

TERM 2 MATHS NOTES

COMMON FRACTIONS

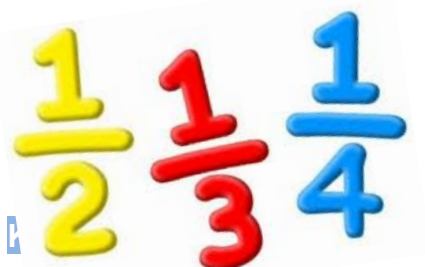
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DEFINITIONS AND KEY WORDS:

A **fraction** is a portion of a whole that has been divided into equal parts. A **common fraction** is written as $\frac{1}{2}$. The number 1 represents a whole number called the **numerator** and the 2 represents a whole number called the **denominator**.



Numerator – the whole number above the fraction line.

Denominator – the whole number below the fraction line.

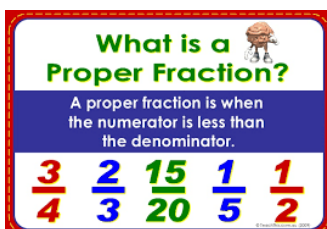


3 ← numerator

4 ← denominator

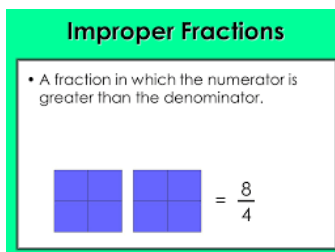
Proper Fractions:

These are fractions where the numerator is smaller than the denominator, e.g. $\frac{1}{2}$



Improper Fractions:

These are fractions where the numerator is bigger than the denominator, e.g. $\frac{9}{2}$



Mixed Fractions:

These consist of a whole number and a proper fraction, e.g. $5\frac{3}{4}$

CONVERTING FRACTIONS

To convert an improper fraction to a mixed number, simply divide the number by the denominator:

Examples:

$$\frac{12}{5} = 12 \div 5 = 2 \text{ r } 2$$

We write this as $2\frac{2}{5}$.

To convert a mixed number to an improper fraction, multiply the whole number by the denominator. Add the numerator to this. Write this answer as the numerator and keep the denominator the same.

Examples: $8\frac{1}{2}$

Multiply 8 by 2, and then add 1

This will give you a total of 17

The fraction will therefore be $\frac{17}{2}$



EXERCISE 1

Number 1: Convert the mixed numbers to improper fractions:

a) $13\frac{2}{3}$

d) $1001\frac{4}{15}$

b) $17\frac{8}{11}$

e) $9\frac{5}{7}$

c) $4\frac{3}{9}$

Number 2: Convert the improper fractions to mixed numbers:

a) $\frac{41}{9}$

d) $\frac{316}{3}$

b) $\frac{199}{10}$

e) $\frac{1000}{125}$

c) $\frac{412}{15}$

EQUIVALENT FRACTIONS

Equivalent fractions are fractions that are equal to one another, even though the numerator and denominator are different. It means the value of the fraction is the same.

e.g. $\frac{1}{2} = \frac{2}{4} = \frac{3}{6}$ etc.

To find an equivalent fraction, you need to look for the link between the fractions.

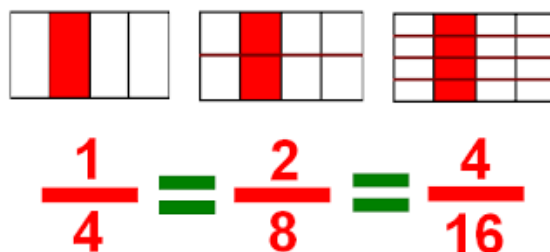
Example:

You need to ask what you did to the number 25 to get it to 75.

The answer would be that you multiplied by 3. $25 \times 3 = 75$.

As the golden rule states that what you do to the bottom, you must do to the top (and vice versa), you say: $\frac{12}{25} \times \frac{3}{3} = \frac{36}{75}$

Hence: $\frac{12}{25} = \frac{36}{75}$



SIMPLIFYING FRACTIONS

To simplify a fraction, you must reduce the fraction to its smallest form.

To do this, you need to divide both the numerator and the denominator by the same highest common factor.

Example: $\frac{12}{30} = *$

The highest number that can fit into both 12 and 30 is 6.

6 is therefore the highest common factor (HCF)

Divide the numerator and denominator by the highest common factor.

E.g. $\frac{12}{30} \div \frac{6}{6} = \frac{2}{5}$

Hence: $\frac{12}{30} = \frac{2}{5}$

NB: A common fraction must always be written in the simplest form!

EXERCISE 2

Find the equivalent fractions as indicated.

