Multiply them as whole numbers. The **product** will contain the **same number of digits** after the decimal point as that of the decimal number.
E.g : 11.3×4=45.2

Multiplication of **decimals** with **powers of 10** :
If a decimal is multiplied by a power of 10, then the **decimal point shifts** to the right by the **number of zeros in its power.**
E.g : 45.678×10=456.78(decimal point shifts by 1 place to the right) or, 45.678×1000=45678 (decimal point shifts by 3 places to the right)

Multiplication of **decimals** with **decimals** :

Multiply the decimal numbers without decimal points and then give decimal point in the answer as many places same as the total number of places right to the decimal points in both numbers.

E.g :

	23.053
x	6.65
	153.30245

Division of Decimals

Dividing a **decimal number** by a **whole number**:
Example : 45.255
Step 1. Convert the Decimal number into Fraction: 45.25=4525100
Step 2. Divide the fraction by the whole number: 4525100÷5=(4525100)×(15)=9.05

Dividing a **decimal number** by a **decimal number**:
Example1 : 45.250.5
Step 1. Convert both the decimal numbers into fractions: 45.25=4525100 and 0.5=510
Step 2. Divide the fractions: 4525100÷510=4525100×105=90.5
Example 2:

2.02	208.666
It can be written as :	__103.3
202	20866.6
	202
	__666
	__606
	___606
	___606
	____0

Dividing a **decimal number** by **powers of 10** :
If a decimal is divided by a power of 10, then the **decimal point shifts** to the **left** by the **number of zeros** present in the **power of 10.**
Example: 98.765÷100=0.98765Infinity

When the **denominator** in a fraction is **very very small** (almost tending to 0), then the **value of the fraction** tends towards **infinity**.
E.g : 9999990.000001=9999990000001≈ a very large number, which is considered to be ∞

Before going into the conversion of non-terminating and repeating decimal to fractions, let us understand what significance do these terms hold. What are terminating, non-terminating, repeating and non-repeating decimals.

Terminating and Non-Terminating decimals-

A terminating decimal that has an ends. It is a decimal, which has a finite number of digits(or terms).

Eg. 0.15, 0.86 etc.

Whereas non-terminating decimals are the one that do not have an end term. It has infinite number of terms.

Eg. 0.5444444….., 0.1111111….., etc.

Repeating and Non-Repeating decimals:

Repeating decimals are the one, which have a set of terms in a decimal to be repeated in a uniform manner.

Eg. 0.666666…., 0.123123…., etc.

It is to be noted that the repeated term in a decimal are represented by bar on top of the repeated part. Such as 0.333333…..=$0.3\bar{}$.

Whereas non-repeating decimals are the one that do have have repeated terms.

Non-Terminating and non-repeating decimals are said to be an Irrational numbers. Eg. 2–√=1.4142135…….
The square roots of all the terms (leaving perfect squares) are irrational numbers.

Non- Terminating and repeating decimals are Rational numbers and can be represented in the form of p/q, where q is not equal to 0.

Let us now learn to convert Non-Terminating and repeating decimals in rational form.

(i) Fraction of the type $0.abcd$ –

$$\overline{abcd} = \frac{Repeated\ term}{Number\ of\ 9's\ for\ the;\ repeated\ terms}$$

Example – Convert $0.\overline{7}$ in Rational form

Solution – Here the number of repeated term is only 7, thus number of times 9 to be repeated in the denominator is only one.

$$0.\overline{7} = \frac{7}{9}$$

Example – Convert 0.125125125..... in Rational form

Solution – The decimal shown above can be written as $0.\overline{125}$.

Here 125 consist three terms to be repeated in a continuous manner. Thus number of time 9 to be repeated in the denominator becomes three.

$$0.\overline{125} = \frac{125}{999}$$

(ii) Fraction of the type

$$0.ab..\overline{cd} = \frac{(ab....cd.....)–ab.....}{Number\ of\ time\ 9's\ the\ repeating\ term\ followed\ by\ the\ number\ of\ times\ 0's\ for\ the\ non–repeated\ terms}$$

Example – Convert $0.12\overline{34}$ in a Rational form

Solution – In the given ratio we have 12 to be of the non-repeated form and 34 to be of the repeating form. Thus denominator becomes 9900.

$$0.12\overline{34} = \frac{1234–12}{9900} = \frac{1222}{9900}$$

Example – Convert $0.00\overline{69}$ in p/q form

Solution- In the given ratio we have 00 to be of the non-repeated form and 69 to be of the repeating form. Thus denominator becomes 9900.

$$0.00\overline{69} = \frac{0069}{9900} = \frac{69}{9900}$$

Estimation of Numbers by Rounding Off Method

Rounding off is a kind of estimation used quite often in mathematics. See, there does exist a general rule to this art of rounding off numbers. The rule states that one must look at the digit to the right of the digit one wants to estimate and if it is less than 5 then you round down, but if it turns out to be greater than 5, then you participate in rounding up, this process is known as the rounding off of numbers. Take an example like 5.3, since 3 is lesser than 5 the number will be rounded off to 5. While on the other hand if the number were 5.6, then it will be rounded up to 7 since 6 is greater than 5.

SOLVED NUMERICALS

Question 1:

$\frac{2}{5} \times 5\frac{1}{5}$ is equal to

(a) $\frac{26}{25}$ (b) $\frac{52}{25}$

(c) $\frac{2}{5}$ (d) 6

Solution:

(b) Given, $\frac{2}{5} \times 5\frac{1}{5}$

$\because \quad 5\frac{1}{5} = \frac{(5 \times 5) + 1}{5}$

$= \frac{25 + 1}{5} = \frac{26}{5}$

$\therefore \quad \frac{2}{5} \times 5\frac{1}{5} = \frac{2}{5} \times \frac{26}{5} = \frac{52}{25}$

Question 2:

$3\frac{3}{4} \div \frac{3}{4}$ is equal to

(a) 3 (b) 4

(c) 5 (d) $\frac{45}{16}$

Solution:

(c) Given, $3\frac{3}{4} \div \frac{3}{4}$

$\because \quad 3\frac{3}{4} = \frac{(3 \times 4) + 3}{4} = \frac{12 + 3}{4} = \frac{15}{4}$

$\therefore \quad 3\frac{3}{4} \div \frac{3}{4} = \frac{15}{4} \times \frac{4}{3} = 5$ $\left[\because \text{reciprocal of } \frac{3}{4} = \frac{4}{3}\right]$

Question 3:

A ribbon of length $5\frac{1}{4}$ m is cut into small pieces each of length $\frac{3}{4}$ m.

Number of pieces will be

(a) 5 (b) 6 (c) 7 (d) 8

Solution:

(c) Number of pieces

$= \frac{\text{Total length of ribbon}}{\text{Length of one piece}} = \frac{\left(5\frac{1}{4}\right)}{\left(\frac{3}{4}\right)}$

$= \left(\frac{\frac{(5 \times 4) + 1}{4}}{\frac{3}{4}}\right) = \frac{\left(\frac{21}{4}\right)}{\left(\frac{3}{4}\right)}$

$= \frac{21}{4} \times \frac{4}{3}$ $\left[\because \text{reciprocal of } \frac{3}{4} = \frac{4}{3}\right]$

$= 7$

Question 4:

The ascending arrangement of $\frac{2}{3}, \frac{6}{7}, \frac{13}{21}$ is

(a) $\frac{6}{7}, \frac{2}{3}, \frac{13}{21}$ (b) $\frac{13}{21}, \frac{2}{3}, \frac{6}{7}$ (c) $\frac{6}{7}, \frac{13}{21}, \frac{2}{3}$ (d) $\frac{2}{3}, \frac{6}{7}, \frac{13}{21}$

Solution:

(b) Given, $\frac{2}{3}, \frac{6}{7}, \frac{13}{21}$

LCM of $(3, 7, 21) = 21$

$\therefore \quad \frac{2}{3} = \frac{2}{3} \times \frac{7}{7} = \frac{14}{21}$,

$\frac{6}{7} = \frac{6}{7} \times \frac{3}{3} = \frac{18}{21}$

and $\frac{13}{21} = \frac{13}{21}$

Now, compare $\frac{14}{21}, \frac{18}{21}$ and $\frac{13}{21}$.

So, $\frac{13}{21} < \frac{14}{21} < \frac{18}{21}$

Hence, $\frac{13}{21} < \frac{2}{3} < \frac{6}{7}$ (ascending order)

Note *With same denominators, fraction with larger numerator is greater.*

Question 5:

Reciprocal of the fraction $\frac{2}{3}$ is

(a) 2 (b) 3 (c) $\frac{2}{3}$ (d) $\frac{3}{2}$

Solution:

(d) The reciprocal of a non-zero fraction is obtained by interchanging its numerator and denominator.

Hence, the reciprocal of $\frac{2}{3}$ is $\frac{3}{2}$.

Question 6:

The product of $\frac{11}{13}$ and 4 is

(a) $3\frac{5}{13}$ (b) $5\frac{3}{13}$

(c) $13\frac{3}{5}$ (d) $13\frac{5}{3}$

Solution:

(a) We have, $\frac{11}{13} \times 4$

$\therefore \frac{11}{13} \times 4 = \frac{44}{13} = 3\frac{5}{13}$

Hence, the product of $\frac{11}{13}$ and 4 is $3\frac{5}{13}$.

Question 7:

The product of 3 and $4\frac{2}{5}$ is

(a) $17\frac{2}{5}$ (b) $\frac{24}{5}$

(c) $13\frac{1}{5}$ (d) $5\frac{1}{13}$

Solution:

(c) Given, $3 \times 4\frac{2}{5}$

$\because \quad 4\frac{2}{5} = \frac{(4 \times 5) + 2}{5} = \frac{22}{5}$

$\therefore \quad 3 \times 4\frac{2}{5} = 3 \times \frac{22}{5} = \frac{66}{5} = 13\frac{1}{5}$

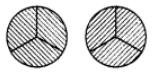
Hence, the product of 3 and $4\frac{2}{5}$ is $13\frac{1}{5}$.

Question 8:

Pictorial representation of $3 \times \frac{2}{3}$ is

(a) 

(b) 

(c) 

(d) 

Solution:

(b) $3 \times \frac{2}{3}$ means 3 times the two-third part of anything.

$\therefore$ Option (b) is correct.

Question 9:

$\frac{1}{5} \div \frac{4}{5}$ is equal to

(a) $\frac{4}{5}$ (b) $\frac{1}{5}$ (c) $\frac{5}{4}$ (d) $\frac{1}{4}$

Solution:

(d) Given, $\frac{1}{5} \div \frac{4}{5} = \frac{1}{5} \times \frac{5}{4}$ $\left[\because \text{reciprocal of } \frac{4}{5} = \frac{5}{4}\right]$

$= \frac{1}{4}$

Question 10:

The product of 0.03×0.9 is

(a) 2.7 (b) 0.27 (c) 0.027 (d) 0.0027

Solution:

(c) Given, 0.03×0.9

Here, $3 \times 9 = 27$

$\because$ Sum of the decimal places to the right of the decimal point is 0.03 and 0.9 is 3.

So, $0.03 \times 0.9 = 0.027$

Question 11:

$\frac{5}{7} \div 6$

(a) $\frac{30}{7}$ (b) $\frac{5}{42}$ (c) $\frac{30}{42}$ (d) $\frac{6}{7}$

Solution:

(b) Given, $\frac{5}{7} \div 6 = \frac{5}{7} \times \frac{1}{6}$ $\left[\because \text{reciprocal of } 6 \text{ or } \frac{6}{1} = \frac{1}{6}\right]$

$= \frac{5}{42}$

Question 12:

$5\frac{1}{6} \div \frac{9}{2}$ is equal to

(a) $\frac{31}{6}$ (b) $\frac{1}{27}$ (c) $5\frac{1}{27}$ (d) $\frac{31}{27}$

Solution:

(d) Given, $5\frac{1}{6} \div \frac{9}{2}$

$\because 5\frac{1}{6} = \frac{(5 \times 6) + 1}{6} = \frac{30 + 1}{6} = \frac{31}{6}$

$\therefore 5\frac{1}{6} \div \frac{9}{2} = \frac{31}{6} \times \frac{2}{9} = \frac{31}{27}$ $\left[\because \text{reciprocal of } \frac{9}{2} = \frac{2}{9}\right]$

Question 13:

Which of the following represents $\frac{1}{3}$ of $\frac{1}{6}$?

