WINNING TEAMS: Mathematics

JSS1 Topic Progress Chart for Maths Captains (to support JSS2 pupils) TERM 1

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JSS2 Term 1	JSS1 resources for JSS2
Lessons 1 – 5 (JSS2 PHB) **Fractions and decimals**	**TERM 1, TOPIC PROGRESS CHART 3** Lesson 14 to 22 (JSS1 PHB)
Lessons 6 – 10 (JSS2 PHB) Decimals, rounding off & significant figures **Decimal numbers & rounding**	**TERM 1, TOPIC PROGRESS CHART 4 & 5** Lesson 23 to 28 (JSS1 PHB)
Lessons 11 – 15 (JSS2 PHB) Add, subtract, multiply, divide integers and decimals Operations on integers and decimals	**TERM 1, TOPIC PROGRESS CHART 6 & 7** Lesson 29 to 35 (JSS1 PHB) **TERM 2, TOPIC PROGRESS CHART 3 – 5**
Lessons 16 – 20 (JSS2 PHB) Factors, multiples, primes, composites, HCF & LCM	**TERM 1, TOPIC PROGRESS CHART 1** Lesson 1 to 7 (JSS1 PHB)
Lessons 21 – 27 (JSS2 PHB) Index laws	**TERM 1, TOPIC PROGRESS CHART 2** Lesson 8 to 13 (JSS1 PHB)
Lessons 28 – 30 (JSS2 PHB) Negative indices (exponents)	
Lessons 31 – 35 (JSS2 PHB) Percentage, increase & decrease	**TERM 1, TOPIC PROGRESS CHARTS 8 - 11** Lesson 36 to 45 (JSS1 PHB)
Lessons 36 – 40 (JSS2 PHB) Profit and loss Percentages greater than 100	
Lessons 41 – 45 (JSS2 PHB) Ratio, rate, unit rate, unit price	**TERM 2, TOPIC PROGRESS CHART 1** Lessons 46 to 50 (JSS1 PHB)

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Topic 1: Multiples & Factors p2–17

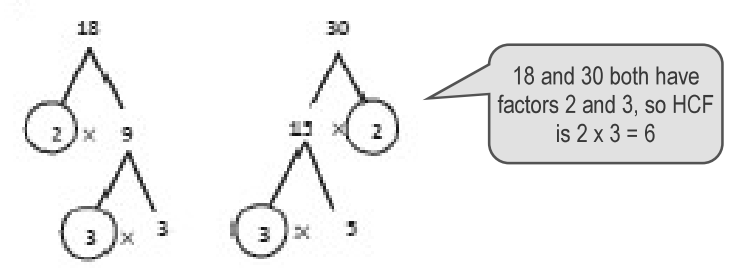
Check that you know your times tables up to 12 × 12	**Do you understand these words?** factor; common factor; prime factors; factor tree; HCF; multiple; LCM; infinite

Refer to JSS1 Pupil's Handbook (PHB) pages 2–19 and the Lesson Plan Manual pages 2 – 17

CONCEPTS:

* **Times tables**
* **Factors –** if a number divides exactly into another number, then it is a factor — Example: 12 ÷ 4 = 3. 4 and 3 are both factors of 12.
* **Prime numbers** are numbers that only have TWO factors, 1 and itself. — Examples: 2, 3, 5, 7
* **Prime factors:** Factors of a number that are prime numbers. — Examples: The prime factors of 12 are 2 and 3. Other factors of 12 are not prime (1, 4, 6, 12)
* **Common factors** of two numbers — Example: 3 is a common factor of 12 and 18.

* **Multiples:** If a number is multiplied by another number, the answer is a multiple of the number — Example: 8 × 7 = 56, so 56 is a multiple of 7 and of 8.
- All the numbers in the times tables of a number are multiples of the number. — Example: 3, 6, 9, 12, … are multiples of 3.
- Each number is a multiple of itself and a multiple of 1.
- A multiple of a number cannot be *less* than the number.
- The list of multiples of any number is infinite.
* To find the **HCF (highest common factor)** of two or more numbers, we can use a **factor tree**.



