



MATHEMATICS WORKSHEET

(FRACTIONS, DECIMALS)

Grade 7: CAPS





1.1 Fractions and Decimals

By definition, fractions are numerical quantities that are not whole numbers. Different from whole numbers such as 1, 2, 3 and many more, fractions are usually represented as following:

$$\text{Fraction} = \frac{a}{b}$$

In the above, a is called the numerator, and b is the denominator. The numerator represents the amount that is needed out of a whole (which is b), i.e. $\frac{1}{4}$ represents 1 portion out of 4 equal parts which make up a whole. Some of the properties that govern whole numbers also govern fractions, though some changes and additional properties may apply.

Fractions make it easier to calculate problems that include ratios, percentages, and rates. The unique nature of them is that they present a clear picture of what is being represented without having to do tedious work in calculations. Some examples have been looked at in the section of whole numbers and integers hence a deep dive into fractions will further make it easier to calculate these. Other applications are for when numbers with remainders are needed.

Decimals stem from fractions, when the denominator is a power of ten. This forms a decimal point and units that follow from that. An example of a decimal is the following:

$$\text{Decimal} = 2.567$$

In the above number, the (.) is called the decimal point and the numbers to the right of it are all fractions with denominators in increasing powers of 10. 5 is a fraction of $\frac{5}{10}$; 6 is $\frac{6}{100}$ and 7 is $\frac{7}{1000}$. During addition and subtraction, the same principles that applied to whole numbers also apply to decimals. Some additional properties will apply when dealing with the arithmetic of fractions and decimals, and like fractions, their applications in many problems make them ideal to use.

1.2 Properties of Fractions and Decimals

In addition to the properties that whole numbers have, fractions also have these properties:

- Inverse Property
- Identity property



There are types of fractions we deal with that include:

- Proper Fractions (*when the numerator is smaller than the denominator*)
- Improper Fractions (*when numerator is greater than denominator*)
- Mixed fractions (*fractions presented with quotient and remainder*)

Decimals also have their properties that can be useful as a check when doing calculations:

- When a decimal and a whole number are multiplied, the product remains the same (*this implies the number of decimal places does not change for e.g. $0.55 \times 3 = 1.65$*)
- Multiplying a decimal by 1 results in the answer being the decimal itself
- Multiplying two decimals in any order gives the same result. ($0.5 \times 1.2 = 1.2 \times 0.5$)
- Same principles of BODMAS apply to decimals when in operation

There are four types of Decimals:

- Terminating Decimals (*decimals that have an end*)
- Non-terminating (*a decimal that does not end with a sequence of zeros, pi for example*)
- Recurring Decimals (*contains infinitely repeating numbers*)
- Non-Recurring Decimals (*it continues endlessly but with no repeating numbers*)

Use of Decimals is in situations where precision is required and rounding off may often distort the accuracy of the answer. It is easy to estimate decimal points when dealing with decimals; this can be achieved by looking at the decimal places before any problem is solved.

Revision of Grade 6 work on fractions and decimals is advised to the student to familiarize themselves with the work.



1.3 Problem Set 1: Fractions

1.3.1 Addition and Subtraction

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

Ans:

*Step one in solving fractions is to have a common denominator
common denominator for 2 and 3 is 6 (2×3)*

hence the equation becomes:

$$\frac{3}{6} + \frac{2}{6} = \frac{5}{6} \text{ (which is the answer)}$$

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

Ans:

*Step one in solving fractions is to have a common denominator
common denominator for 2 and 3 is 6 (2×3) and conversely the numerator
hence the equation becomes:*

$$\frac{3}{6} - \frac{2}{6} = \frac{1}{6}$$

3) Simplify the ratio : (fractions and ratios are closely connected)
22:33

Ans: *to simplify a ratio we need to present it as a fraction*

$\frac{22}{33}$ = *find a common factor for both numerator and denominator*

In this case the common factor is 11:

this reduces to $\frac{2}{3}$ which as a ratio is 2:3

4) Solve for x: (these are problems with mixed fractions and whole numbers)

$$x = 3 - 1\frac{2}{5}$$

Ans:

To solve the above, we need to convert both the whole number and mixed fraction into improper fractions

Since the fraction is to denominator 5, we change 3 to $\frac{15}{5}$ and $1\frac{2}{5}$ to $\frac{7}{5}$