(a) $\frac{1}{3} + \frac{1}{6}$ (b) $\frac{1}{3} - \frac{1}{6}$

(c) $\frac{1}{3} \times \frac{1}{6}$ (d) $\frac{1}{3} \div \frac{1}{6}$

Solution:

(c) We have, $\frac{1}{3}$ of $\frac{1}{6} = \frac{1}{3} \times \frac{1}{6}$

Note *'of' represents multiplication (×).*

Question 14:

$\frac{3}{7}$ of $\frac{2}{5}$ is equal to

(a) $\frac{5}{12}$ (b) $\frac{5}{35}$ (c) $\frac{1}{35}$ (d) $\frac{6}{35}$

Solution:

(d) Given, $\frac{3}{7}$ of $\frac{2}{5} = \frac{3}{7} \times \frac{2}{5} = \frac{6}{35}$

Question 15:

One packet of biscuits requires $2\frac{1}{2}$ cups of flour and $1\frac{2}{3}$ cups of sugar. Estimated total quantity of both ingredients used in 10 such packets of biscuits will be

(a) less than 30 cups (b) between 30 cups and 40 cups

(c) between 40 cups and 50 cups (d) above 50 cups

Solution:

(c) Total quantity of both ingredients in one packet of biscuits

$$= \text{Quantity of flour} + \text{Quantity of sugar}$$
$$= 2\frac{1}{2}\text{ cups} + 1\frac{2}{3}\text{ cups}$$
$$= \frac{(2\times 2)+1}{2} + \frac{(1\times 3)+2}{3}$$
$$= \frac{4+1}{2} + \frac{3+2}{3}$$
$$= \frac{5}{2} + \frac{5}{3}$$
$$= \frac{5\times 3 + 2\times 5}{6} \qquad [\because \text{LCM of } 2 \text{ and } 3 = 6]$$
$$= \frac{15+10}{6}$$
$$= \frac{25}{6}$$

$\therefore$ Total quantity of both ingredients used in 10 packets

$$= 10 \times \text{Total quantity of ingredients in one packet}$$
$$= 10 \times \frac{25}{6} = \frac{250}{6}$$

Since, $\frac{250}{6}$ lies between 40 and 50.

Question 16:

The product of 7 and $6\frac{3}{4}$ is

(a) $42\frac{1}{4}$ (b) $47\frac{1}{4}$ (c) $42\frac{3}{4}$ (d) $47\frac{3}{4}$

Solution:

(b) Given, $7 \times 6\frac{3}{4}$

$\because \quad 6\frac{3}{4} = \frac{(6\times 4)+3}{4} = \frac{24+3}{4} = \frac{27}{4}$

$\therefore \quad 7 \times 6\frac{3}{4} = 7 \times \frac{27}{4} = \frac{189}{4} = 47\frac{1}{4}$

Hence, the product of 7 and $6\frac{3}{4}$ is $47\frac{1}{4}$.

Question 17:

On dividing 7 by $\frac{2}{5}$, the result is

(a) $\frac{14}{2}$ (b) $\frac{35}{4}$ (c) $\frac{14}{5}$ (d) $\frac{35}{2}$

Solution:

(d) Given, $7 \div \frac{2}{5} = 7 \times \frac{5}{2}$ $\left[\because \text{reciprocal of } \frac{2}{5} = \frac{5}{2}\right]$

$$= \frac{35}{2}$$

Hence, on dividing 7 by $\frac{2}{5}$, we get $\frac{35}{2}$.

Question 18:

$2\frac{2}{3} + 5$ is equal to

(a) $\frac{8}{15}$ (b) $\frac{40}{3}$ (c) $\frac{40}{5}$ (d) $\frac{8}{3}$

Solution:

(a) Given, $2\frac{2}{3} \div 5 = \frac{(2 \times 3) + 2}{3} \div 5 = \frac{6+2}{3} \div 5$

$= \frac{8}{3} \times \frac{1}{5}$ $\left[\because \text{reciprocal of } 5 = \frac{1}{5}\right]$

$= \frac{8}{15}$

Hence, $2\frac{2}{3} \div 5$ is equal to $\frac{8}{15}$.

Question 19:

$\frac{4}{5}$ of 5 kg apples were used on Monday. The next day $\frac{1}{3}$ of what was left was used. Weight (in kg) of apples left now is

(a) $\frac{2}{7}$ (b) $\frac{1}{14}$ (c) $\frac{2}{3}$ (d) $\frac{4}{21}$

Solution:

(c) Apples used on Monday $= \frac{4}{5}$ of $5 = \frac{4}{5} \times 5$

$= 4\,\text{kg}$

Remaining apples $= 5 - 4$

$= 1\,\text{kg}$

Apples used next day $= \frac{1}{3}$ of remaining apples

$= \frac{1}{3} \times 1\,\text{kg} = \frac{1}{3}\,\text{kg}$

So, weight of apples left now

= Total apples – Apples used on Monday – Apples used next day

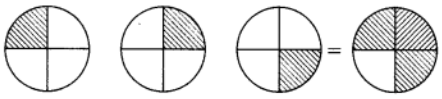
$= \left(5 - 4 - \frac{1}{3}\right)$

$= \frac{15 - 12 - 1}{3}$ [taking LCM]

$= \frac{2}{3}\,\text{kg}$

Question 20:

The picture



interprets

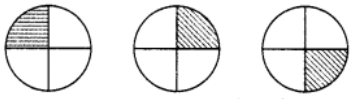
(a) $\frac{1}{4} \div 3$ (b) $3 \times \frac{1}{4}$ (c) $\frac{3}{4} \times 3$ (d) $3 \div \frac{1}{4}$

Solution:

(b)

This interprets $\frac{1}{4}$ th part of a circle.

$\therefore$



$= 3 \times \frac{1}{4}$

Hence, the whole picture represents $3 \times \frac{1}{4}$ i.e. $\frac{3}{4}$ th part

Fill in the Blanks

In questions 21 to 44, fill in the blanks to make the statements true.

Question 21:

Rani ate $\frac{2}{7}$ part of a cake while her brother Ravi ate $\frac{4}{5}$ of the remaining.

Part of the cake left is _____.

Solution:

Given, Rani ate $\frac{2}{7}$ part of the cake, then

Remaining part $= 1 - \frac{2}{7} = \frac{7-2}{7} = \frac{5}{7}$

Her brother ate $\frac{4}{5}$ of $\frac{5}{7} = \frac{4}{5} \times \frac{5}{7} = \frac{4}{7}$

So, remaining part of the cake $= \frac{5}{7} - \frac{4}{7} = \frac{5-4}{7} = \frac{1}{7}$

Hence, part of the cake left is $\frac{1}{7}$.

Question 22:

The reciprocal of $\frac{3}{7}$ is _____.

Solution:

The reciprocal of $\frac{3}{7}$ is $\frac{7}{3}$.

Note *The reciprocal of a non-zero fraction is obtained by interchanging its numerator and denominator.*

Question 23:

$\frac{2}{3}$ of 27 is _____.

Solution:

Given, $\frac{2}{3}$ of $27 = \frac{2}{3} \times 27 = 18$

Hence, $\frac{2}{3}$ of 27 is **18.**

Question 24:

$\frac{4}{5}$ of 45 is _____.

Solution:

Given, $\frac{4}{5}$ of $45 = \frac{4}{5} \times 45 = 4 \times 9$

$= 36$

Hence, $\frac{4}{5}$ of 45 is **36.**

Question 25:

$4 \times 6\frac{1}{3}$ is equal to _____.

Solution:

Given, $4 \times 6\frac{1}{3} = 4 \times \frac{(6 \times 3) + 1}{3} = 4 \times \frac{19}{3} = \frac{76}{3} = 25\frac{1}{3}$

Hence, $4 \times 6\frac{1}{3} = \mathbf{25\frac{1}{3}}$

Question 26:

$\frac{1}{2}$ of $4\frac{2}{7}$ is _____.

Solution:

Given, $\frac{1}{2}$ of $4\frac{2}{7} = \frac{1}{2} \times \frac{(4 \times 7) + 2}{7}$

$= \frac{1}{2} \times \frac{30}{7} = \frac{30}{14}$

$= \frac{15}{7}$

Hence, $\frac{1}{2}$ of $4\frac{2}{7}$ is $\mathbf{\frac{15}{7}}$.

Question 27:

$\frac{1}{9}$ of $\frac{6}{5}$ is _____.

Solution:

Given, $\frac{1}{9}$ of $\frac{6}{5} = \frac{1}{9} \times \frac{6}{5} = \frac{2}{15}$

Hence, $\frac{1}{9}$ of $\frac{6}{5}$ is $\mathbf{\frac{2}{15}}$.

Question 28:

The lowest form of the product $2\frac{3}{7} \times \frac{7}{9}$ is _____.

Solution:

Given, $2\frac{3}{7} \times \frac{7}{9} = \frac{(2 \times 7) + 3}{7} \times \frac{7}{9} = \frac{17}{7} \times \frac{7}{9} = \frac{17}{9}$

$= 1\frac{8}{9}$

Hence, the lowest form of the product $2\frac{3}{7} \times \frac{7}{9}$ is $\frac{17}{9}$ or $\mathbf{1\frac{8}{9}}$.

Question 29:

$\frac{4}{5} \div 4$ is equal to _____.

Solution:

Given, $\frac{4}{5} \div 4 = \frac{4}{5} \times \frac{1}{4} = \frac{1}{5}$ $\left[\because \text{reciprocal of } 4 = \frac{1}{4}\right]$

Hence, $\frac{4}{5} \div 4$ is equal to $\mathbf{\frac{1}{5}}$.

Question 30:

$\frac{2}{5}$ of 25 is _____.

Solution:

Given, $\frac{2}{5}$ of $25 = \frac{2}{5} \times 25 = 2 \times 5$

$= 10$

Hence, $\frac{2}{5}$ of 25 is **10.**

Question 31:

$\frac{1}{5} \div \frac{5}{6} = \frac{1}{5}$ _____ $\frac{6}{5}$

Solution:

Given, $\frac{1}{5} \div \frac{6}{5}$

$\therefore \frac{1}{5} \div \frac{5}{6} = \frac{1}{5} \times \frac{6}{5}$ $\left[\because \text{reciprocal of } \frac{5}{6} = \frac{6}{5}\right]$

Question 32:

$3.2 \times 10 =$ _____.

Solution:

Given, $3.2 \times 10 = \frac{32}{10} \times 10 = 32$

Hence, $3.2 \times 10 = \mathbf{32}$

Question 33:

$25.4 \times 1000 =$ _____.

Solution:

Given, $25.4 \times 1000 = \frac{254}{10} \times 1000$

$= 25400$

Hence, $25.4 \times 1000 = \mathbf{25400}$

Question 34:

$93.5 \times 100 =$ _____.

Solution:

$$\text{Given, } 93.5 \times 100 = \frac{935}{10} \times 100$$

$$= 9350$$

Hence, $93.5 \times 10 =$ **9350**

Question 35:

$4.7 \div 10 =$ _____.

Solution:

$$\text{Given, } 4.7 \div 10 = \frac{47}{10} \times \frac{1}{10} \qquad \left[\because \text{reciprocal of } 10 = \frac{1}{10}\right]$$

$$= \frac{47}{100} = 0.47$$

Hence, $4.7 \div 10 =$ **0.47**

Question 36:

$4.7 \div 100 =$ _____.

Solution:

$$\text{Given, } 4.7 \div 100 = \frac{47}{10} \times \frac{1}{100} \qquad \left[\because \text{reciprocal of } 100 = \frac{1}{100}\right]$$

$$= \frac{47}{1000}$$

$$= 0.047$$

Hence, $4.7 \div 100 =$ **0.047**

Question 37:

$4.7 \div 1000 =$ _____.

Solution:

$$\text{Given, } 4.7 \div 1000 = \frac{47}{10} \times \frac{1}{1000} \qquad \left[\because \text{reciprocal of } 1000 = \frac{1}{1000}\right]$$

$$= \frac{47}{10000}$$

$$= 0.0047$$

Hence, $4.7 \div 1000 =$ **0.0047**

Question 38:

The product of two proper fractions is _____ than each of the fractions that are multiplied.

Solution:

The product of two proper fractions is **less** than each of the fractions that are multiplied.

e.g. $\frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$

$\therefore$ $\frac{1}{6} < \frac{1}{2}$ and $\frac{1}{6} < \frac{1}{3}$

Question 39:

While dividing a fraction by another fraction, we _____ the first fraction by the _____ of the other fraction.