* **LCM (lowest common factor)**

Multiples of 3: 3, 6, 9, ⑫

Multiples of 4: 4, 8, ⑫

LCM: 12

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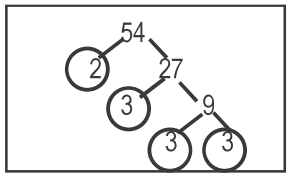
Topic 1: Multiples & Factors

Examples:

1. Find the HCF of 100 and 30.
   Factors of 100: 1 2 4 5 10 20 25 50 100
   Factors of 30: 1 2 3 5 6 10 15 30
   1, 2, 5 and 10 are factors of 100 and 30
   So HCF is 10.
2. Write 54 as the product of prime factors. Use a factor tree.
   $54 = 2 \times 3 \times 3 \times 3$



More exercises:

1. Name all the factors of 32.
2. What number is a factor of all even numbers?
3. List the first seven prime numbers.
4. List the multiples of a) 5 from 35 to 50 b) 3 between 20 and 40.
5. Find the first three common multiples of: a) 12 and 16 b) 15 and 25
6. Look at this list of numbers: 0; 24; 48; 8; 23; 2; 40; 1; 14.
   a) Which numbers are factors of 24?
   b) Which numbers are multiples of 24?
   c) Which numbers are prime?
7. Answer as quickly as you can (this is mental maths):
   a) Find all the factors of i) 20 ii) 24 iii) 63 iv) 49.
   b) is 87 a prime number?
   c) Find the HCF of 16 and 6.
   d) Find the HCF and the LCM of i) 8, 16 and 24 and ii) 9, 12 and 48.
8. Find the HCF and the LCM of 36 and 99
9. What are the prime factors of a) 30 b) 50 c) 315?
10. Use a factor tree to find the HCF of 140 and 168.
11. Use a factor tree to find the LCM of:
    a) 15 and 21 b) 42 and 18 c) 9, 12 and 48

Check your answers:

1. 1, 2, 4, 8, 16, 32.
2. 2
3. 2, 3, 5, 7, 11, 13, 17
4. a) 35, 40, 45, 50
   b) 21, 24, 27, 30, 33, 36, 39.
5. a) 1, 2, 4. b) 1, 5, 25.
6. a) 24, 8, 2, 1. b) 24, 48 c) 2, 23

7a) i) 1, 2, 4, 5, 20.
ii) 1, 2, 3, 4, 6, 8, 12, 24.
iii) 1, 3, 9, 7, 21, 63. iv) 1, 7, 49.
b) 87 is not prime. It has factors 3 and 29 as well as 1 and 87.
c) 2
d) i) HCF is 8. LCM is 48
ii) HCF is 3. LCM is 144

8. $36 = 2 \times 2 \times 3 \times 3$
   $99 = 3 \times 3 \times 11$
   so HCF is $3 \times 3 = 9$ and
   LCM is $2 \times 2 \times 3 \times 3 \times 11 = 396$

9a) 2, 3, 5. b) 2, 5. c) 3, 3, 5, 7.

10. $140 = 2 \times 2 \times 5 \times 7$
    $168 = 2 \times 2 \times 2 \times 3 \times 7$
    HCF: $2 \times 2 \times 7 = 28$

11. a) 105 b) 126 c) 144

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Topic 2: Exponents M-07-008 to M-07-013 p18 – 30

Check that you understand:	**Do you understand these words?**	*Refer to JSS1 Pupil's Handbook (PHB) pages 20 – 32 and the Lesson Plan Manual p18 to 30.*
* how a number raised to a power is written e.g. 2^3 * x^y is x multiplied by itself y times, e.g. $2^3 = 2 \times 2 \times 2$	square/cube of a number; base; power (index, *indices pl.*)	

CONCEPTS:

* 3^{2} ← power, base →

* 3 squared means 3 times by itself (3×3)

Example: $1^2 = 1 \times 1 = 1$ and $0^2 = 0 \times 0 = 0$

* 2^3 is "2 cubed" or "2 to the power of 3".