1 a) $\frac{30}{35} = \frac{*}{7}$

b) $\frac{11}{44} = \frac{1}{*}$

c) $\frac{63}{90} = \frac{7}{*}$

d) $\frac{9}{11} = \frac{99}{*}$

e) $\frac{6}{*} = \frac{24}{100}$



Method 1:

$\frac{1}{10}$ of 30

$$= \frac{1}{10} \times \frac{30}{1}$$

$$= \frac{30}{10} \left(\div \frac{10}{10} \right)$$

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

(Bodmas Rule: 'of' becomes x)

(Multiply numerator, then denominator)

(Reduce answer to simplest form)

Method 2:

$\frac{1}{10}$ of 30

$$= \frac{1}{10} \times \frac{30}{1}$$

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

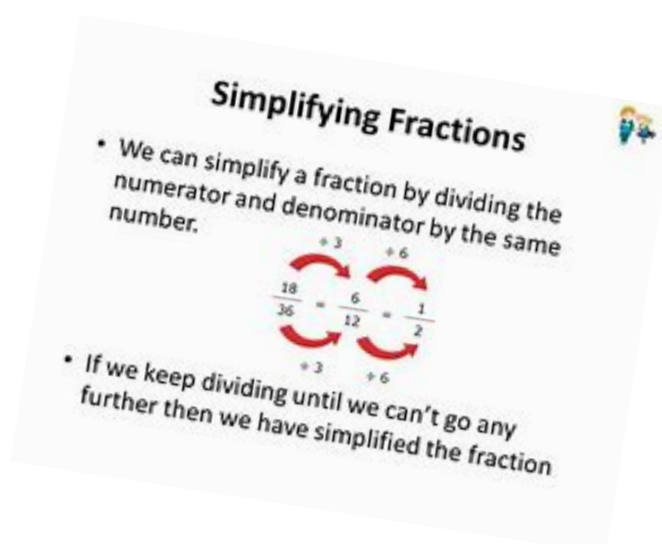
$$= 3$$

(Change 'of' to x, then 'cross' cancel when working out to give the simplest form)

Simplify:

2 a) $\frac{25}{45}$

b) $3\frac{18}{90}$



c) $4\frac{12}{30}$

d) $9\frac{46}{112}$

FRACTIONS OF QUANTITIES

When asked to work out a fraction of a quantity, use one of the following methods:

EXERCISE 3

a) $\frac{3}{4}$ of 200

b) $\frac{7}{10}$ of 150

c) $\frac{5}{8}$ of 800

d) $\frac{4}{5}$ of 375

GIVING PARTS OF QUANTITIES AS FRACTIONS

First change the amounts to the same unit of measurement.

Write both amounts as fractions.

Reduce the fraction to its simplest form.

Example: What fraction is 20c of R2?

$$R2 = 200c \quad (\text{Same unit of measurement})$$

$$= \frac{20}{200} \div \frac{20}{20} \quad (\text{Both amounts as fractions})$$

$$= \frac{1}{10} \quad (\text{Simplest form})$$

EXERCISE 4

Solve the problems given below, in your books, and remember to show your workings:

a) What is $\frac{3}{4}$ of 640?

b) What is $\frac{2}{3}$ of 900?

c) What fraction is $\frac{5}{8}$ of 800?

d) What is $\frac{5}{6}$ of 300?

e) What fraction is 14 hours of 1 week?

f) What is $\frac{17}{20}$ of 1000?

COMPARING FRACTIONS

When asked to compare fractions, you first need to ensure that the denominators are the same.

To do this you need to find the lowest common denominator or (LCD).

Example: fill in >, < or = for $\frac{8}{15}$ $\frac{11}{20}$

Start by going through the multiples of 15 and 20. Identify (circle or underline) the lowest number that both have in common (i.e. the LCD)

So: 15 30 45 60
 20 40 60 80

The LCD is 60. Now apply the same method used to find equivalent fractions to change each of the denominators to 60. Remember that what you do to the bottom you must do to the top.

$$\text{e. g } \frac{8}{15} \times \frac{4}{4} = \frac{32}{60}; \frac{11}{20} \times \frac{3}{3} = \frac{33}{60}$$

Now rewrite $\frac{8}{15}$ $\frac{11}{20}$ as $\frac{32}{60}$ $\frac{33}{60}$

Give the appropriate symbol in the box:

$$\frac{32}{60} < \frac{33}{60}$$

ORDERING FRACTIONS

Ascending order means from smallest to biggest.

Descending order means from biggest to smallest.

When asked to order fractions, apply the same method of finding the lowest common denominator (LCD). Once the denominators are the same, put the fractions in the required order.

Example:

Arrange in ascending order: $\frac{4}{9}$ $\frac{35}{45}$ $\frac{8}{15}$ $\frac{3}{5}$

Find the LCD by going through the multiples of each number

i.e. 9 18 27 36 45

45 90 135 180 225

15 30 45 60 75

5 10 15 20 25 30 35 40 45

Change each denominator to 45. Remember that what you do to the bottom, you must do to the top.

i.e. $\frac{5}{9} \times \frac{5}{5} = \frac{20}{45}$; $\frac{8}{15} \times \frac{3}{3} = \frac{24}{45}$; $\frac{3}{5} \times \frac{9}{9} = \frac{27}{45}$; ... $\frac{35}{45} \rightarrow$ (Stays the same)

Now place in ascending order:

i.e. $\frac{20}{45}$ $\frac{8}{15}$ $\frac{27}{45}$ $\frac{35}{45}$ $(\frac{4}{9} \frac{2}{4} \frac{4}{5} \frac{3}{5} \frac{35}{45})$

EXERCISE 5

Complete by filling in >, < or =. Show your working out:

a)	$\frac{9}{10}$	<input type="text"/>	$\frac{19}{20}$	b)	$\frac{8}{9}$	<input type="text"/>	$\frac{9}{10}$
c)	$\frac{18}{40}$	<input type="text"/>	$\frac{50}{60}$	d)	$\frac{8}{12}$	<input type="text"/>	$\frac{12}{18}$
e)	$\frac{5}{7}$	<input type="text"/>	$\frac{7}{8}$	f)	$\frac{17}{34}$	<input type="text"/>	$\frac{51}{102}$