Solution:

While dividing a fraction by another fraction, we **multiply** the first fraction by the **reciprocal** of the other fraction.

e.g. $4 \div \frac{1}{2} = 4 \times 2 = 8$ $\left[\because \text{reciprocal of } \frac{1}{2} = 2\right]$

Question 40:

$8.4 \div \_\_\_\_ = 2.1$

Solution:

Let x be the missing number, then

$8.4 \div x = 2.1$

$\Rightarrow$ $8.4 \times \frac{1}{x} = 2.1$ $\left[\because \text{reciprocal of } x = \frac{1}{x}\right]$

$\Rightarrow$ $8.4 = 2.1x$ [by cross-multiplication]

$\Rightarrow$ $x = \frac{8.4}{2.1}$

$\Rightarrow x = \frac{84}{21} \times \frac{10}{10} = 4$

$\Rightarrow$ $x = 4$

Hence, $8.4 \div \mathbf{4} = 2.1$

Question 41:

$52.7 \div \_\_\_\_ = 0.527$

Solution:

Let x be the missing number, then $52.7 \div x = 0.527$

$\Rightarrow$ $\frac{527}{10} \times \frac{1}{x} = \frac{527}{1000}$ $\left[\because \text{reciprocal of } x = \frac{1}{x}\right]$

$\Rightarrow$ $\frac{527}{10} \times \frac{1000}{527} = x$

$\Rightarrow$ $x = 100$

Hence, $52.7 \div \mathbf{100} = 0.527$

Question 42:

$0.5 \_\_\_\_ 0.7 = 0.35$

Solution:

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

and $0.7 = \frac{7}{10}$

$\therefore 0.5 \times 0.7 = \frac{5}{10} \times \frac{7}{10} = \frac{35}{100} = 0.35$

Hence, $0.5 \times 0.7 = 0.35$

Question 43:

$2 \_\_\_\_ \frac{5}{3} = \frac{10}{3}$

Solution:

Since, on multiplying 2 by $\frac{5}{3}$, we get $\frac{10}{3}$.

Hence, $2 \times \frac{5}{3} = \frac{10}{3}$

Question 44:

$2.001 \div 0.003 = \_\_\_\_$

Solution:

Given, $2.001 \div 0.003$

$\because \quad 2.001 = \frac{2001}{1000}$

and $0.003 = \frac{3}{1000}$

$\therefore \quad 2.001 \div 0.003 = \frac{2001}{1000} \div \frac{3}{1000} = \frac{2001}{1000} \times \frac{1000}{3}$ $\left[\because \text{reciprocal of } \frac{3}{1000} = \frac{1000}{3}\right]$

$= 667$

Hence, $2.001 \div 0.003 =$ **667**

True / False

In questions 45 to 54, State whether the statements are True or False.

Question 45:

The reciprocal of a proper fraction is a proper fraction.

Solution:

False

The reciprocal of a proper fraction is always an improper fraction.

e.g. 5/6 —> Proper fraction

Its reciprocal is 5/6 , i.e. improper fraction.

Question 46:
The reciprocal of an improper fraction is an improper fraction.
Solution:
False
The reciprocal of an improper fraction is a proper fraction, e.g. 7/6 —> Improper fraction
Its reciprocal is 7/6, i.e. proper fraction.

Question 47:

$$\text{Product of two fractions} = \frac{\text{Product of their denominators}}{\text{Product of their numerators}}$$

Solution:
False
Two fractions are multiplied by multiplying their numerators and denominators separately and writing the product as,

$$\text{Product of two fractions} = \frac{\text{Product of their numerators}}{\text{Product of their denominators}}$$

Question 48:
The product of two improper fractions are less than both the fractions.
Solution:
False
The product of two improper fractions are greater than both the fractions.

$$\text{e.g. } \frac{3}{2} \times \frac{7}{4} = \frac{21}{8}$$

Hence, $\frac{21}{8}$ is greater than both $\frac{3}{2}$ and $\frac{7}{4}$.

Question 49:
A reciprocal of a fraction, is obtained by inverting it upside down.
Solution:
True
Let a/b be the fraction. Then, for obtaining its reciprocal, numerator and denominator are interchanged.
∴ Reciprocal of a/b = b/a

Question 50:
To multiply a decimal number by 1000, we move the decimal point in the number to the right by three places.
Solution:
True
e.g. 2.732 x 1000= 2732 (moving the decimal to right by three places)

Question 51:
To divide a decimal number by 100, we move the decimal point in the number to the left by two places.
Solution:
True
e.g. 273.2/100 = 2.732 (moving decimal point to the left by two places.

Question 52:
1 is the only number which is its own reciprocal.
Solution:
True
For obtaining the reciprocal of a number, we simply interchange the numerator and denominator.
Hence, reciprocal of 1 will be 1/1, i.e. 1

Question 53:

$\frac{2}{3}$ of 8 is same as $\frac{2}{3} \div 8$.

Solution:

False

$$\frac{2}{3} \text{ of } 8 = \frac{2}{3} \times 8 = \frac{16}{3}$$

$$\frac{2}{3} \div 8 = \frac{2}{3} \times \frac{1}{8} = \frac{2}{24}$$

$$\therefore \quad \frac{2}{3} \text{ of } 8 \neq \frac{2}{3} \div 8$$

Hence, $\frac{2}{3}$ of 8 is not same as $\frac{2}{3} \div 8$.

Question 54:

The reciprocal of $\frac{4}{7}$ is $\frac{4}{7}$.

Solution:

False

Reciprocal of $\frac{4}{7}$ is $\frac{7}{4}$.

Question 55:

If 5 is added to both the numerator and the denominator of the fraction $\frac{5}{9}$, will the value of the fraction be changed? If so, will the value increase or decrease?

Solution:

Given fraction $= \frac{5}{9}$

Now, adding 5 to numerator and denominator $= \frac{5+5}{9+5} = \frac{10}{14} = \frac{5}{7}$

Obviously, $\frac{5}{7} > \frac{5}{9}$

So, the value will increase.

Question 56:
What happens to the value of a fraction, if the denominator of the fraction is decreased while numerator is kept unchanged?

Solution:

When the numerator is kept unchanged and the denominator of the fraction is decreased, the value of fraction would increase.

e.g. Fraction $= \frac{2}{3}$

New fraction $= \frac{2}{2}$

Obviously $\frac{2}{2} > \frac{2}{3}$ [$\because 1 > 0.66$]

Question 57:

Which letter comes $\frac{2}{5}$ of the way among A and J?

Solution:

D

From A to J, there are 10 letters.

So, letter at $\frac{2}{5}$ place $= \left(\frac{2}{5} \times 10\right)$th letter = 4th letter = D

Question 58:

If $\frac{2}{3}$ of a number is 10, then what is 1.75 times of that number?

Solution:

Let the number be x.

According to the question, $\frac{2}{3}$ of $x = 10 \Rightarrow \frac{2}{3} \times x = 10$

On multiplying both sides by $\frac{3}{2}$, we get

$$\frac{2}{3} \times x \times \frac{3}{2} = 10 \times \frac{3}{2} \Rightarrow x = 5 \times 3 \Rightarrow x = 15$$

1.75 times of 15 = 1.75 of 15 $= 1.75 \times 15 = \frac{175}{100} \times 15 = \frac{2625}{100} = 26.25$

Question 59:

In a class of 40 students, $\frac{1}{5}$ of the total number of students like to eat rice only, $\frac{2}{5}$ of the total number of students like to eat chapati only and the remaining students like to eat both. What fraction of the total number of students like to eat both?

Solution:

Total number of students = 40 [given]

Students who eat rice only = $\frac{1}{5}$ of total students = $\frac{1}{5} \times 40 = 8$

Students who eat chapati only = $\frac{2}{5}$ of total students

$= \frac{2}{5} \times 40 = 16$

$\therefore$ Students who eat both chapati and rice

= Total number of students – (Students who eat rice only + Students who eat chapati only)

$= 40 - (8 + 16)$

$= 40 - 24 = 16$

$\therefore$ Fraction of students who eat both chapati and rice

$= \frac{\text{Number of students eat both chapati and rice}}{\text{Total number of students}}$

$= \frac{16}{40}$

$= \frac{2}{5}$

Question 60:

Renu completed $\frac{2}{3}$ part of her home work in 2 hours. How much part of her home work had she completed in $1\frac{1}{4}$ hours?

Solution:

The part of the work finished by Renu in 2 h = $\frac{2}{3}$

So, the part of the work finished by Renu in 1 h = $\frac{2}{3} \times \frac{1}{2} = \frac{1}{3}$

$\therefore$ The part of the work finished by Renu in $1\frac{1}{4}$ h = $\frac{1}{3} \times 1\frac{1}{4}$

$= \frac{1}{3} \times \frac{(1 \times 4) + 1}{4}$

$= \frac{1}{3} \times \frac{5}{4} = \frac{5}{12}$ part

Hence, $\frac{5}{12}$ part of Renu's home work is completed by her in $1\frac{1}{4}$ h.

Question 61:

61 Reemu read $\frac{1}{5}$th pages of a book. If she reads further 40 pages, she would have read $\frac{7}{10}$th pages of the book. How many pages are left to be read?

Solution:

Let total pages of the book be x.

According to the question, $\frac{1}{5}x + 40 = \frac{7}{10}x$

$\Rightarrow \quad 40 = \frac{7}{10}x - \frac{1}{5}x = \frac{7x - 2x}{10}$

$\Rightarrow \quad 40 = \frac{5x}{10}$

$\Rightarrow \quad x = \frac{400}{5} = 80$

$\therefore$ Total pages of a book = 80

Hence, pages left to be read = Total pages of a book $- \left(\frac{7}{10}x\right)$

$= 80 - \frac{7}{10} \times 80$

$= 80 - 56 = 24$ pages

Question 62:

Write the number in the box $\square$, such that $\frac{3}{7} \times \square = \frac{15}{98}$.

Solution:

Let the missing number be x.

Then, $\frac{3}{7} \times x = \frac{15}{98}$

$\Rightarrow \quad x = \frac{15}{98} \div \frac{3}{7} = \frac{15}{98} \times \frac{7}{3}$ $\left[\because \text{reciprocal of } \frac{3}{7} = \frac{7}{3}\right]$

$x = \frac{5}{14}$

Hence, $\frac{3}{7} \times \boxed{\frac{5}{14}} = \frac{15}{98}$

Question 63:

Will the quotient $7\frac{1}{6} \div 3\frac{2}{3}$ be a fraction greater than 1.5 or less than 1.5? Explain.

Solution:

Yes,

Given, $7\frac{1}{6} \div 3\frac{2}{3} = \frac{(7 \times 6) + 1}{6} \div \frac{(3 \times 3) + 2}{3}$

$= \frac{42 + 1}{6} \div \frac{9 + 2}{3} = \frac{43}{6} \div \frac{11}{3}$

$= \frac{43}{6} \times \frac{3}{11}$ $\left[\because \text{reciprocal of } \frac{11}{3} = \frac{3}{11}\right]$

$= \frac{43}{22} = 1.95$

Obviously, $1.95 > 1.5$

Hence, $7\frac{1}{6} \div 3\frac{2}{3} > 1.5$

Question 64:

Describe two methods to compare $\frac{13}{17}$ and 0.82. Which do you think is easier and why?

Solution:

Method I Convert both into decimals

$\frac{13}{17} = 0.76$

$\therefore$ $0.76 < 0.82$

Hence, $\frac{13}{17} < 0.82$

Method II Convert both into fractions

$0.82 = \frac{82}{100} = \frac{41}{50}$

Now, compare $\frac{13}{17}$ and $\frac{41}{50}$.

To compare these fractions, we have to make the denominator same,

$\therefore$ $\frac{13}{17} = \frac{13}{17} \times \frac{50}{50} = \frac{650}{850}$

$\frac{41}{50} = \frac{41}{50} \times \frac{17}{17} = \frac{697}{850}$

$\therefore$ $\frac{697}{850} > \frac{650}{850}$

Hence, $\frac{13}{17} < 0.82$

Conclusion Method II is easier.

Question 65:

Health: The directions for a pain reliever recommend that an adult of 60 kg and overtake 4 tablets every 4 hours as needed, and an adult who weighs between 40 kg and 50 kg take only $2\frac{1}{2}$ tablets every 4 hours as needed. Each tablet weighs $\frac{4}{25}$ gram.

(a) If a 72 kg adult takes 4 tablets, how many grams of pain reliever is he or she receiving?

(b) How many grams of pain reliever is recommended dose for an adult weighing 46 kg?

Solution:

(a) Given, 72 kg adult takes 4 tablets and each tablet weighs $\frac{4}{25}$ g.