Now we can apply addition and subtraction properties

$$\frac{15}{5} - \frac{7}{5} = \frac{8}{5}$$

Same principles apply when its addition of a whole number and a fraction



1.4 Question Bank 1

Solve the following:

1) $\frac{2}{5} - \frac{2}{40}$ 2) $\frac{2}{10} + \frac{1}{100} - \frac{1}{20}$ 3) $2 - 1\frac{1}{4}$

Express as decimals in their lowest form

4) $3\frac{4}{5}$ 5a) $\frac{22}{7}$ express to 5 decimal places 5b) $\frac{11}{9}$ express to 5 decimal places

Simplify the following ratios:

6) 10:30:55

7) 12:48:60

8) 13:52:156

9) *In a class of 135 student, there are 54 boys.*

Calculate the ratio of boys to girls in this class

10) *there are 3 types of trees, type A has 45 trees.*

if the 3 types are in this ratio of 3:4:5, how many type B and C trees are there?

11) *While awake Peter spends $1\frac{1}{2}$ hrs walking, $\frac{3}{4}$ hrs eating and $3\frac{2}{3}$ hrs studying.*

what is the total amount of time Peter spends awake in a day? Ans. as a mixed fraction

12) *what is x, if $x = \left(\frac{2}{3} + 1\frac{3}{2} - 2 + 2\frac{5}{8}\right)$? Solve without a calculator*

13) *Arrange from biggest to smallest*

$2\frac{3}{4}; \frac{15}{4}; \frac{3}{2}; \frac{18}{36}$

14) *find x if; $x = 1\frac{2}{3} - \frac{4}{6}$*



1.5 Problem Set 2: Multiplication and Division of Fractions

a) $\frac{3}{5} \times \frac{7}{6} =$

Ans: When multiplying fractions, numerators multiply each other as do denominators

In the above, it becomes: $\frac{(3 \times 7)}{(5 \times 6)} = \frac{21}{30}$

If the question specifies to leave in the lowest form, you have to look for HCF of both the numerator and denominator. In this instance the HCF is 3.

$\frac{21}{30} = \frac{7}{10}$ *in its lowest form.*

b) $\frac{3}{5} \div \frac{7}{6}$

Ans: The first step in solving division problems is to change it to multiplication however in order to change that, we have to multiply the first fraction by the reciprocal of the second one. in this case the reciprocal of $\frac{7}{6}$ is $\frac{6}{7}$

therefore it becomes : $\frac{3}{5} \times \frac{6}{7} = \frac{18}{35}$ which is the final ans. since there is no HCF

c) 'of' In fractions of can be substituted for \times
an example is find 25% of 100

Ans: the first instance is to convert the percentage into a fraction then multiply:

$25\% = \frac{25}{100} = \frac{1}{4}$ of 100 = $\frac{1}{4} \times 100 = 25$.

d) $5\frac{1}{3} \times \frac{3}{8}$

Ans: To solve a fraction that is mixed, we have to convert it into an improper fraction

$5\frac{1}{3} = \frac{16}{3}$; hence it becomes $\frac{16}{3} \times \frac{3}{8} = \frac{48}{24} = 2$

This principle also applies when solving for division problems



1.6 Question Bank 2

Simplify the following : Give Answer as a mixed fraction

1a) $\frac{2}{3} \times \frac{6}{10} + 2$

1b) $\frac{6}{11} \times \frac{121}{36}$

2a) $3\frac{1}{5} \div \frac{8}{3}$

2b) show that $\frac{7}{21} \times \frac{1}{3}$ is equal to 0.11111 to 5 decimal places

3a) 16% of 120 3b) 45% of 100 3c) 11% of 121

4) find 10%, 15%, 20% of 1525.

5) $\frac{1}{4}$ of $\frac{1}{2}$ of 20

6) $\frac{2}{3}$ of 360

7) $1\frac{2}{8} \div 2\frac{1}{7}$

8) $4\frac{1}{4} \times 2\frac{2}{3} \div 1\frac{1}{6}$

9) $2\frac{1}{4} \div 1\frac{2}{3}$

10) $11 \div 2\frac{2}{3} \times \frac{1}{6}$

11) $\frac{5}{6} \times \frac{(2-2)}{5}$

12) $8 \div \frac{1}{2} + (2 \times \frac{3}{8})$

13) $\frac{7}{5} \div \frac{14}{10}$

14) $\frac{5}{4} \times 1\frac{4}{5}$

15) $\frac{11}{12} \div \frac{2}{3}$



1.7 Problem Set 3: Decimals

a) find the solution to $\frac{0.072}{0.012}$

Ans: To solve for decimals, without a calculator the following steps are taken:

convert both the numerator and denominator into whole numbers

this involves multiplying both numerator and denominator by 1000

you therefore have $\frac{0.072 \times 1000}{0.012 \times 1000} = \frac{72}{12} = 6$

this also applies even if one of the terms in the only decimal

b) 2.79×7.5

Ans: To solve for the multiplication of decimals, first pretend the comma is not there

then do multiplication as if they were whole numbers:

it therefore becomes $279 \times 75 = 20\ 925$

After multiplication count the number of decimal places for both numbers

2.79 has 2 decimal places and 7.5 has 1 decimal place:

therefor the total is 3 decimal places. Go to your answer : 20 925, and count 3 decimal places from the right to left. place the comma there, it becomes 20.925 your final answer.

c) of: as with fractions, of means multiply by:

0.25 of 100 is the same as $0.25 \times 100 = 25$. check example b for reference

d) Decimal addition and subtraction follows the same rules as whole numbers

the difference is the decimal point, for numbers like $2.55 + 1.2$;

to solve them, make sure the two numbers have the same decimal point

therefore it becomes $2.55 + 1.20 = 3.75$

Decimals can also be used in ratios when the ratio is not clearly defined



1.8 Question Bank 3

Solve the following division problems, first without a calculator then with a calculator

1) $0.025 \div 5$

2) $1.25 \div 0.025$

3) $578.7 \div 9$

4) $0.0001 \div 0.25$

5) $2.5 \div 0.25$

Solve the following multiplication problems

6) 0.25×1.25

7) 0.11×1.11

8) 0.018×0.3

9) $(0.024 + 0.015) \times 2.5$

10) $(0.048 \div 8)$ of $(0.036 \div 6)$

addition and subtraction of decimals

11) $2.567 + 1.236 - 0.456$

12) $0.0045 - 0.00045 + 0.045$

13) $1.85 - (0.25 \text{ of } 1)$

14) *What is the HCF for 0.25 ; 0.5 ; 0.75*

15) *What is the LCM of 0.3 ; 0.6 ; 1.5*



Answers to Question Banks:

Question Bank 1

1) $\frac{7}{2}$ 2) $\frac{4}{25}$ 3) $\frac{3}{4}$ 4) $3\frac{4}{5}$

5a) 3.14286 5b) 1.22222 6) 2: 6: 11

7) 1: 4: 5 8) 1: 4: 12 9) 2: 3

10) $A = 45; B = 60; C = 75$ 11) $5\frac{11}{12}$ 12) $2\frac{19}{24}$

13) $\frac{18}{36}; \frac{3}{2}; 2\frac{3}{4}; \frac{15}{4}$ 14) 1

Question Bank 2

1a) $2\frac{2}{5}$ 1b) $1\frac{5}{6}$ 2a) $1\frac{1}{5}$ 2b) $\frac{1}{9} = 0.11111$

3a) $19\frac{1}{5}$ 3b) 45 3c) $13\frac{31}{100}$

4a) $152\frac{1}{2}$ 4b) $228\frac{3}{4}$ 4c) 305

5) $2\frac{1}{2}$ 6) 240 7) $\frac{7}{12}$ 8) $9\frac{5}{7}$

9) $1\frac{7}{20}$ 10) $\frac{11}{16}$ 11) $\frac{1}{6}$

12) $16\frac{3}{4}$ 13) 1 14) $2\frac{1}{4}$ 15) $1\frac{3}{8}$

Question Bank 3

1) 0.005 2) 50 3) 64.3

4) 0.0004 5) 10 6) 0.3125

7) 0.1221 8) 0.0054 9) 0.0975



10) 0.000036 11) 3.347 12) 0.04905

13) 1.6 14) 0.25 15) 3.0

Self-Assessment for the Student

Please complete the following:

After this chapter, can you:

	Yes	No	I need more practice
<i>Solve problems of addition and subtraction of fractions</i>			
<i>Solve problems of multiplication and division of fractions</i>			
<i>Solve problems of addition and subtraction of decimals</i>			
<i>Solve problems of multiplication and division of decimals</i>			
<i>Has my skill of solving fractions and decimals improved</i>			

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