Arrange these fractions in descending order, show your working out:

a) $\frac{5}{12}$ $\frac{3}{4}$ $\frac{1}{3}$ $\frac{5}{6}$ $\frac{7}{9}$

b) $\frac{1}{4}$ $\frac{1}{2}$ $\frac{11}{24}$ $\frac{5}{6}$ $\frac{8}{12}$

Arrange these fractions in ascending order, show your working out:

$$a) \frac{2}{3} \quad \frac{6}{7} \quad \frac{1}{2} \quad \frac{15}{21} \quad \frac{8}{14}$$

$$b) \frac{3}{4} \quad \frac{2}{3} \quad \frac{5}{6} \quad \frac{8}{9} \quad \frac{11}{12}$$

ADDITION AND SUBTRACTION OF COMMON FRACTIONS

If the denominators are different, you must make them the same by finding the lowest common denominator.

Remember that when changing to the LCD, what you do to the bottom must be done to the top!

Also remember that you must always write your answer in the simplest form.

Examples:

$$1) \quad \frac{1}{2} + \frac{5}{9}$$

LCD : 18

$$\text{So: } \frac{1}{2} \times \frac{9}{9} = \frac{9}{18}; \quad \frac{5}{9} \times \frac{2}{2} = \frac{10}{18}$$

$$\therefore \frac{9}{18} + \frac{10}{18} = \frac{19}{18} = 1 \frac{1}{18}$$

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

LCD : 12

$$\text{So: } \frac{1}{3} \times \frac{4}{4} = \frac{4}{12}; \quad \frac{2}{4} \times \frac{3}{3} = \frac{6}{12}$$

$$\therefore \frac{4}{12} + \frac{6}{12} = \frac{10}{12} \left(\div \frac{2}{2} \right)$$

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

EXERCISE 6

Complete the sums and write each answer in its simplest form (where possible):

$$a) \frac{3}{10} + \frac{2}{15}$$

$$b) \frac{5}{6} + \frac{3}{7} + \frac{1}{2}$$

$$c) \frac{5}{20} + \frac{3}{7} + \frac{1}{2}$$

OPERATIONS WITH UNLIKE FRACTIONS (MIXED NUMBERS)

If the denominators are different when adding or subtracting mixed numbers, one of the easiest approaches is to first change the mixed number to an improper fraction.

Then find the LCD and change the fractions to the LCD.

Add or subtract the fractions and simplify the answer.

Example 1:

$$\begin{aligned}
 &5\frac{2}{3} - 3\frac{1}{2} \\
 &= \frac{17}{3} - \frac{7}{2} \quad \text{LCD: 6} \\
 &= \frac{34}{6} - \frac{21}{6} \\
 &= \frac{13}{6} \\
 &= 2\frac{1}{6}
 \end{aligned}$$

Example 2:

$$\begin{aligned}
 &2\frac{2}{5} + 2\frac{1}{4} \\
 &= \frac{12}{5} + \frac{9}{4} \quad \text{LCD: 20} \\
 &= \frac{48}{20} + \frac{45}{20} \\
 &= \frac{93}{20} \\
 &= 4\frac{13}{20}
 \end{aligned}$$

EXERCISE 7

1. $1\frac{7}{8} + 4\frac{2}{5}$
2. $11\frac{3}{7} - 7\frac{4}{6}$
3. $2\frac{1}{2} + 1\frac{1}{9}$
4. $4\frac{2}{3} - 1\frac{3}{5} + \frac{4}{15}$
5. $2\frac{3}{18} + 1\frac{7}{36} + 4\frac{1}{2}$
6. $3\frac{4}{5} + 7\frac{3}{10} - 1\frac{1}{2}$
7. $6\frac{2}{9} - 2\frac{7}{11} - 1\frac{1}{3}$
8. $10\frac{2}{3} + 5\frac{1}{2} - 4\frac{1}{4}$
9. $\left(4\frac{3}{5} - 2\frac{3}{4}\right) + \left(10\frac{6}{7} + 9\frac{2}{6}\right)$
10. $\left(2\frac{5}{6} + 1\frac{2}{3}\right) - \left(2\frac{4}{8} - 1\frac{1}{6}\right)$

MULTIPLICATION OF FRACTIONS

If you are asked to multiply mixed numbers, first change these to improper fractions.

Continue with the same method as before, ensuring that the answer is simplified.

Example:

$$\begin{aligned} 5\frac{3}{5} \times 4\frac{1}{4} \\ &= \frac{28}{5} \times \frac{17}{4} \\ &= \frac{119}{20} \\ &= 23\frac{4}{5} \end{aligned}$$

EXERCISE 8

Complete the following:

1. $1\frac{3}{10} \times 2\frac{1}{2}$
2. $3\frac{4}{5} \times 2\frac{5}{10}$
3. $\frac{2}{9} \text{ of } 15 \times \frac{12}{15}$
4. $1\frac{3}{8} \times 4\frac{3}{22} \times 1\frac{1}{3}$
5. $3\frac{3}{8} \times 6\frac{1}{2} \times 2\frac{2}{3}$

EXERCISE 9

1. A baker uses $1\frac{4}{5}$ of 10kg bag of flour each day.

How much flour does he use?