* $7 \times 7 \times 7 \times 7 \times 7 = 7^5$ "7 to the power of 5"

* When multiplying two indices with the same base, simply **add the powers.**
This is the first law of indices $\mathbf{a^m \times a^n = a^{m+n}}$

Example: $3^2 \times 3^4 = 3^{(2+4)} = 3^6$

* When dividing two indices with the same base, **subtract the powers.**
This is the second law of indices $\mathbf{a^m \div a^n = a^{m-n}}$

Example: $3^4 \div 3^2 = \frac{3^4}{3^2} = 3^{4-2} = 3^2$

Example: $3^5 \div 3^2 = \frac{3^5}{3^2} = \frac{③\times③\times3\times3\times3}{③\times③} = \frac{3\times3\times3}{1} = 3 \times 3 \times 3 = 3^3$

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JSS1 Topic Progress Chart for Maths Captains (to support JSS2 pupils) TERM 1

Topic 2: Exponents

Exercise

1. True or false:
   a. $2^3 = 6$ b. $4^2 = 8$ c. $3^3 = 9$
   d. $6^2 = 36$ e. $0^3 = 0^2$ f. $1^5 = 1$

2. a. Write $5 \times 5 \times 5 \times 5$ in index form. b. Write $2 \times 2 \times 2$ in index form.
   c. Write 4^3 as a multiplication. d. Write 2^4 as a multiplication

3. a. What is the square of 7? b. What is 9×9?
   c. Simplify 6^2. d. Which is bigger? 3^2 or 2^3?

4. Simplify the following. Leave your answer in index form.
   a. $2^5 \times 2^2$ b. $3^4 \times 3$
   c. $5^3 \times 5^2$ d. $2^3 \times 2^3$
   e. $a^4 \times a^2$ f. $x \times x^4$

5. Simplify the following. Leave your answer in index form.
   a. $2^6 \div 2^2$ b. $3^3 \div 3^2$
   c. $5^4 \div 5$ d. $\frac{2^5}{2^2}$
   e. $\frac{a^4}{a^2}$ f. $x^5 \div x^3$
   g. $2^3 \times 2^4 \div 2^2$ h. $3 \times 3^3 \div 3^2$
   i. $5^4 \times 5^3 \div 5^5$ j. $\frac{2^4 \times 2^3}{2^5}$
   k. $\frac{3^4 \times 3^2}{3}$ l. $\frac{5^4 \times 5}{5^3}$

Check your answers:

1a. False $2^3 = 2 \times 2 \times 2 = 8$
b. False $4^2 = 4 \times 4 = 16$
c. False $3^3 = 3 \times 3 \times 3 = 27$
d. True e. True f. True

2a. 5^4 b. 2^3
c. $4^3 = 4 \times 4 \times 4$

3a. $7 \times 7 = 49$ b. $9 \times 9 = 81$
c. $6^2 = 6 \times 6 = 36$
d. $3^2 = 9$ and $2^3 = 8$ so 3^2 is bigger

4a. 2^7 b. 3^5 c. 5^5
d. 2^6 e. a^6 f. x^5

5a. 2^4 b. 3
c. 5^3 d. 2^3
e. a^2 f. x^2
g. $2^{3+4-2} = 2^5$
h. $3^{1+3-2} = 3^2$
i. $5^{4+3-5} = 5^2$
j. $\frac{2^4 \times 2^3}{2^5} = \frac{2^7}{2^5} = 2^2$
k. $\frac{3^4 \times 3^2}{3} = \frac{3^6}{3} = 3^5$
l. $\frac{5^4 \times 5}{5^3} = \frac{5^5}{5^3} = 5^2$

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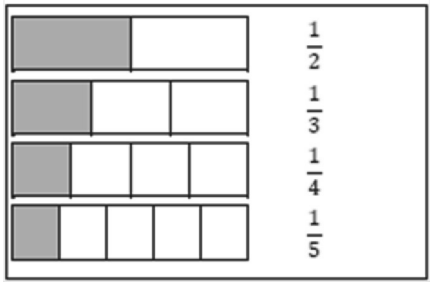
Topic 3: Fractions M-07-014 to M-07-015 p31 – 35

Check that you:	**Do you understand these words?**	*Refer to JSS1 Pupil's Handbook (PHB) pages **31 – 35** and the Lesson Plans p31 – 35.*
• know that equal parts of a whole are fractions • can compare and order fractions	numerator; denominator; equal parts; ascending/ descending order	

CONCEPTS:

* Fractions of shapes are **equal parts** of the shape e.g. ½ is one part out of two equal parts.
* The **numerator** shows the number of equal parts we want and the **denominator** shows the total number of equal parts.
* A **big** denominator tells us that the fraction is divided into many **small** parts. The more parts the fraction is divided into, the smaller each part will be.
* Use **diagrams** to compare fractions.

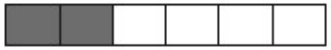


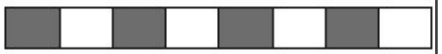
Topic 3: Fractions

Exercise

1. What fraction of each shape below has been shaded?

a. 

b. 

c. 

d. 