$\therefore$ Total weight of pain reliever, he/she is receiving

$$= 4 \times \frac{4}{25} g = \frac{16}{25} g$$

(b) Given, Adult weighing 46 kg takes $2\frac{1}{2}$ tablets and each tablet weighs $\frac{4}{25}$ g.

$\therefore$ Total weight of pain reliever, he/she is receiving

$$= \left(\frac{4}{25} \times 2\frac{1}{2}\right) g = \left[\frac{4}{25} \times \frac{(2 \times 2) + 1}{2}\right] g$$

$$= \left(\frac{4}{25} \times \frac{5}{2}\right) g$$

$$= \frac{2}{5} g$$

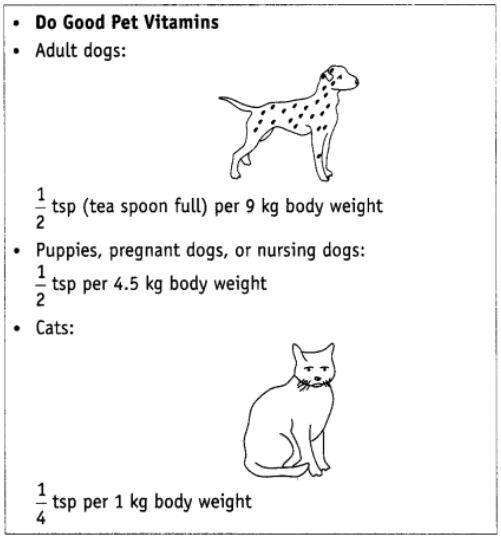
Question 66:

Animals: The label on a bottle of pet vitamins lists dosage guidelines. What dosage would you give to each of these animals?

(a) a 18 kg adult dog

(b) a 6 kg cat

(c) a 18 kg pregnant dog



Solution:

(a) Dosage prescribed for a adult dog is $\frac{1}{2}$ tsp per 9 kg body weight.

$$\therefore \text{For a 18 kg adult dog, dosage} = \frac{\left(\frac{1}{2}\right)}{9} \times 18 = \frac{1}{2 \times 9} \times 18$$

$$= \frac{1}{18} \times 18 = 1 \text{ tsp}$$

(b) Dosage prescribed for a cat is $\frac{1}{4}$ tsp per 1 kg body weight.

$$\therefore \text{For a 6 kg cat, dosage} = \frac{\left(\frac{1}{4}\right)}{1} \times 6 = \frac{1}{4} \times 6 \text{ tsp}$$

$$= \frac{6}{4} = \frac{3}{2} \text{ tsp}$$

$$= 1\frac{1}{2} \text{ tsp}$$

(c) Dosage prescribed for pregnant dog is $\frac{1}{2}$ tsp per 4.5 kg body weight.

$$\therefore \text{For a 18 kg pregnant dog, dosage} = \frac{\left(\frac{1}{2}\right)}{4.5} \times 18$$

$$= \frac{1}{2 \times 4.5} \times 18 = \frac{1}{9} \times 18$$

$$= \frac{18}{9} \text{ tsp} = 2 \text{ tsp}$$

Question 67:

How many $\frac{1}{16}$ kg boxes of chocolates can be made with $1\frac{1}{2}$ kg chocolates?

Solution:

$$\text{Total chocolates} = 1\frac{1}{2} \text{ kg} = \frac{(1 \times 2) + 1}{2} = \frac{3}{2} \text{ kg}$$

$$\therefore \text{Number of boxes of chocolates of } \frac{1}{16} = \frac{\text{Total chocolates}}{\text{Weight of 1 box}} = \left(\frac{3}{2} \div \frac{1}{16}\right)$$

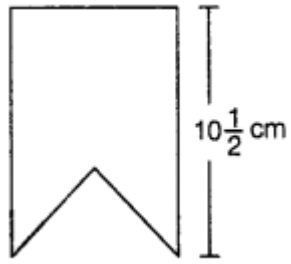
$$= \frac{3}{2} \times 16 \qquad [\because \text{reciprocal of } \frac{1}{16} = 16]$$

$$= 3 \times 8$$

$$= 24$$

Question 68:

Anvi is making bookmarker like the one shown in the given figure. How many bookmarker can she make from a 15 m long ribbon?



Solution:

Height of one bookmarker $= 10\frac{1}{2}$ cm

$$= \frac{(10 \times 2) + 1}{2} = \frac{21}{2} \text{ cm}$$

Length of ribbon = 15 m = 1500 cm

$$\therefore \text{Number of bookmarkers} = \frac{\text{Length of ribbon}}{\text{Height of one bookmarker}} \qquad [\because 1\text{m} = 100 \text{ cm}]$$

$$= \frac{1500}{\frac{21}{2}}$$

$$= \frac{1500}{21} \times 2$$

$$= 142.85 \approx 142$$

Hence, 142 bookmarkers can be made from a 15 m long ribbon.

Question 69:

A rule for finding the approximate length of diagonal of a square is to multiply the length of a side of the square by 1.414.

Find the length of the diagonal when:

(a) the length of a side of the square is 8.3 cm.

(b) the length of a side of the square is exactly 7.875 cm.

Solution:

(a) Side of square = 8.3 cm

$\therefore$ Length of diagonal = Length of side of the square × 1.414

$$= 8.3 \times 1.414$$

$$= 11.7362$$

$$= 11.74 \text{ cm (approx.)}$$

(b) Side of square = 7.875 cm

$\therefore$ Length of diagonal = Length of side of the square × 1.414

$$= 7.875 \times 1.414$$

$$= 11.13525$$

$$= 11.14 \text{ cm (approx.)}$$

Question 70:

The largest square that can be drawn in a circle has a side whose length is 0.707 times the diameter of the circle. By this rule, find the length of the side of such a square, when the diameter of the circle is

(a) 14.35 cm
(b) 8.63 cm

Solution:

Given,

Side of square = 0.707 × Diameter of circle

(a) We have,

Diameter of circle = 14.35 cm

∴ Side of square = 0.707 × 14.35

= 10.15 cm

(b) We have,

Diameter of circle = 8.63 cm

∴ Side of square = 0.707 × 8.63

= 6.10 cm

Question 71:

To find the distance around a circular disc, multiply the diameter of the disc by 3.14.
What is the distance around the disc, when
(a) the diameter is 18.7cm?
(b) the radius is 6.45cm?

Solution:

Given,

Distance around a circular disc = Diameter of disc × 3.14

(a) Diameter of disc = 18.7 cm

Distance around a circular disc = 18.7 × 3.14

= 58.718 cm

(b) Radius of disc = 6.45 cm

Diameter of disc = 2 × Radius of disc = 2 × 6.45 = 12.9 cm

Distance around a circular disc = 12.9 × 3.14

= 40.506 cm

Question 72:

What is the cost of 27.5 m of cloth at Rs. 53.50 per metre ?

Solution:

By unitary method,

Cost of 1 m of cloth = ₹ 53.50

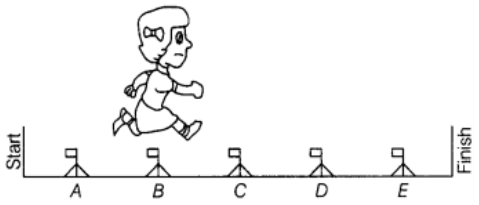
Cost of 27.5 m of cloth = ₹ (53.50 × 27.5)

$$= ₹\left(\frac{5350}{100} \times \frac{275}{10}\right) = ₹\left(\frac{1471250}{1000}\right)$$

= ₹ 1471.25

Question 73:

In a hurdle race, Nidhi is over hurdle B and $\frac{2}{6}$ of the way through the race, as shown in the given figure.



Then, answer the following:

(a) Where will Nidhi be, when she is $\frac{4}{6}$ of the way through the race?

(b) Where will Nidhi be, when she is $\frac{5}{6}$ of the way through the race?

(c) Give two fractions to tell what part of the race Nidhi has finished, when she is over hurdle C.

Solution:

Since, if Nidhi is at B, then $\frac{2}{6}$ of the way is completed.

$$\therefore \text{If she is at } A, \text{ she will cover} = \frac{\left(\frac{2}{6}\right)}{2} \times 1 = \frac{2}{6 \times 2}$$

$$= \frac{1}{6} \text{ way}$$

(a) When she is $\frac{4}{6}$ of the way, she will be at $\frac{\left(\frac{4}{6}\right)}{\left(\frac{1}{6}\right)}$ position

$$= \left(\frac{4}{6} \times \frac{6}{1}\right) \qquad [\because \text{reciprocal of } \frac{1}{6} = 6]$$

$$= 4\text{th position}$$

$$= D$$

(b) When she is $\frac{5}{6}$ of the way, she will be at $\frac{\left(\frac{5}{6}\right)}{\left(\frac{1}{6}\right)}$ position

$$= \frac{5}{6} \times \frac{6}{1} = 5\text{th position}$$

$$= E$$

(c) When she is over hurdle C, she has completed half race. Hence, she will be at $\frac{3}{6}$ way

$$= \frac{3}{6} = \frac{1}{2} \text{ way}$$

Question 74:

Diameter of Earth is 12756000 m. In 1996, a new planet was discovered, whose diameter is $\frac{5}{86}$ of the diameter of Earth. Find the diameter of this planet in km.

Solution:

Given, diameter of Earth = 12756000 m = $\frac{12756000}{1000}$ = 12756 km

According to the question,

Diameter of new planet $= \frac{5}{86}$ of diameter of Earth

$= \frac{5}{86} \times 12756 = \frac{63780}{86}$

$= 741.62$ km

Question 75:

What is the product of $\frac{5}{129}$ and its reciprocal?

Solution:

$\because$ Reciprocal of $\frac{5}{129} = \frac{129}{5}$

$\therefore$ Product of $\frac{5}{129}$ and its reciprocal

$= \frac{5}{129} \times \frac{129}{5} = 1$

Note *Product of any number and its reciprocal is always 1.*

Question 76:

Simplify: $\frac{2\frac{1}{2} + \frac{1}{5}}{2\frac{1}{2} + \frac{1}{5}}$

Solution:

Given, $\frac{2\frac{1}{2} + \frac{1}{5}}{2\frac{1}{2} + \frac{1}{5}} = \frac{\frac{(2 \times 2) + 1}{2} + \frac{1}{5}}{\frac{(2 \times 2) + 1}{2} + \frac{1}{5}}$

$= \frac{\frac{5}{2} + \frac{1}{5}}{\frac{5}{2} + \frac{1}{5}} = \frac{\frac{25 + 2}{10}}{\frac{5}{2} \times 5}$ $\left[\because \text{reciprocal of } \frac{1}{5} = 5\right]$

$= \frac{\frac{27}{10}}{\frac{25}{2}} = \frac{27}{10} \times \frac{2}{25}$ $\left[\because \text{reciprocal of } \frac{25}{2} = \frac{2}{25}\right]$

$= \frac{27}{125}$

Question 77:

Simplify: $\dfrac{\frac{1}{4}+\frac{1}{5}}{1-\frac{3}{8}\times\frac{3}{5}}$

Solution:

Given, $\dfrac{\frac{1}{4}+\frac{1}{5}}{1-\frac{3}{8}\times\frac{3}{5}} = \dfrac{\frac{5+4}{20}}{1-\frac{9}{40}}$

$= \dfrac{\frac{9}{20}}{\frac{40-9}{40}}$

$= \dfrac{\frac{9}{20}}{\frac{31}{40}} = \dfrac{9}{20}\times\dfrac{40}{31}$ $\left[\because \text{reciprocal of } \dfrac{31}{40} = \dfrac{40}{31}\right]$

$= \dfrac{18}{31}$

Question 78:

Divide $\dfrac{3}{10}$ by $\left(\dfrac{1}{4} \text{ of } \dfrac{3}{5}\right)$.

Solution:

Given, $\dfrac{3}{10} \div \left(\dfrac{1}{4} \text{ of } \dfrac{3}{5}\right) = \dfrac{3}{10} \div \left(\dfrac{1}{4}\times\dfrac{3}{5}\right)$

$= \dfrac{3}{10} \div \left(\dfrac{3}{20}\right)$

$= \dfrac{3}{10}\times\dfrac{20}{3}$ $\left[\because \text{reciprocal of } \dfrac{3}{20} = \dfrac{20}{3}\right]$

$= 2$

Question 79:

$\dfrac{1}{8}$ of a number equals $\dfrac{2}{5} \div \dfrac{1}{20}$. What is the number?

Solution:

Let the number be x.