- a) In a day
- b) In a week

2. A recipe for biscuits makes 24 biscuits. A baker needs to make $3\frac{3}{4}$ of that amount. How many biscuits will he make?

3. Kimera is given R240. Her mother tells her to spend $\frac{3}{8}$ on flour, $\frac{1}{5}$ on sugar and to bring home the change.

- a) What fraction of the money will she bring home?
- b) How much money will this be?

4. A chef is $1\frac{5}{6}$ m tall. When a school group visits his kitchen, he notices that the smallest child is half his size. His own daughter is one third of his height. How tall is his daughter?
5. Oliver's petrol tank is $\frac{4}{5}$ full. His car will use $\frac{12}{15}$ of this amount to complete its next journey. What fraction of petrol will be used?
6. A shop keeper grants a discount of $\frac{2}{3}$ off a damaged product so that he can clear a space for his new stock. The original sale price is R330. How much will the customer pay for the damaged product?
7. Siya is given R450 for his birthday. He uses $\frac{1}{5}$ to buy shoes, $\frac{1}{15}$ on CDs, $\frac{1}{6}$ for games and $\frac{1}{2}$ on clothes.
- What fraction of the money has been spent?
 - How much change will he receive?
8. There are 185 learners in a Grade Seven group. $\frac{3}{5}$ of these learners are girls. How many girls are there?
9. Kelsey completes a Math test in $4\frac{7}{8}$ of an hour. Dan completes his test in $5\frac{2}{5}$ of an hour.
- How long does Kelsey take to complete the test?
 - How long does Dan take to complete the test?
10. Corbin uses $12\frac{7}{8}$ of his free time on the weekend to study for exams. Sasha used $9\frac{6}{5}$ of the same time period to study. How much more fractional time does Corbin spend studying than Sasha?
11. A house hold budget is drawn up as follows:
- $\frac{1}{7}$ – Electricity
 - $\frac{2}{5}$ – Rent
 - $\frac{2}{10}$ – Groceries
 - $\frac{2}{14}$ – Insurance

a) What portion of the budget remains?

b) If the budget is R6500, how much money has been allocated in total to electricity?

EXERCISE 10

Mixed Exercise:

1. $1\frac{3}{25} + 2\frac{1}{3} + 3\frac{4}{15}$
2. $10\frac{4}{7} - 3\frac{1}{3}$
3. $4\frac{5}{6} \times 3\frac{9}{10}$
4. $\left(2\frac{3}{4} + 3\frac{7}{8}\right) - \left(1\frac{3}{5} \times 2\frac{5}{6}\right)$
5. $5\frac{3}{7} \times 3\frac{1}{3} - 2\frac{1}{2}$
6. $6\frac{2}{4} + \frac{2}{8}$ of $3 + 2\frac{3}{6}$
7. $\left(5\frac{2}{3}\right)^3$
 $\left(15\frac{6}{8} - 12\frac{5}{6}\right) \times 3\frac{4}{7}$

DECIMAL FRACTIONS

WHAT IS A DECIMAL FRACTION?

- A decimal fraction is a number that is written with a comma.
- Decimals are commonly used to indicate temperature, length, mass, money and other forms of measurement.
- Proper (common) fractions can be expressed in decimal form
 e.g. $4,9 = 4\frac{9}{10}$

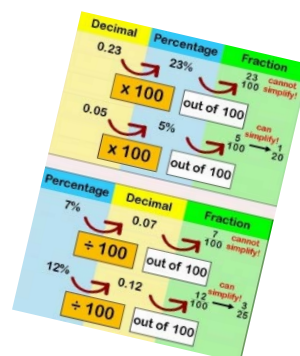
DECIMALS AND PLACE VALUE

The place value table can be represented as follows:

M HTH TTH TH H T U , t h th

Example: 17 Tens + 14 thousandths

$$\begin{aligned}
 &= (17 \times 10) + \frac{14}{1000} \\
 &= 170 + 0,014 \\
 &= 170,014
 \end{aligned}$$



- If we have 9 units and we add 1 more, we now have a Ten.
- Each place value on the left is 10 times bigger than the one on the right, e.g.

1 x 10	=	10	(T)
10 x 10	=	100	(H)
10 x 100	=	1 000	(TH)
10 x 1 000	=	10 000	(TTH)
10 x 10 000	=	100 000	(HTH)
10 x 100 000	=	1 000 000	(M)

SO:

10 x 0,1	=	1	(U)
10 x 0,01	=	0,1	(t)
10 x 0,001	=	0,01	(h)
10 x 0,0001	=	0,001	(th)

EXERCISE 1

Use the place value table (if you need to) to complete the following:

1. Give the place value of the underlined digits:

- | | |
|---------------------------|----------------------------|
| a. 76 321, <u>9</u> 4 | d. <u>7</u> 4 856 984, 253 |
| b. 1 036 942, 37 <u>5</u> | e. 362, 1 <u>2</u> 5 |
| c. 96 <u>5</u> 324, 217 | |

2. Write as a decimal fraction:

- a. 12 hundredths
- b. 78 tenths
- c. 5M + 2 TTH + 6 th
- d. 85 thousandths
- e. 2h + 1T + 16TH + 53t
- f. 721 tenths
- g. 4M + 3th + 12H + 16U + 4t

3. Fill in >, < or =:

a)	45 h		0,045
b)	7,23		7,321
c)	98,24		98,204
d)	712 th		7,12
e)	146,38		146,380

DECIMAL FRACTIONS AND ROUNDING OFF

Remember:

1 st decimal place	=	tenth
2 nd decimal place	=	hundredth
3 rd decimal place	=	thousandth

When rounding off a decimal, the rules for rounding off stay the same, i.e.