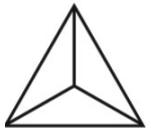
e. 

f. 

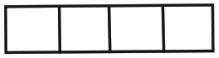
2. Shade each shape to show the fraction.

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

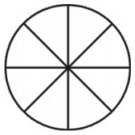
b. $\frac{3}{4}$



c. $\frac{1}{3}$



d. $\frac{2}{4}$



e. $\frac{7}{8}$

3. Five friends share a pizza equally. What fraction of the pizza does each friend get?

4. Draw diagrams to show which fraction is bigger.

a. $\frac{3}{4}$ or $\frac{3}{5}$ b. $\frac{5}{6}$ or $\frac{5}{8}$

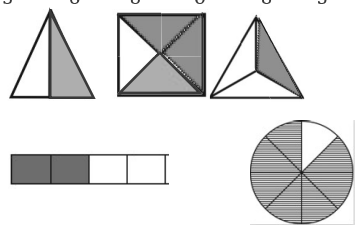
5. Put these fractions in descending order (from biggest to smallest): $\frac{2}{6}$; $\frac{2}{8}$; $\frac{2}{5}$; $\frac{2}{3}$; $\frac{2}{9}$; $\frac{2}{4}$.

6. Which fraction is smaller? Show them on a number line or a fraction wall.

a. $\frac{4}{5}$ or $\frac{2}{3}$. b. $\frac{3}{8}$ or $\frac{2}{6}$.

Check your answers:

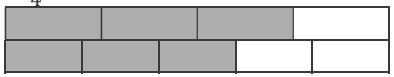
1a. $\frac{2}{3}$ b. $\frac{2}{6}$ c. $\frac{4}{8}$ d. $\frac{5}{6}$ e. $\frac{3}{8}$ f. $\frac{2}{5}$

2a. 

3. They cut the pizza into 5 equal pieces. Each piece is $\frac{1}{5}$ of the pizza.

4. Use circles or bars.

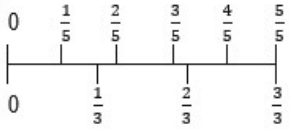
a. $\frac{3}{4}$ is bigger:



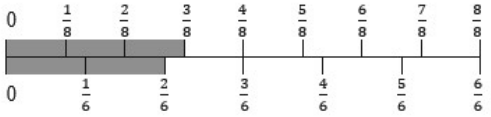
b. $\frac{5}{6}$ is bigger

5. $\frac{2}{3}$; $\frac{2}{4}$; $\frac{2}{5}$; $\frac{2}{6}$; $\frac{2}{8}$; $\frac{2}{9}$.

6a. $\frac{2}{3} < \frac{4}{5}$



b. $\frac{2}{6} < \frac{3}{8}$



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Topic 4: Fraction calculations M-07-016 to M-07-022 p36 – 53

Check that you:

- can compare and order fractions

Do you understand these words?

equivalent, common factor, LCM, simplify, inverse, reciprocal

*Refer to JSS1 Pupil's Handbook (PHB) pages **36 – 53** and the Lesson Plans p31 – 53.*

CONCEPTS:

*** Adding fractions**

Examples:

a. $\frac{3}{7}+\frac{6}{7}=\frac{9}{7}=1\frac{2}{7}$

(same denominators, change mixed fraction to improper fraction)

b. $\frac{4}{5}+\frac{1}{3}=\frac{12}{15}+\frac{5}{15}=\frac{17}{15}=1\frac{2}{15}$

*** Subtracting fractions**

Examples:

a. $\frac{9}{11}-\frac{6}{11}=\frac{3}{11}$

b. $\frac{5}{6}-\frac{1}{4}$

$=\frac{5}{6}\times\frac{2}{2}-\frac{1}{4}\times\frac{3}{3}$ (common denominator of 12)

$=\frac{10}{12}-\frac{3}{12}=\frac{7}{12}$

CONCEPTS:

* When we **multiply fractions**, we multiply the numerators and also multiply the denominators.

Examples:

a. $\frac{3}{7}\times\frac{5}{2}=\frac{15}{14}$

b. $\frac{3}{4}\times\frac{8}{9}=\frac{24}{36}=\frac{2}{3}$ **Simplify** fractions using common factors.

* **Division** is the **inverse** operation of multiplication.