Then, $\frac{1}{8}$ of a number $= \frac{2}{5} \div \frac{1}{20}$ [given]

$\Rightarrow \quad \frac{1}{8} \times x = \frac{2}{5} \times 20 \quad \left[\because \text{reciprocal of } \frac{1}{20} = 20\right]$

$\Rightarrow \quad \frac{x}{8} = 8$

$\Rightarrow \quad x = 8 \times 8$

$\Rightarrow \quad x = 64$

Hence, the number is 64.

Question 80:

Heena's father paid an electric bill of Rs. 385.70 out of a Rs. 500 note. How much change should he have received?

Solution:

Given, total rupees = Rs. 500

and money paid = Rs. 385.70

∴ Change he received = Rs. (500 – 385.70) = Rs. 114.30

Question 81:

The normal body temperature is 98.6°F. When Savitri was ill, her temperature rose to 103.1°F. How many degrees above normal was that?

Solution:

Given, normal body temperature = 98.6° F

and temperature rise to = 103.1° F

∴Rise in temperature = (103.1 – 98.6)° F = 4.5° F

Question 82:

Meteorology One measure of average global temperature shows how each year varies from a base measure.The table shows results for several years.

Year	1958	1964	1965	1978	2002
Difference from base	0.10°C	−0.17°C	−0.10°C	$\left(\frac{1}{50}\right)^{\circ}$C	0.54°C

See the table and answer the following:

(a) Order the five years from coldest to warmest.

(b) In 1946, the average temperature varied by – 0.03°C from the base measure. Between which two years should 1946 fall, when the years are ordered from coldest to warmest?

Solution:

In year 1978, temperature is $\left(\frac{1}{50}\right)^{\circ}$C = 0.02°C

(a) By observing coldest to warmest order is ascending order.

$\therefore$ – 0.17°C < – 0.10°C < 0.02°C < 0.10°C < 0.54°C

Order of years is

1964 < 1965 < 1978 < 1958 < 2002

(b) In 1946, temperature is – 0.03°C.

We know that, – 0.03°C lies between – 0.10°C and $\left(\frac{1}{50}\right)^{\circ}$C or 0.02° C

$\therefore$ – 0.10°C < – 0.03° C < 0.02° C

Hence, the coldest to warmest order including 1946 is

1964 < 1965 < 1946 < 1978 < 1958 < 2002.

Science Application

Question 83:
In her Science class, Jyoti learned that the atomic weight of Helium is 4.0030; of Hydrogen is 1.0080; and of Oxygen is 16.0000. Find the difference between the atomic weights of:
(a) Oxygen and Hydrogen
(b) Oxygen and Helium
(c) Helium and Hydrogen.
Solution:

Given, atomic weight of Helium = 4.0030, Hydrogen = 1.0080

and Oxygen = 16.0000

(a) Difference between atomic weights of Oxygen and Hydrogen

$$\begin{array}{r} 16.0000 \\ -\ 01.0080 \\ \hline 14.9920 \end{array}$$

(b) Difference between atomic weights of Oxygen and Helium

$$\begin{array}{r} 16.0000 \\ -\ 04.0030 \\ \hline 11.9970 \end{array}$$

(c) Difference between atomic weights of Helium and Hydrogen

$$\begin{array}{r} 4.0030 \\ -\ 1.0080 \\ \hline 2.9950 \end{array}$$

Question 84:
Measurement made in Science lab must be as accurate as possible. Ravi measured the length of an iron rod and said, it was 19.34 cm long; Kamal said 19.25 cm; and Tabish said 19.27 cm. The correct length was 19.33 cm. How much of error was made by each of the boys?
Solution:
The actual length of an iron rod = 19.33 cm

Measured Ravi = 19.34 cm
Error = Measured value – Actual value
= (19.34-19.33) cm = 0.01 cm
Kamal measured = 19.25 cm
Error = (19.25- 19.33) cm = – 0.08 cm
Tabish measured = 19.27 cm
Error = (19 27 -19.33) cm = – 0.06 cm

Question 85:
When 0.02964 is divided by 0.004, What will be the quotient?
Solution:

$$\text{Given, } 0.02964 \div 0.004 = \frac{2964}{100000} \div \frac{4}{1000}$$
$$= \frac{2964}{100000} \times \frac{1000}{4} \qquad \left[\because \text{reciprocal of } \frac{4}{1000} = \frac{1000}{4}\right]$$
$$= \frac{741}{100} = 7.41$$

Question 86:
What number divided by 520 gives the same quotient as 85 divided by 0.625 ?
Solution:

Let the number be x.

According to the question, $\frac{x}{520} = \frac{85}{0.625}$

$\Rightarrow$ $x = \frac{85 \times 520 \times 1000}{625} = \frac{44200000}{625}$ [by corss-multiplication]

$\Rightarrow$ $x = 70720$

Hence, the number is 70720.

Question 87:
A floor is 4.5 m long and 3.6 m wide. A 6 cm square tile costs ?Rs. 23.25. What will be the cost to cover the floor with these tiles?
Solution:

Let the number be x.

According to the question, $\frac{x}{520} = \frac{85}{0.625}$

$\Rightarrow$ $x = \frac{85 \times 520 \times 1000}{625} = \frac{44200000}{625}$ [by corss-multiplication]

$\Rightarrow$ $x = 70720$

Hence, the number is 70720.

Question 88:

Sunita and Rehana want to make dresses for their dolls. Sunita has $\frac{3}{4}$ m of cloth and she gave $\frac{1}{3}$ of it to Rehana. How much did Rehana have?

Solution:

Given, Sunita has $\frac{3}{4}$ m of cloth.

$\therefore$ She gave cloth to Rehana $= \frac{1}{3}$ of $\frac{3}{4} = \frac{1}{3} \times \frac{3}{4}$

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

Hence, Rehana has $\frac{1}{4}$ m of cloth.

Question 89:

A flower garden is 22.50 m long. Sheela wants to make a border along one side using bricks that are 0.25 m long. How many bricks will be needed?

Solution:

Length of flower garden = 22.50 m

Length one of brick = 0.25 m

Number of bricks used in one side

$$= \frac{\text{Length of flower garden}}{\text{Length of a brick}} = \frac{22.50}{0.25} = \frac{2250}{25} = 90$$

Hence, 90 bricks will be needed.

Question 90:

How much cloth will be used in making 6 shirts, if each required $2\frac{1}{4}$ m of cloth, allowing $\frac{1}{8}$ m for waste in cutting and finishing in each shirt?

Solution:

Cloth required in making one shirt

$$= \left(2\frac{1}{4} + \frac{1}{8}\right) = \frac{(2 \times 4) + 1}{4} + \frac{1}{8}$$

$$= \frac{9}{4} + \frac{1}{8} = \frac{18 + 1}{8} \qquad [\because \text{LCM of 4 and 8} = 8]$$

$$= \frac{19}{8} \text{ m}$$

$\therefore$ Total cloth required in making such 6 shirts = 6 × Cloth required in one shirt

$$= 6 \times \frac{19}{8} = \frac{114}{8} = \frac{57}{4} = 14\frac{1}{4} \text{ m}$$

Hence, $14\frac{1}{4}$ m cloth will be used in making 6 shirts.

Question 91:

A picture hall has seats for 820 persons. At a recent film show, one usher guessed it was $\frac{3}{4}$ full, another that it was $\frac{2}{3}$ full. The ticket office reported 648 sales. Which usher (first or second) made the better guess?

Solution:

Given, picture hall has seats = 820

One usher guessed, picture hall was $\frac{3}{4}$ full.

$$\therefore \frac{3}{4} \text{ of } 820 = \frac{3}{4} \times 820 = \frac{3 \times 820}{4} = \frac{2460}{4} = 615$$

Another usher guessed, picture hall was $\frac{2}{3}$ full.

$$\therefore \frac{2}{3} \text{ of } 820 = \frac{2}{3} \times 820 = \frac{2 \times 820}{3} = \frac{1640}{3} = 546.66$$

Since, 648 tickets are sold that is near to 615.

So, first usher guess was better.

Note *In many situations, we solve our problems by approximation or guessing.*

Question 92:

For the celebrating children's day, students of Class VII bought sweets for Rs. 740.25 and cold drink for Rs. 70. If 35 students contributed equally what amount was contributed by each student?

Solution:

Cost of sweets = ₹ 740.25

Cost of cold drink = ₹ 70

Total cost = ₹ (740.25 + 70) = ₹ 810.25

Given that, 35 students are contributing equally.

∴ Amount contributed by each student

$$= ₹\frac{810.25}{35} = ₹\frac{81025}{35 \times 100} = ₹\frac{2315}{100}$$

$$= ₹23.15$$

Question 93:

The time taken by Rohan in five different races to run a distance of 500 m was 3.20 minutes, 3.37 minutes, 3.29 minutes, 3.17 minutes and 3.32 minutes. Find the average time taken by him in the races.

Solution:

Total time taken by Rohan in five races

$$= (3.20 + 3.37 + 3.29 + 3.17 + 3.32)$$

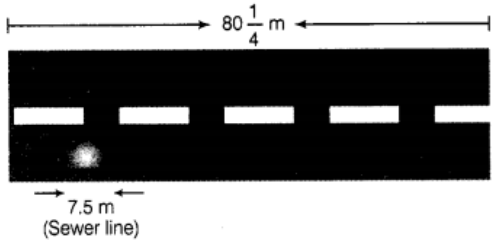
$$= 16.35 \text{ min}$$

∴ Average time taken by Rohan

$$= \frac{\text{Total time taken}}{\text{Total number of observations}} = \frac{\text{Total time taken}}{5} = \frac{16.35}{5} = \frac{1635}{5 \times 100} = \frac{327}{100} = 3.27 \text{ min}$$

Question 94:

A public sewer line is being installed along $80\frac{1}{4}$ m of road. The supervisor says that the labourers will be able to complete 7.5 m in one day. How long will the project take to complete?



Solution:

$$\text{Total sewer line to be installed} = 80\frac{1}{4}\text{ m} = \frac{(80\times 4)+1}{4} = \frac{321}{4}\text{ m}$$

In one day labourers can complete $= 7.5$ m

$\therefore$ Number of days to complete the project

$$= \frac{\text{Total sewer line to be installed}}{\text{One day work}} = \frac{\left(\frac{321}{4}\right)}{7.5}$$

$$= \frac{321}{4\times 7.5} = \frac{312}{30}$$

$$= 10.4 \text{ days} \approx 11 \text{ days.}$$

$\therefore$ Hence, the number of days to complete the project will be 11 days.

Question 95:

The weight of an object on Moon is $\frac{1}{6}$ its weight on Earth. If an object weighs $5\frac{3}{5}$ kg on Earth, how much would it weigh on the Moon?

Solution:

Weight of an object on the Moon is $\frac{1}{6}$ of its weight on Earth.

$$\text{Object weighs on Earth} = 5\frac{3}{5}\text{ kg} = \frac{(5\times 5)+3}{5} = \frac{28}{5}\text{ kg}$$

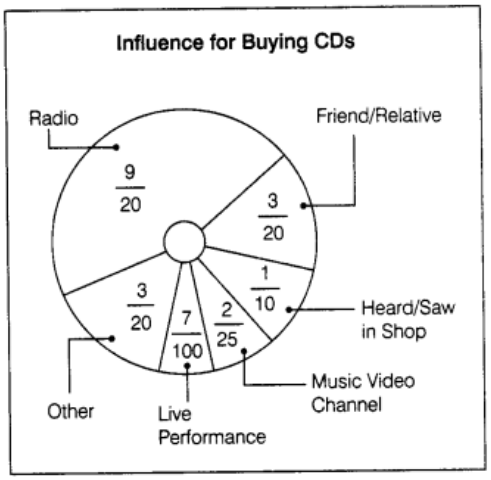
$$\text{Weight on Moon} = \frac{1}{6} \text{ of } \frac{28}{5}\text{ kg}$$

$$= \frac{1}{6}\times\frac{28}{5} = \frac{28}{30} = \frac{14}{15} = 0.93\text{ kg}$$

Hence, the weigh of an object on the Moon is 0.93 kg.

Question 96:

In a survey, 200 students were asked what influenced them most to buy their latest CD. The results are shown in the circle graph



(a) How many students said radio influenced them most?
(b) How many students were influenced by radio than by a music video channel?
(c) How many said a friend or relative influenced them or they heard the CD in a shop?