- If the number to the right of the number being rounded off is between 0 and 4, the number being rounded remains the same.
- If the number to the right of the one being rounded off is between 5 and 9, the number being rounded off moves up by 1.

EXERCISE 2

1. Round off to the nearest whole number:

- | | |
|-----------|------------------|
| a. 0,751 | d. 48,386 |
| b. 1298,3 | e. 9 999 999,999 |
| c. 0,6 | |

2. Round off to the second decimal place:

- | | |
|----------------|------------|
| a. 796 125,324 | d. 908,001 |
| b. 18,961 | e. 0,008 |
| c. 0,423 | |

COMPARING AND ORDERING AND SEQUENCING

EXERCISE 3

1. Arrange each of the decimal sequences below in descending order:

- a. 74,302 74,23 74,203 74,3 74,32
 b. 115,7 115,099 115,709 115,9 115,79

2. Arrange each of the decimal sequences in ascending order:

- a. 43,18 43,089 43,0 43,097 43,819
 b. 734,9 734,099 734,090 743,99 734,909

3. Fill in the missing numbers to complete each sequence:

- | | | | | | |
|---------|------|------|-------|-------|-------|
| a. 0,3 | 0,6 | 0,9 | | | |
| b. 11,6 | 11,4 | 11,2 | _____ | _____ | _____ |
| c. 3,25 | 3,5 | 3,75 | _____ | _____ | _____ |
| d. 0,85 | 0,9 | 0,95 | _____ | _____ | _____ |
| e. 6,5 | 6,25 | 6,0 | _____ | _____ | _____ |

4. Fill in >, < or =

- | | | | |
|----|--------------------|--|------------------|
| a) | 500,60 | | 500,06 |
| b) | 0,120 | | $\frac{12}{100}$ |
| c) | $40\frac{1}{8}$ | | 40,125 |
| d) | $21\frac{6}{1000}$ | | 21,006 |
| e) | $\frac{37}{50}$ | | 0,72 |

CONVERTING TO COMMON FRACTIONS AND PERCENTAGES

A.DENOMINATORS OF 10, 100 OR 1000

- When studying common fractions, you discovered that the denominator must be 10, 100 or 1000 before it can be converted to a decimal fraction.

e.g. $13\frac{1}{2} = 13\frac{1}{2} \times \frac{5}{5} = 13\frac{5}{10} = 13,5$

- When converting from a decimal to a common fraction, first give the fraction a denominator of 10, 100 or 1000 and then simplify the fraction,

e.g. $28,35 = 28\frac{35}{100} \div \frac{5}{5} = 28\frac{7}{20}$

- Remember : **Always give the simplest form!**

EXERCISE 4

1. Convert the decimals below to common fractions in their simplest form:

- | | |
|-------------|-----------|
| a. 25,4 | b. 12,09 |
| b. c. 0,975 | d. 1,125 |
| c. e.101,58 | f. 84,499 |

2. Convert the following fractions to decimals:

- | | |
|-----------------------|-----------------------|
| a. $645\frac{12}{25}$ | b. $1699\frac{2}{50}$ |
| c. $6\frac{14}{20}$ | d. $\frac{9}{8}$ |
| e. $12\frac{1}{8}$ | f. $\frac{3}{5}$ |

A. CONVERTING TO PERCENTAGES

- A percentage is always out of 100
- Percentages are closely linked to common and decimal fractions
- If you can, simply change the denominator to 100. What you do to the bottom, also do to the top.

E.g. $\frac{17}{50} = \frac{*}{100}$
 $\frac{17}{50} \times \frac{2}{2} = \frac{34}{100}$
 = 34%

= 0,34

$3\frac{1}{25} = \frac{*}{100}$
 $= \frac{76}{25} \times \frac{4}{4} = \frac{304}{100}$
 = 304%

= 3,04

- If the denominator cannot be changed to 100, simply , multiply by $\frac{100}{1}$

$$\begin{aligned}
 \text{E.g. } \frac{19}{30} &= \frac{*}{100} \\
 &= \frac{19}{30} \times \frac{100}{1} \\
 &= \frac{190}{3} \\
 &= 63,3 \\
 \therefore \frac{19}{30} &= \frac{63,3}{100} = 63,3\% \\
 &= 0,63
 \end{aligned}$$

EXERCISE 5

1. Convert to percentages and decimals and show your working out:

a. $\frac{1}{2}$

b. $\frac{3}{5}$

c. $\frac{8}{25}$

d. $1\frac{7}{20}$

e. $18\frac{4}{5}$

2. Convert the percentages to decimals and then to common fractions in their simplest form:

- 80%
- 68%
- 91%
- 8%
- 102%

ADDITION AND SUBTRACTION OF DECIMALS

When adding or subtracting decimals, remember the following:

- All the decimal commas must be in line with one another
- Use zero as a place holder if some numbers have more decimal places or values than others

Example 1:

$$142,7 + 6,395 + 12,42$$

$$142,700$$

$$6,395$$

$$+12,420$$

$$\underline{161,515}$$

Example 2:

$$15,8 - 2,345$$

$$15,800$$

$$- 2,345$$

$$\underline{13,455}$$

EXERCISE 6**1. Complete the following:**

a. $27,046 + 1436,2$

f. $8,8 - 3,796$

b. $0,789 + 65,7$

g. $15,81 - 7,9$

c. $41,2 + 2,704 + 715,437$

h. $951,283 - 12,9$

d. $99.875 + 2,1 + 112$

i. $53,6 - 17,154$

e. $0,006 + 1043,9 + 712,38$

j. $71,947 - 3,26$

MULTIPLICATION OF DECIMALS**HORIZONTAL MULTIPLICATION**

- This is a mental process that can be carried out without showing the method. This should be used for basic sums only.

Example:

$$\begin{array}{ll}
 6 \times 0,02 & \longrightarrow \text{Ask what } 6 \times 2 \text{ is. Write the answer of 12, then count} \\
 = 12 & \text{how many spaces there are after the comma. Insert} \\
 = 0,12 & \text{the comma in the answer.}
 \end{array}$$

Other examples:

$$\begin{array}{llll}
 0,7 \times 0,3 & = & 0,21 & 1,5 \times 0,3 & = & 0,45 \\
 0,08 \times 0,2 & = & 0,016 & 0,004 \times 0,003 & = & 0,000012
 \end{array}$$

Can you see how we arrived at these answers?
Discuss this in class.

VERTICAL MULTIPLICATION

- Follow the same method you would use to multiply whole numbers
- Ignore the decimal comma in your method
- Once you have worked out the answer, check how many decimal places were after each number. Count this amount of spaces in the answer (from the right) and insert the comma.
- **You need not line up the commas underneath each other.**

Example 1:

$$483,2 \times 7$$

$$\begin{array}{r} 483,2 \\ \times 7 \\ \hline 3382,4 \end{array}$$

(1 place after the comma)
(1 place after the comma)

Example 2:

$$13,5 \times 2,4$$

$$\begin{array}{r} 13,5 \\ \times 2,4 \\ \hline 540 \\ +2700 \\ \hline 32,40 \end{array}$$

(1 place after the comma + 1 place comma)
(leave out the comma)
insert comma after 2 comma

MULTIPLYING BY 10, 100 AND 1000

Study the examples below:

$$0,6 \times 10 = 6$$

$$0,23 \times 1000 = 230$$

$$0,145 \times 100 = 14,5$$

$$0,002 \times 10^4 = 20$$

You should see that when you multiply by 10, 100 or 1000 to make the number bigger, the number of times the comma “moves” is in direct relation to the number of zeroes there are in the number you are multiplying by:

i.e. $\times 10$ moves one space to the right
 $\times 100$ moves two spaces to the right
 $\times 1000$ moves three spaces to the right

EXERCISE 7

1. Complete the following:

a. $0,4 \times 0,09$

b. $4,3 \times 0,007$

c. $6,2 \times 0,05$

- d. $32,6 \times 0,8$
- e. $8,7 \times 2,4$

2. Complete the following:

- a. $23,7 \times 2,5$
- b. $6,7 \times 8,6$
- c. $432,54 \times 1,7$
- d. $56,72 \times 6,4$
- e. $589,6 \times 0,8$

3. Write down the answers to the following:

- a. $14,06 \times 1000$
- b. $0,007 \times 10$
- c. $125,3 \times 100$
- d. $(0,2)^2$
- e. $4,59 \times 10^3$

4. Complete the following:

- a. $71,83 \times 6000$
- b. $0,007 \times 10$
- c. $412,6 \times 90$
- d. $9,836 \times 4000$
- e. $98,6 \times 500$

5. Select the best and easiest method to solve each of the following:

- a. A tour to certain parts of South Africa costs R4698,35 per person. If 68 tourists go on the trip, how much money will be collected?
- b. A local deli sells cheese for R29,99 per kilogram. What will it cost me if I buy $3\frac{1}{2}$ kg of cheese?
- c. Liane earns R54,75 for every 1 hour shift she works. If she works 8 hours a day over 100 days, what will her total earnings be?
- d. A greengrocer sells peaches for R3,99 per kilogram. A customer selects some peaches and is told that her fruit weighs 5,2 kg. How much money must she pay the greengrocer?
- e. A money-lending business charges R68,75 interest per day on a loan that it made to a client. How much interest does the client have to pay for the month of April?

DIVISION OF DECIMALS. HORIZONTAL (SHORT) DIVISION

This mental process can be carried out without showing the method. **This should be used for basic sums only.**

Example:

$$85,635 \div 9 = 9,515$$

DIVIDING BY 10, 100 OR 1000

Study the examples below:

$$21,795 \div 10 = 2,1795$$

$$469,837 \div 1000 = 0,469837$$

$$3,46 \div 100 = 0,0346$$

$$78\,346,27 \div 10^4 = 7,834627$$

You will notice that when dividing by 10, 100 or 1000 to make the number smaller, the number of times the comma “moves” is linked to the number of zeroes in the number you are diving by.