* To divide, **convert** mixed fractions to improper fractions first

* To divide, **multiply by the reciprocal** of the second fraction.

$\frac{2}{9}\div\frac{4}{3}=\frac{2}{9}\times\frac{3}{4}=\frac{6}{36}=\frac{1}{6}$

* Decide what operations to use to solve fraction **word problems.**

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JSS1 Topic Progress Chart for Maths Captains (to support JSS2 pupils) TERM 1

Topic 4: Fraction calculations

Exercise

1. Calculate and write your answer as a fraction in simplest form:

   a. $\frac{3}{8}+\frac{5}{8}$ b. $\frac{7}{9}-\frac{2}{9}$ c. $4\frac{2}{5}+3\frac{1}{5}$ d. $6\frac{2}{3}-2\frac{1}{3}$

   e. $\frac{5}{6}+\frac{1}{4}$ f. $\frac{2}{9}+\frac{3}{5}$ g. $\frac{17}{24}-\frac{1}{6}$ h. $\frac{2}{9}+\frac{5}{12}$

2. a. $3\frac{3}{5}+2\frac{1}{6}$ b. $2\frac{1}{3}-1\frac{1}{4}$ c. $2\frac{2}{3}-1\frac{1}{6}$

3. Calculate and write your answer as a fraction in simplest form:

   a. $\frac{1}{6}\times\frac{2}{9}$ b. $\frac{2}{11}\times\frac{33}{46}$ c. $\frac{16}{21}\times\frac{3}{4}$

   d. $1\frac{3}{7}\times 2\frac{1}{3}$ e. $3\frac{2}{5}\times 1\frac{1}{4}$

4. Calculate and write your answer as a fraction in simplest form:

   a. $6\div\frac{3}{4}$ b. $3\frac{1}{3}\div\frac{5}{9}$ c. $\frac{5}{8}\div 2$

   d. $2\frac{1}{6}\div 1\frac{1}{3}$ e. $5\frac{1}{3}\div 1\frac{1}{9}$

Check your answers:

1 a. $\frac{8}{8}=1$ b. $\frac{5}{9}$

c. $7\frac{3}{5}$ d. $4\frac{1}{3}$

e. $\frac{5\times2}{6\times2}+\frac{1\times3}{4\times3}=\frac{10}{12}+\frac{3}{12}$
$=\frac{13}{12}=1\frac{1}{12}$

f. $\frac{2}{9}+\frac{3}{5}=\frac{10}{45}+\frac{27}{45}=\frac{37}{45}$

g. $\frac{17}{24}-\frac{4}{24}=\frac{13}{24}$

h. $\frac{2}{9}+\frac{5}{12}=\frac{8}{36}+\frac{15}{36}=\frac{23}{36}$

2a. $\frac{21}{5}+\frac{13}{6}=\frac{121}{30}+\frac{65}{30}$
$=\frac{186}{30}=\frac{31}{5}=6\frac{1}{5}$

b. $\frac{7}{3}-\frac{5}{4}=\frac{28}{12}-\frac{15}{12}=\frac{13}{12}=1\frac{1}{12}$

c. $\frac{8}{3}-\frac{7}{6}=\frac{16}{6}-\frac{7}{6}=\frac{9}{6}=\frac{3}{2}=1\frac{1}{2}$

3a. $\frac{1}{27}$ b. $\frac{3}{23}$ c. $\frac{4}{7}$

d. $\frac{10}{7}\times\frac{7}{3}=\frac{10}{3}=3\frac{1}{10}$

e. $\frac{17}{5}\times\frac{5}{4}=\frac{17}{4}=4\frac{1}{4}$

4a. $6\div\frac{3}{4}=6\times\frac{4}{3}=8$

b. $\frac{10}{3}\times\frac{9}{5}=6$ c. $\frac{5}{8}\times\frac{1}{2}=\frac{5}{16}$

d. $\frac{13}{6}\div\frac{4}{3}=\frac{13}{6}\times\frac{3}{4}=\frac{13}{8}=1\frac{5}{8}$

e. $\frac{16}{3}\div\frac{10}{9}=\frac{16}{3}\times\frac{9}{10}=\frac{24}{5}=4\frac{4}{5}$

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Topic 5: Decimals M-07-023 to M-07-025 p54 – 62

Check that you know:	**Do you understand these words?**	*Refer to JSS1 Pupil's Handbook (PHB) pages 60 – 67 and the Lesson Plans for further practice.*
• that 0.23 is a decimal number. We say "zero point two three"	decimal number; place value; tenths, hundredths, thousandths; decimal places	

CONCEPTS:

* Decimal numbers use a point to separate the whole number digits from the digits representing fractions of a whole.
* The place value table is extended after the units to include tenths, hundredths, thousandths etc.