Solution:

(a) Fraction of radio (in figure) $= \frac{9}{20}$

Total number of students $= 200$

$\therefore$ Number of students influenced by radio the most $\frac{9}{20}$ of $200 = \frac{9}{20} \times 200$

$= 90$

(b) We have to find,

(Students influenced by radio) – (Students influenced by music video channel)

= (Fraction of radio × Total number of students)
– (Fraction of music video channel × Total number of students)

$= \frac{9}{20}$ of $200 - \frac{2}{25}$ of 200

$= \frac{9}{20} \times 200 - \frac{2}{25} \times 200$

$= 90 - 16$

$= 74$

Hence, 74 more students were influenced by radio than by a music video channel.

(c) We have to find,

(Students who influenced by a friend or relative) + (Students who influenced by hearing song in shop)

$= \frac{3}{20}$ of $200 + \frac{1}{10}$ of 200

$= \frac{3}{20} \times 200 + \frac{1}{10} \times 200$

$= 30 + 20 = 50$

Question 97:

In the morning, a milkman filled $5\frac{1}{2}$ L of milk in his can. He sold to Renu, Kamla and Renuka $\frac{3}{4}$ L each; to Shadma he sold $\frac{7}{8}$ L; and to Jassi he gave $1\frac{1}{2}$ L. How much milk is left in the can?

Solution:

Given, milk in can = $5\frac{1}{2}$ L

$$= \frac{(5\times 2)+1}{2} = \frac{10+1}{2} = \frac{11}{2} \text{ L}$$

If $\frac{3}{4}$ L sold to Renu, Kamla and Renuka.

Then, total milk sold $= \frac{3}{4}+\frac{3}{4}+\frac{3}{4} = \frac{3+3+3}{4} = \frac{9}{4}$ L

Milk sold to Shadma $= \frac{7}{8}$ L

Milk sold to Jassi $= 1\frac{1}{2}$ L $= \frac{(1\times 2)+1}{2} = \frac{3}{2}$ L

Total milk sold $= \frac{9}{4}+\frac{7}{8}+\frac{3}{2} = \frac{18+7+12}{8} = \frac{37}{2}$ L

$\therefore$ Total milk left in can $= \frac{11}{2} - \left(\frac{37}{8}\right) = \frac{44-37}{8} = \frac{7}{8}$ L [$\because$ LCM of 2 and 8 = 8]

Hence, $\frac{7}{8}$ L milk is left in the can.

Question 98:

Anuradha can do a piece of work in 6hours. What part of the work can she do in 1 hour, in 5 hours and in 6 hours?

Solution:

It is given that, Anuradha can do a piece of work in 6 h.

In other words,

In 6 h, Anuradha can do = Complete the work

In 1 h, Anuradha can do = $\frac{1}{6}$ part of work

In 5 h, Anuradha can do = $\frac{1}{6}\times 5 = \frac{5}{6}$ part of work

Question 99:

What portion of a 'saree' can Rehana paint in 1 hour, if it requires 5hours to paint the whole saree? In $4\frac{3}{5}$ hours? In $3\frac{1}{2}$ hours?

Solution:

In 5 h, Rehana paints = Whole saree

In 1 h, she paints = $\frac{1}{5}$ part of saree

In $4\frac{3}{5}$ h, she paints = $\frac{1}{5} \times 4\frac{3}{5} = \frac{1}{5} \times \frac{(5 \times 4) + 3}{5} = \frac{1}{5} \times \frac{23}{5}$

$= \frac{23}{25}$ part of saree

In $3\frac{1}{2}$ h, she paints = $\frac{1}{5} \times 3\frac{1}{2} = \frac{1}{5} \times \frac{(3 \times 2) + 1}{2}$

$= \frac{1}{5} \times \frac{7}{2} = \frac{7}{10}$ part of saree

Question 100:

Rama has $6\frac{1}{4}$ kg of cotton wool for making pillows. If one pillow takes $1\frac{1}{4}$ kg, how many pillows can she make?

Solution:

Given, Rama has $6\frac{1}{4}$ kg of cotton for making pillows

i.e. $6\frac{1}{4}$ kg = $\frac{(6 \times 4) + 1}{4} = \frac{24 + 1}{4} = \frac{25}{4}$ kg

where, one pillow can be made from $1\frac{1}{4}$ kg

i.e. $1\frac{1}{4}$ kg = $\frac{(1 \times 4) + 1}{4} = \frac{4 + 1}{4} = \frac{5}{4}$ kg

$\therefore$ Number of pillows = $\frac{\text{Total quantity of cotton available}}{\text{Cotton used in one pillow}}$

$= \frac{\left(\frac{25}{4}\right)}{\left(\frac{5}{4}\right)} = \frac{25}{4} \times \frac{4}{5} = \frac{25}{5} = 5$ [$\because$ division is reverse of the multiplication]

Hence, Rama can make 5 pillows.

Question 101:

It takes $2\frac{1}{3}$ m of cloth to make a shirt. How many shirts can Radhika make from a piece of cloth $9\frac{1}{3}$ m long?

Solution:

Given, Radhika takes $2\frac{1}{3}$ m of cloth to make a shirt

i.e. $2\frac{1}{3}\text{ m} = \frac{(2\times 3)+1}{3} = \frac{6+1}{3} = \frac{7}{3}\text{ m}$

If Radhika has $9\frac{1}{3}$ m long cloth

i.e $9\frac{1}{3}\text{ m} = \frac{(9\times 3)+1}{3} = \frac{27+1}{3} = \frac{28}{3}\text{ m}$

Then, number of shirts that can be made $= \frac{\text{Available cloth}}{\text{Required cloth to make one shirt}}$

$= \frac{28/3}{7/3} = \frac{28}{3}\times\frac{3}{7}$ [$\because$ division is reverse of the multiplication]

$= \frac{28}{7} = 4$

Hence, Radhika can make 4 shirts from available piece of cloth.

Question 102:

Ravi can walk $3\frac{1}{3}$ km in one hour. How long will it take him to walk to his office which is 10 km from his home?

Solution:

Given, Ravi can walk $3\frac{1}{3}$ km in 1 h.

$\therefore$ Ravi's speed $= 3\frac{1}{3}\text{ km/h} = \frac{(3\times 3)+1}{3}$ $\left[\because \text{speed} = \frac{\text{distance}}{\text{time}}\right]$

$= \frac{9+1}{3} = \frac{10}{3}\text{ km/h}$

$\because$ Distance between Ravi and his office = 10 km

$\therefore$ Time $= \frac{\text{Distance between Ravi and his office}}{\text{Ravi's speed in 1 h}}$

$= \frac{10}{\frac{10}{3}} = \frac{10}{1}\times\frac{3}{10}$ [$\because$ division is reverse of the multiplication]

$= \frac{30}{10} = 3\text{ h}$

Hence, Ravi reaches his office in 3 h.

Question 103:

Raj travels 360 km on three-fifth of his petrol tank. How far would he travel at the same rate with a full tank of petrol?

Solution:

Given, Raj travels 360 km on three-fifth of his petrol tank.

$\therefore$ Total distance travelled = Reciprocal of $\frac{3}{5} \times 360$ km

$$= \frac{5}{3} \times 360 = 5 \times 120 = 600 \text{ km}$$

Hence, total distance travelled by Raj from the available petrol tank is 600 km.

Question 104:

Kajol has ₹ 75. This is $\frac{3}{8}$ of the amount she earned. How much did she earn?

Solution:

Given, Kajol has rupees ₹ 75.

According to the question, $75 = \frac{3}{8}$ of amount earned

$\Rightarrow$ $75 = \frac{3}{8} \times$ amount earned

$\therefore$ Amount earned $= \frac{75}{3} \times 8 = ₹200$

"

Question 105:

It takes 17 full specific type of trees to make one tonne of paper. If there are 221 such trees in a forest, then

(i) what fraction of forest will be used to make
   (a) 5 tonne of paper?
   (b) 10 tonne of paper?

(ii) To save $\frac{7}{13}$ part of the forest, how much of paper we have to made?

Solution:

(i) (a) 1 tonne of paper require = 17 trees

$\therefore$ 5 tonne of paper require $= 17 \times 5$ trees = 85 trees

Now, there are 221 trees in the forest.

So, 85 trees covers $= \frac{85}{221}$ fraction of forest

$$= \frac{5}{13} \text{ fraction of forest}$$

(b) Similarly,

10 tonne of paper require $= 17 \times 10$ trees $= 170$ trees

So, 170 trees covers $= \frac{170}{221}$ fraction of forest

$$= \frac{10}{13} \text{ fraction of forest}$$

(ii) $\frac{7}{13}$ part of forest $= \frac{7}{13} \times 221$ trees $= 119$ trees

$\therefore$ Number of tonnes of paper which can be made by 119 trees $= \frac{119}{17} = 7$

Question 106:

Simplify and write the result in decimal form:

$$\left(1+\frac{2}{9}\right)+\left(1+3\frac{1}{5}\right)+\left(1+2\frac{2}{3}\right)$$

Solution:

Given, $\left(1+\frac{2}{9}\right)+\left(1+3\frac{1}{5}\right)+\left(1+2\frac{2}{3}\right)$

$$=\left(1+\frac{2}{9}\right)+\left(1+\frac{(5\times3)+1}{5}\right)+\left(1+\frac{(2\times3)+2}{3}\right)$$

$$=\left(1\times\frac{9}{2}\right)+\left(1+\frac{16}{5}\right)+\left(1+\frac{8}{3}\right)=\left(1\times\frac{9}{2}\right)+\left(1\times\frac{5}{16}\right)+\left(1\times\frac{3}{8}\right)$$

$$=\frac{9}{2}+\frac{5}{16}+\frac{3}{8}$$

$$=\frac{72+5+6}{16} \quad \text{[taking LCM]}$$

$$=\frac{83}{16}$$

$$=5.1875$$

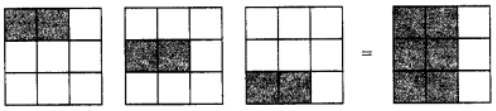
Question 107:

Some pictures (a) to (f) are given below. Tell which of them show:

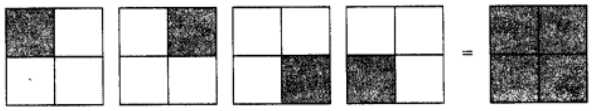
(1) $2\times\frac{1}{4}$ (2) $2\times\frac{3}{7}$ (3) $2\times\frac{1}{3}$

(4) $\frac{1}{4}\times4$ (5) $3\times\frac{2}{9}$ (6) $\frac{1}{4}\times3$

(a)

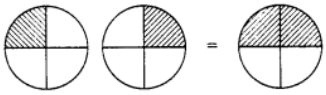


(b)

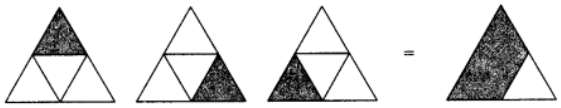


(c)

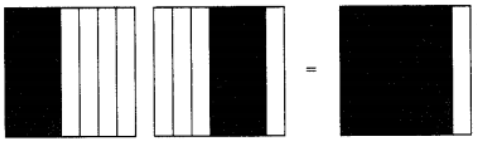
(d)



(e)

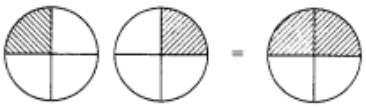


(f)



Solution:

(1) → (d)



$\frac{1}{4}+\frac{1}{4}=2\times\frac{1}{4}$

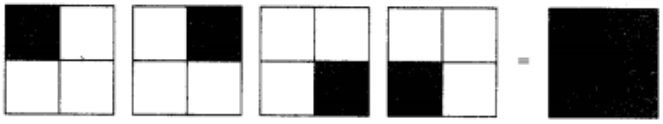
(2) → (f)

$\frac{3}{7}+\frac{3}{7}=2\times\frac{3}{7}$

(3) → (c)

$\frac{1}{3}+\frac{1}{3}=2\times\frac{1}{3}$

(4) → (b)



$\frac{1}{4}+\frac{1}{4}+\frac{1}{4}+\frac{1}{4}=4\times\frac{1}{4}$

(5) → (a)

$\frac{2}{9}+\frac{2}{9}+\frac{2}{9}=3\times\frac{2}{9}$

(6) → (e)

$\frac{1}{4}+\frac{1}{4}+\frac{1}{4}=3\times\frac{1}{4}$

Question 108:

Evaluate: (0.3) x (0.3)-(0.2) x (0.2)

Solution:

Given, $(0.3)\times(0.3)-(0.2)\times(0.2)$

$\because\ 0.3=\frac{3}{10}$ and $0.2=\frac{2}{10}$

$\therefore\ \left(\frac{3}{10}\times\frac{3}{10}\right)-\left(\frac{2}{10}\times\frac{2}{10}\right)=\frac{9}{100}-\frac{4}{100}$

$=\frac{9-4}{100}=\frac{5}{100}$ [taking LCM]

$=0.05$

Question 109:

Evaluate: $\frac{0.6}{0.3}+\frac{0.16}{0.4}$

Solution:

Given, $\frac{0.6}{0.3}+\frac{0.16}{0.4}$

$\because 0.6=\frac{6}{10}$ and $0.3=\frac{3}{10}$, $0.16=\frac{16}{100}$ and $0.4=\frac{4}{10}$

$\therefore \frac{0.6}{0.3}+\frac{0.16}{0.4}=\frac{\frac{6}{10}}{\frac{3}{10}}+\frac{\frac{16}{100}}{\frac{4}{10}}=\left(\frac{6}{10}\times\frac{10}{3}\right)+\left(\frac{16}{100}\times\frac{10}{4}\right)$ [$\because$ division is reverse of the multiplication]

$=\frac{60}{30}+\frac{160}{400}=\frac{6}{3}+\frac{16}{40}=\frac{2}{1}+\frac{4}{10}=\frac{20+4}{10}$ [$\because$ LCM of 1 and 10 = 10]

$=\frac{24}{10}=\frac{12}{5}=2.4$

Question 110:

Find the value of $\frac{(0.2\times0.14)+(0.5\times0.91)}{(0.1\times0.2)}$.