- $\div 10$: comma moves 1 space to the left
- $\div 100$: comma moves 2 spaces to the left
- $\div 1000$: comma moves 3 spaces to the left

Dividing by multiples of 10, 100 OR 1000

When you multiplied by numbers of 10, 100 or 1000, you did the following:

$$\begin{aligned} &71,246 \times 30 \\ &= 71,246 \times 10 \times 3 \\ &= 712,46 \times 3 \\ &= 2137,38 \end{aligned}$$

When you divide by multiples of 10, 100 or 1000, you follow the same procedure. However, this time you need to replace the X signs with \div signs because you are doing a division sum.

Example:

$$\begin{aligned} &493,64 \div 700 \\ &= 496,64 \div 100 \div 7 \\ &= 4,9664 \div 7 \\ &= 0,7052 \end{aligned}$$

EXERCISE 8

1. Complete the following:

- | | |
|--------------------|----------------------|
| a. $71,435 \div 7$ | d. $24,1 \div 4$ |
| b. $6,257 \div 5$ | e. $288,144 \div 12$ |
| c. $837,84 \div 6$ | |

2. Write down the answers to the following:

- a. $165,2 \div 1000$ d. $143\,725,811 \div 1000$
 b. $18,976 \div 10$ e. $0,8 \div 100$
 c. $0,0731 \div 100$

3. Use any method to complete the following:

- a. $29,185 \div 50$
 b. $571,424 \div 700$
 c. $32,13 \div 9000$
 d. $146,5 \div 20$
 e. $8166,128 \div 400$

FUNCTIONS AND RELATIONSHIPS

By using a description or a rule, you will be able to describe relationships between numbers. A number sentence is a useful way to write a rule and solve problems.

Recognition of variables and constants

A constant is something that never changes, e.g. the number of sides in a triangle. A variable is something that can change in value, e.g. the daily temperature.

A number sentence is an equation in Mathematics where we use a in the place of a number, e.g. $12 + \text{} = 36$.

Example:

- a) $3 \times b = 15$, therefore the $b = 5$
 b) $e \div 4 + 1 = 13$, therefore the $e = 48$.

Exercise 1:

Determine the value of x if:

- a) $5 + x = 33$
 b) $x + 1\,345 = 2698$
 c) $x - 1457 = 26$
 d) $46,14 - x = 23,03$
 e) $2x = 10\,135$
 f) $5x = 212,5$

AREA AND PERIMETER OF 2D SHAPES

The perimeter of any polygon is the distance around its outside. Perimeter is a length that you can measure in millimetres (mm), centimetres (cm), metres (m) or kilometres (km).

Remember:

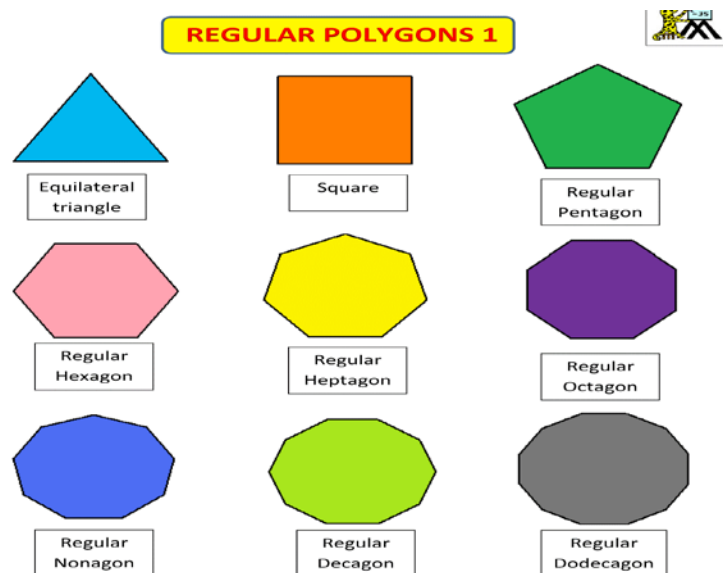
$$1 \text{ km} = 1000 \text{ m}$$

$$1 \text{ m} = 100 \text{ cm}$$

$$1 \text{ cm} = 10 \text{ mm}$$

A two-dimensional (2D) shape is flat with only a length and a breadth. A regular polygon is a 2D shape where all the sides have the same length and all the angles are the same.

A polygon that is not regular is called an irregular polygon. To find the perimeter of a polygon, you must calculate the total length of all the sides, or the sum of the lengths of the sides.



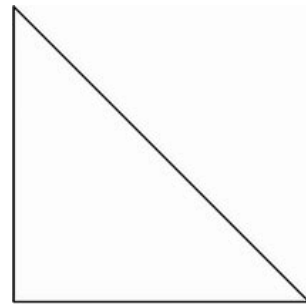
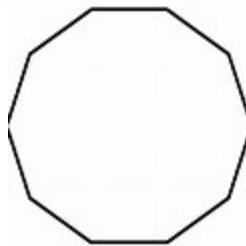
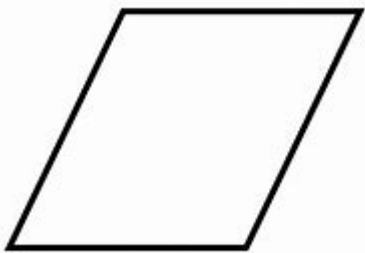
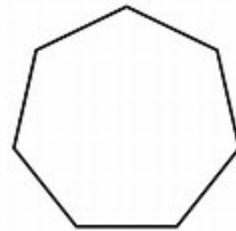
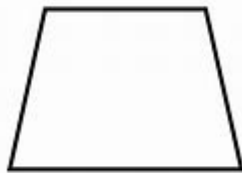
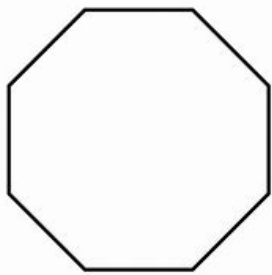
In geometry the term area refers to the amount of space that a flat surface or shape covers. Area is measured in the same units that you use to measure length, but is expressed in units squared.

These are the metric units of area:

- 1 square millimetre (mm^2) is the area enclosed by a square with sides that are 1mm long.
- 1 square centimetre (cm^2) is the area enclosed by a square with sides that are 1 cm long.
- 1 square metre (m^2) is the area enclosed by a square with sides that are 1 m long.
- 1 square kilometre (km^2) is the area enclosed by a square with sides that are 1 km long.
- 1 hectare (ha) is the area enclosed by a square with sides that are 100 m long.

Exercise 1:

1. Convert these measurements to metres:
 - a) 637 mm
 - b) 0,056 km
 - c) 350,7 cm
2. Convert these measurements to centimetres:
 - a) 0,975 km
 - b) 54,2 m
 - c) 22,8 mm
3. Name the polygons 1,2,3,4,5 and 6 according to the number of sides:



4. The perimeter of an equilateral triangle is 60 cm. What is the length of one side?
5. Kirsten and Anton run laps around the school playground. The playground is rectangular and measures 131,5 m long and 55,7 m wide. Calculate how many laps it will take to run a total of 1 km.
6. Find the perimeter of a regular pentagon with each side measuring 6,5 m.
7. The perimeter of a regular hexagon is 108 m. Find the length of one side.

SURFACE AREA AND VOLUME OF 3 D OBJECTS

SOLIDS

Geometrical objects that have three dimensions: length, width and height, are called three – dimensional 3D solid objects or solid. Another name for width is breadth and another name for height is depth.

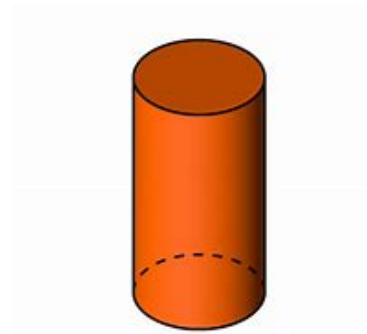
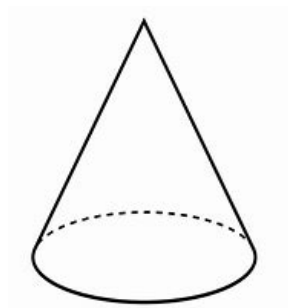


A building brick is an example of a solid. It has 6 faces which are flat and polygonal in shape. Two faces of this solid meet at an edge. Each pair of adjoining faces meets at a right angle. Where three edges meet, they form a vertex or a solid.

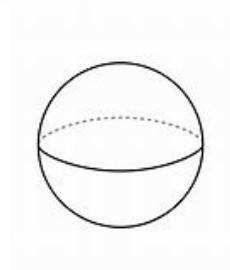
A cube is a rectangular solid with six square faces.

Solids with curved faces

Not all solids have only flat faces. For example, the cone and the cylinder in the diagrams below have both flat and curved faces.



The sphere is a solid with a curved face only.

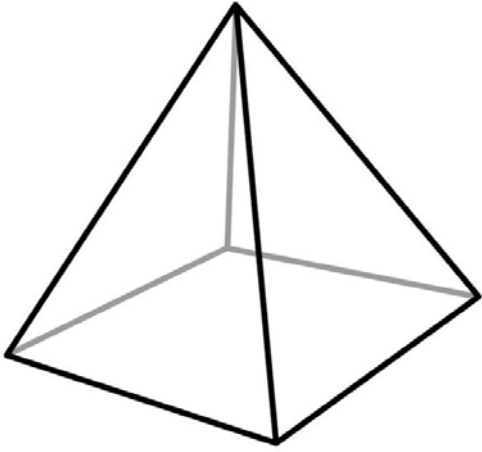


POLYHEDRA

Prisms and pyramids all belong to a larger family of solids called polyhedra. A geometric solid surrounded by flat faces and is called a polyhedron. Polyhedra can differ from one another in their appearance and their number of faces, edges and vertices.

A pyramid is a solid that is formed by joining a polygonal base and a point (which is not on the base) by triangular faces. This point mentioned in the definition is called the apex of the pyramid. The rest of the faces of a pyramid are called the lateral faces.

A pyramid is named according to the shape of its base. A tetrahedron is a pyramid with four triangular faces.



A rectangular solid is a part of a large family of solids called prisms. They are solids that have at least one pair of parallel flat faces. These are called the 'end' faces or the bases of the prism. The rest of the face of the prism is called its lateral faces and are all flat.