Solution:

Given, $\frac{(0.2\times0.14)+(0.5\times0.91)}{(0.1\times0.2)}$

$\because 0.2=\frac{2}{10}$, $0.14=\frac{14}{100}$ and $0.5=\frac{5}{10}$

$0.91=\frac{91}{100}$, $0.1=\frac{1}{10}$ and $0.2=\frac{2}{10}$

$\therefore \frac{(0.2\times0.14)+(0.5\times0.91)}{(0.1\times0.2)}=\frac{\left(\frac{2}{10}\times\frac{14}{100}\right)+\left(\frac{5}{10}\times\frac{91}{100}\right)}{\left(\frac{1}{10}\times\frac{2}{10}\right)}=\frac{\frac{2\times14}{1000}+\frac{5\times91}{1000}}{\frac{1\times2}{100}}$

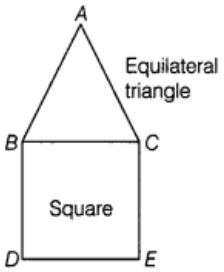
$=\frac{\frac{28}{1000}+\frac{455}{1000}}{\frac{2}{100}}$

$=\frac{\frac{28+455}{1000}}{\frac{2}{100}}=\frac{\frac{483}{1000}}{\frac{2}{100}}=\frac{483}{1000}\times\frac{100}{2}$ [$\because$ division is reverse of the multiplication]

$=\frac{483}{10\times2}=\frac{241.5}{10}=24.15$

Question 111:

A square and an equilateral triangle have a side in common. If side of triangle is $\frac{4}{3}$ cm long, find the perimeter of figure formed (see the figure).



Solution:

As square and equilateral triangle both have a common side, i.e. BC.

So, all the sides of square and triangle will be equal and of measure $\frac{4}{3}$ cm.

$\therefore$ Perimeter of the figure $= AB + BD + DE + EC + AC$

$= 5 \times AB$ [since, all the lengths are equal]

$= 5 \times \frac{4}{3}$

$= \frac{20}{3}$ cm

Question 112:

Rita has bought a carpet of size $4\,\text{m} \times 6\frac{2}{3}$ m. But her room size is $3\frac{1}{3}\text{m} \times 5\frac{1}{3}$ m. What fraction of area should be cut-off to fit wall-wall carpet into the room?

Solution:

Given, carpet size $= 4\,\text{m} \times 6\frac{2}{3}\,\text{m} = 4 \times \frac{(6 \times 3) + 2}{3}$

$= 4 \times \frac{(18+2)}{3} = 4 \times \frac{20}{3}$

$= \frac{4}{1} \times \frac{20}{3} = \frac{80}{3} = \frac{80}{3}\,\text{m}^2$

$\because$ Room size $= 3\frac{1}{3}\,\text{m} \times 5\frac{1}{3}\,\text{m}$

$= \frac{(3 \times 3)+1}{3} \times \frac{(5 \times 3)+1}{3} = \frac{(9+1)}{3} \times \frac{(15+1)}{3}$

$= \frac{10}{3} \times \frac{16}{3} = \frac{160}{9}\,\text{m}^2$

$\therefore$ Difference between the area of carpet and room sizes = Size of the carpet − Size of the room

$= \frac{80}{3} - \frac{160}{9} = \frac{240-160}{9} = \frac{80}{9}\text{m}^2$ [$\because$ LCM of 3 and 9 = 9]

In fraction,

$$\frac{\text{Area that will be cut-off}}{\text{Original area}} = \frac{\left(\frac{80}{9}\right)}{\left(\frac{80}{3}\right)} = \frac{80}{9} \times \frac{3}{80} = \frac{1}{3}$$

Hence, $\frac{1}{3}$ of area should be cut-off.

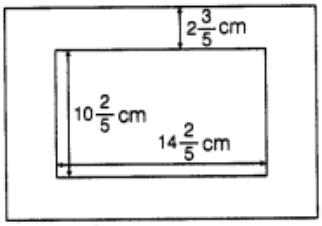
Question 113:

Family photograph has length $14\frac{2}{5}$ cm and breadth $10\frac{2}{5}$ cm. It has border of uniform width $2\frac{3}{5}$ cm. Find the area of framed photograph.

Solution:

Length of family photograph $=14\frac{2}{5}$ cm

$$=\frac{(14\times5)+2}{5}=\frac{72}{5}\text{ cm}$$



Breadth of family photograph $=10\frac{2}{5}$ cm

$$=\frac{(10\times5)+2}{5}=\frac{52}{5}\text{ cm}$$

New length including border (from both sides)

$$=\frac{72}{5}+\left(2\frac{3}{5}\times2\right)=\frac{72}{5}+\left(\frac{13}{5}\times2\right)$$

$$=\frac{72}{5}+\frac{26}{5}=\frac{72+26}{5}=\frac{98}{5}\text{ cm}$$

New width including border (from both sides)

$$=\frac{52}{5}+\left(2\frac{3}{5}\times2\right)=\frac{52}{5}+\frac{26}{5}=\frac{52+26}{5}$$

$$=\frac{78}{5}\text{ cm}$$

$\therefore$ Area of framed photograph = Length × Breadth $=\frac{98}{5}\times\frac{78}{5}=\frac{7644}{25}$

$$=305\frac{19}{25}\text{ cm}^2$$

Hence, the area of framed photograph is $305\frac{19}{25}$ cm^2.

Question 114:

Cost of a burger is ₹ $20\frac{3}{4}$ and of macpuff is ₹ $15\frac{1}{2}$. Find the cost of 4 burgers and 14 macpuffs.

Solution:

Cost of 1 burger = ₹ $20\frac{3}{4}$ = ₹ $\frac{(20\times4)+3}{4}$ = ₹ $\frac{83}{4}$

$\therefore$ Cost of 4 burgers = ₹ $4\times\frac{83}{4}$ = ₹ 83

Cost of 1 macpuffs = ₹ $15\frac{1}{2}$ = ₹ $\frac{31}{2}$

Cost of 14 macpuffs = ₹ $14\times\frac{31}{2}$ = ₹ 217

$\therefore$ Total cost of 4 burgers and 14 macpuffs = ₹(83 + 217)

= ₹ 300

Question 115:

A hill, $101\frac{1}{3}$ m in height, has $\frac{1}{4}$th of its height under water. What is the height of the hill visible above the water?

Solution:

Given, height of the hill $= 101\frac{1}{3}\text{ m} = \frac{(101\times 3)+1}{3}$

$$= \frac{303+1}{3} = \frac{304}{3}\text{ m}$$

$\because$ Height of the hill under water $= \frac{1}{4}$ of the height of the hill

$$= \frac{1}{4}\times\frac{304}{3}$$

$$= \frac{76}{3}\text{ m}$$

$\therefore$ Height of the hill above the water

= Height of the hill – Height of the hill under water

$$= \frac{304}{3} - \frac{76}{3} = \frac{228}{3} = 76\text{ cm}$$

Hence, height of the hill above the water is 76 cm.

Alternate Method

Fraction of height of the hill above water $= 1 - \frac{1}{4} = \frac{4-1}{4} = \frac{3}{4}$

So, $\frac{3}{4}$ of the height of the hill is visible.

$\therefore$ Height of the hill above the water $= \frac{3}{4}\times$ Height of the hill

$$= \frac{3}{4}\times 101\frac{1}{3}$$

$$= \frac{3}{4}\times\frac{(101\times 3)+1}{3}$$

$$= \frac{3}{4}\times\frac{304}{3} = 76\text{ m}$$

Question 116:

Sports: Reaction time measures, how quickly a runner reacts to the starter pistol? In the 100 m dash at the 2004 Olympic Games, Lauryn Williams had a reaction time of 0.214 second. Her total race time, including reaction time, was 11.03 seconds. How Long did it take her to run the actual distance?

Solution:

Time taken to run the actual distance =Total race time – Reaction time

=(11.03-0.214) s

= 10.816 s

Question 117:

State whether the answer is greater than 1 or less than 1. Put a '√' mark in appropriate box.

Questions	Greater than 1	Less than 1
$\frac{2}{3}\div\frac{1}{2}$		
$\frac{2}{3}\div\frac{2}{1}$		
$6\div\frac{1}{4}$		
$\frac{1}{5}\div\frac{1}{2}$		
$4\frac{1}{3}\div3\frac{1}{2}$		
$\frac{2}{3}\times8\frac{1}{2}$		

Solution:

(i) $\frac{2}{3}\div\frac{1}{2}=\frac{2}{3}\times\frac{2}{1}=\frac{4}{3}=1.33\,(>1)$

(ii) $\frac{2}{3}\div\frac{2}{1}=\frac{2}{3}\times\frac{1}{2}=\frac{1}{3}=0.33\,(<1)$

(iii) $6\div\frac{1}{4}=6\times\frac{4}{1}=24\,(>1)$

(iv) $\frac{1}{5}\div\frac{1}{2}=\frac{1}{5}\times\frac{2}{1}=\frac{2}{5}=0.4\,(<1)$

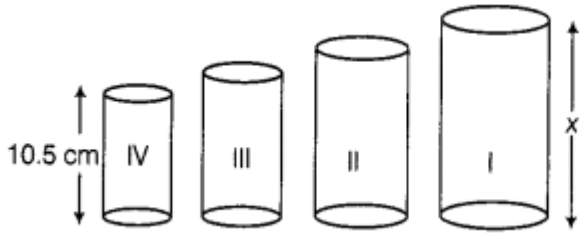
(v) $4\frac{1}{3}\div3\frac{1}{2}=\frac{13}{3}\div\frac{7}{2}=\frac{13}{3}\times\frac{2}{7}=\frac{26}{21}=1.24\ (>1)$

(vi) $\frac{2}{3}\times8\frac{1}{2}=\frac{2}{3}\times\frac{17}{2}=\frac{17}{3}=5.67\,(>1)$

Questions	Greater than 1	Less than 1
$\frac{2}{3}\div\frac{1}{2}$	√	
$\frac{2}{3}\div\frac{2}{1}$		√
$6\div\frac{1}{4}$	√	
$\frac{1}{5}\div\frac{1}{2}$		√
$4\frac{1}{3}\div3\frac{1}{2}$	√	
$\frac{2}{3}\times8\frac{1}{2}$	√	

Question 118:

There are four containers that are arranged in the ascending order of their heights. If the height of the smallest container given in figure is expressed as $\frac{7}{25}x = 10.5$ cm. Then, find the height of the largest container.



Solution:

From the above figure, it is given that height of the smallest cylinder is 10.5 cm.

It is also given that, height of smallest cylinder in terms of x is $\frac{7}{25}x$, where x is height of largest cylinder.

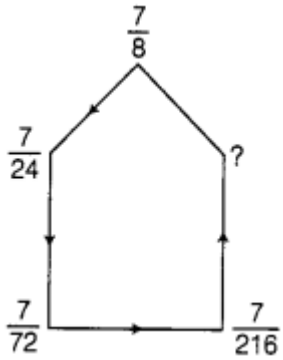
Then, $\frac{7}{25}x = 10.5$

$\Rightarrow$ $x = \frac{10.5}{1} \times \frac{25}{7} = \frac{10.5 \times 25}{7} = \frac{262.5}{7} = 37.5$ cm

Hence, height of the container is 37.5 cm.

In questions 119 to 122, replace '?' with appropriate fraction.

Question 119:



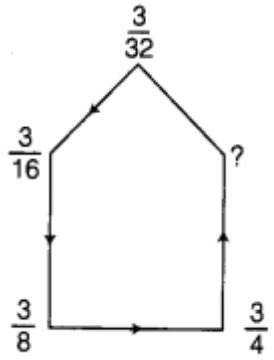
Solution:

Given sequence is $\frac{7}{8}, \frac{7}{24}, \frac{7}{72}, \frac{7}{216}, ?$.

We observe that each fraction is divided by 3 to get next fraction.

So, $? = \frac{7}{216} \div 3 = \frac{7}{216} \times \frac{1}{3} = \frac{7}{648}$

Question 120:



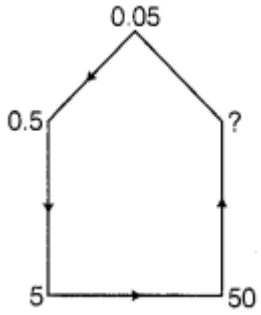
Solution:

Given sequence is $\frac{3}{32}, \frac{3}{16}, \frac{3}{8}, \frac{3}{4}, ?$.

We observe that, each fraction is multiplied by 2 to get next fraction.

So, $? = \frac{3}{4} \times 2 = \frac{3}{2}$

Question 121:



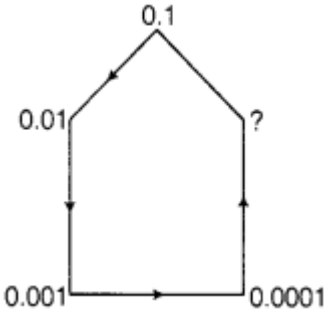
Solution:

Given sequence is 0.05, 0.5, 5, 50, ?.

We observe that, each number is multiplied by 10 to get next number.

?= 50 x 10 = 500

Question 122:



Solution:

Given sequence is 0.1, 0.01, 0.001, 0.0001, ?.

We observe that, each number is divided by 10 to get next number.

$\therefore\ ? = \frac{0.0001}{10} = 0.00001$

What is the error in each of questions 123 to 125 ?

Question 123:

A student compared $-\frac{1}{4}$ and -0.3. He changed $-\frac{1}{4}$ to the decimal -0.25 and wrote, "Since, 0.3 is greater than 0.25, -0.3 is greater than -0.25." What was the student's error?

Solution:

If the numbers are negative, then the numbers whose absolute value is greater, will be smaller.
Hence, -0.25 is greater than -0.3.
So, the student made the error that (- 0.3)> – (0.25)

Question 124:

A student multiplied two mixed fractions in the following manner: $2\frac{4}{7}\times 3\frac{1}{4}=6\frac{1}{7}$. What error the student has done?

Solution:

For multiplying two mixed fractions, first convert them into improper fraction.

So, $$2\frac{4}{7}\times 3\frac{1}{4} = \frac{2\times 7+4}{7}\times\frac{3\times 4+1}{4}$$

$$= \frac{18}{7}\times\frac{13}{4} = \frac{234}{28}$$

$$= \frac{117}{14} = 8\frac{5}{14}$$

Question 125:

In the pattern $\frac{1}{3}+\frac{1}{4}+\frac{1}{5}+\ldots$, which fraction makes the sum greater than 1 (first time)? Explain.

Solution:

$\frac{1}{3}+\frac{1}{4}+\frac{1}{5}=\frac{20+15+12}{60}=\frac{47}{60}<1$ [∵numerator < denominator]

According to the pattern, next number will be $\frac{1}{6}$.

$\therefore \quad \frac{1}{3}+\frac{1}{4}+\frac{1}{5}+\frac{1}{6}=\frac{40+30+24+20}{120}$

$=\frac{114}{120}<1$ [∵numerator < denominator]

Now, according to the pattern, next number after $\frac{1}{6}$ is $\frac{1}{7}$.

$\therefore \quad \frac{1}{3}+\frac{1}{4}+\frac{1}{5}+\frac{1}{6}+\frac{1}{7}$

$=\frac{280+210+168+140+120}{840}$

$=\frac{918}{840}>1$ [∵numerator > denominator]

Hence, $\frac{1}{7}$ makes the sum greater than 1 (first time).

Solution of Previous Years' Question Papers

2019

1st term

3) Hema had $\frac{5}{8}$ Kg of tea. She repacked the tea into bags of $\frac{5}{32}$ Kg each. How many bags of tea did Hema get?

Let the no. of bags of tea be x

$\therefore \frac{5x}{32}=\frac{5}{8}$

or, $x=\frac{5 \times 32}{5 \times 8}=4$ bags

3) Calculate the total cost of 6 pens priced at ₹ 25.35 and 3 books priced at ₹ 156.80

Total cost of 6 pens = ₹ (25.35 x 6) = ₹ 152.10

Total cost of 3 books = ₹ (156.80 x 3) = ₹ 470.40

∴ Total cost = ₹ (152.10 + 470.40) = ₹ 622.50

4) Simplify: $[(\frac{5}{9} \times \frac{3}{7}) \div \frac{8}{21}] \times (\frac{-3}{5})]$

$\frac{5}{9} \times \frac{3}{7} \times \frac{21}{8} \times \frac{-3}{5}=\frac{-3}{8}$

1) Sourav got a baby rabbit and a pup. The rabbit weighs $\frac{7}{16}$ Kg and the pup weighs $\frac{3}{4}$ Kg. How many times is the pup heavier than the baby rabbit?

Required times $=\frac{3}{4} \div \frac{7}{16}=\frac{3 \times 16}{4 \times 7}=\frac{12}{7}=1\frac{5}{7}$ times

2) Divide: 9.729 by 2.3

$\frac{9.729}{2.3}=\frac{9729}{2300}=4.23$

2nd Term

1) Simplify: $\frac{121}{100}+\frac{100}{11}+\frac{(-63)}{10}+\frac{17}{50}$

Ans: $\{\frac{121+17 \times 2+(-63 \times 10)}{100}+\frac{100}{11}$, or $\frac{-475}{100}+\frac{100}{11}=\frac{4775}{1100}=4\frac{15}{44}$

3rd Term

i) 0.05x5-0.005x5=
b) 0.225

2. Add : 859.6 , 0.007 , 4.02 , 3.567
Ans-867.194

3. Multiply : $\frac{-8}{57} \times \frac{19}{-32}$
Ans-1/12

iv) Divide 9.828 by 4.2 Ans- 2.34

2018

1st Term

ii) After simplifying $\frac{4}{5} \times \frac{3}{7} \times \frac{1}{8}$ we get
$a)$ $\frac{3}{70}$
iii)Dividig 6.58 by 100 we get
b)0.0658

(iii) Find the difference: $-\frac{3}{7} - \frac{4}{7}$.
(iv) Divide: $\frac{9}{-14} \div 6$.

(iii) $-\frac{3}{7} - \frac{4}{7} = -\frac{7}{7} = -1$.
(iv) $-\frac{9}{14} \div 6 = \frac{-9}{14} \times \frac{1}{6} = \frac{-3}{28}$

Compare: $\frac{3}{14}$ and $\frac{5}{21}$
(iii) Add: $(-1\frac{5}{12}) + 2\frac{1}{16}$

LCM of 14 and 21 is 7 x 2 x 3 = 42
$\frac{3}{14} = \frac{3 \times 3}{14 \times 3} = \frac{9}{42}$

$\frac{5}{21} = \frac{5 \times 2}{21 \times 2} = \frac{10}{42}$

Since 10 > 9, $\therefore \frac{5}{21} > \frac{3}{14}$ [It can also be done by cross multiplication method].

(iii) $(-1\frac{5}{12}) + 2\frac{1}{16}$

$= -\frac{17}{12} + \frac{33}{16} = \frac{-17 \times 4 + 33 \times 3}{48} = \frac{-68+99}{48} = \frac{31}{48}$

(iii) The product of two numbers is $-24\frac{1}{2}$. If one of the numbers is $5\frac{1}{4}$, find the other number.
(iv) Simplify: $\frac{11}{-25} + \frac{9}{20} - \frac{-17}{50} + \frac{51}{100}$

Or

Simplify: $\frac{1}{2} \times \frac{1}{7} \div \frac{2}{3}$ of $1\frac{2}{7}$

(iii) The other number = $\frac{\text{The product of two numbers}}{\text{One number}} = \frac{-24\frac{1}{2}}{5\frac{1}{4}} = -\frac{-49}{2} \div \frac{21}{4} = \frac{-49}{2} \times \frac{4}{21} = -\frac{14}{3} = -4\frac{2}{3}$

(iv) $\frac{11}{-25} + \frac{9}{20} - \frac{-17}{50} + \frac{51}{100}$

$= \frac{-220 + 225 + 170 + 255}{500} = \frac{430}{500} = \frac{43}{50}$

$\frac{1}{2} \times \frac{1}{7} \div \frac{2}{3}$ of $1\frac{2}{7}$

$= \frac{1}{2} \times \frac{1}{7} \div \frac{2}{3}$ of $\frac{9}{7}$

$= \frac{1}{2} \times \frac{1}{7} \div \frac{6}{7}$

$= \frac{1}{2} \times \frac{1}{7} \times \frac{7}{6}$

$= \frac{1}{12}$

(viii) Find: 1.364 × 0.06

(viii) 1.364 × 0.06 = 0.08184

2nd Term

(ii) $1\frac{1}{2} \times 1\frac{1}{4} \times 1\frac{1}{5}$
$= \frac{3}{2} \times \frac{5}{4} \times \frac{6}{5}$
$= \frac{9}{4} = 2\frac{1}{4}$

(iii) $-\frac{5}{9} \div \frac{2}{-3}$
$= -\frac{5}{9} \times \frac{-3}{2}$
$= \frac{5}{6}$

(v) The product of two numbers is $-24\frac{1}{2}$. If one of the numbers is $5\frac{1}{4}$, find the other number.

Or

By what number should we multiply $-4\frac{9}{14}$ so that the product is $4\frac{8}{63}$?

(v) The product of two numbers is $-24\frac{1}{2} = -\frac{49}{2}$

One of the numbers is $5\frac{1}{4} = \frac{21}{4}$

Let the other number be x.

Then $x \times \frac{21}{4} = -\frac{49}{2}$

Or $x = -\frac{49}{2} \div \frac{21}{4}$

Or $x = -\frac{49}{2} \times \frac{4}{21} = \frac{-14}{3} = -4\frac{2}{3}$

Or

Let the required number be x, then

BTP

$-4\frac{9}{14} \times x = 4\frac{8}{63}$

Or $x = 4\frac{8}{63} \div (-4\frac{9}{14})$

Or $x = \frac{260}{63} \div (-\frac{65}{14})$

Or $x = \frac{260}{63} \times -\frac{14}{65} = -\frac{8}{9}$

i)Simplify: $3\frac{1}{7} \times (3\frac{1}{2} - 5\frac{1}{4}) \times (5\frac{1}{4} + 3\frac{1}{2}) \times 1\frac{1}{11}$

Ans: $\frac{22}{7} \times (-\frac{7}{4}) \times \frac{35}{4} \times \frac{12}{11} = \frac{-105}{2} = -52\frac{1}{2}$

ii)There are 1.6 km in a mile .How many miles are there in 135.28 km?

Ans:There is 1.6 km in 1 mile

There is 1 km in 1/1.6 mile

There is 135.28 km in 135.28/1.6 mile= 84.55 mile

3rd Term

(i) Hema had $\frac{5}{8}$ kg. of tea. She repacked the tea into bags of $\frac{5}{32}$ kg. each. How many bags of tea did Hema get?

(a) 4.

(i) Find the value $\frac{7}{15}$ of rs 750.

$₹750 \times \frac{7}{15} = ₹350$

Exercise Problems

1) Express the following in kg forms

a) 480g

b) 4500 g

c) 2kg 300g

2) Which of the following is greatest

a) .50 ,.55, .555

b) 11.16, 11.14,11.145

3) Find

a) (1/3) x (4/11)

b) (1/2) + (3/2) + (11/3)

c) .2 x .45 X.13

d) (1/11) X (1/2) X (1/3)

e) 1 ÷ 5/4

4) The side of an equilateral triangle is 11.5 cm. Find its perimeter

5) The length of a rectangle is 3.1 cm and its breadth is 1.5 cm. What is the area of the rectangle?