Example 1:

hundreds	tens	units	.	tenths	hundredths	thousandths
100s	10s	1s	.	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$
2	0	3	.	1	2	5

Example 2:

The number 3.24 represents 3 whole units and a fraction of a whole unit.

Example 3:

The number 0.214 has no whole units, 2 tenths, 1 hundredth and 4 thousandths.

Example 4: 1.1 > 1.01

1.1 represents one and one tenth, but 1.01 represents one and one hundredth.

* To change a decimal to a fraction, count the number of place values after the point.

$0.2 = \frac{2}{10}$ 2 is in the tenths place value, (one decimal place).

$0.02 = \frac{2}{100}$ 2 is in the hundredths place value, (two decimal places).

$0.002 = \frac{2}{1000}$ 2 is in the thousandths place value, (three decimal places).

Often, we can simplify the fractions e.g. $\frac{2}{10} = \frac{1}{5}$

* To change a fraction to a decimal, we need a denominator of 10, 100 or 1000 e.g. $\frac{3}{10} = 0.3$

Use equivalent fractions: $\frac{1}{4} = \frac{25}{100} = 0.25$

Or divide numerator by denominator using long division

$$\frac{4}{5} = 5\overline{)4.0} = 0.8$$

$$-\ 4\ 0$$

$$0$$

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JSS1 Topic Progress Chart for Maths Captains (to support JSS2 pupils) TERM 1

Topic 5: Decimals

Exercise

1. Which numbers are less than 1? Which numbers are greater than 1?
   a. 3.14 b. 0.314 c. 1.01
   d. 0.99

2. How many decimal places are in each of the following numbers?
   a. 1.01 b. 0.3 c. 1.125

3. Write the decimal numbers as fractions using tenths, hundredths or thousandths.
   a. 1.01 b. 0.3 c. 1.125

4. Express the following decimal numbers as fractions in their lowest terms:
   a. 0.8 b. 0.02 c. 0.005 d. 0.25 e. 0.305
   f. 4.05 g. 80.75 h. 3.14 i. 10.07 j. 1.709

5. Write each of these fractions as decimals.
   a. $\frac{7}{10}$ b. $\frac{7}{100}$ c. $\frac{9}{1000}$ d. $\frac{23}{1000}$ e. $\frac{308}{1000}$
   f. $\frac{204}{1000}$ g. $\frac{1}{5}$ h. $\frac{3}{4}$ i. $3\frac{16}{100}$ j. $40\frac{1}{2}$

Check your answers:

1a. 3.14 > 1 b. 0.314 < 1
c. 1.01 > 1 d. 0.99 < 1

2a. 2 b. 1 c. 3

3a. $1\frac{1}{100}$ b. $\frac{3}{10}$ c. $1\frac{125}{1000}$

4a. $0.8 = \frac{8}{10} = \frac{4}{5}$ b. $0.02 = \frac{2}{100} = \frac{1}{50}$
c. $0.005 = \frac{5}{1000} = \frac{1}{200}$ d. $0.25 = \frac{25}{100} = \frac{1}{4}$
e. $0.305 = \frac{305}{1000} = \frac{61}{200}$ f. $4.05 = 4\frac{5}{100} = 4\frac{1}{20}$
g. $80.75 = 80\frac{75}{100} = 80\frac{3}{4}$
h. $3.14 = 3\frac{14}{100} = 3\frac{7}{50}$
i. $10.07 = 10\frac{7}{100}$ j. $1.709 = 1\frac{709}{1000}$

5a. $\frac{7}{10} = 0.7$ b. $\frac{7}{100} = 0.07$
c. $\frac{9}{1000} = 0.009$ d. $\frac{23}{1000} = 0.023$
e. $\frac{308}{1000} = 0.308$ f. $\frac{204}{1000} = 0.204$
g. $\frac{1}{5} = \frac{2}{10} = 0.2$ h. $\frac{3}{4} = \frac{75}{100} = 0.75$
i. $3\frac{16}{100} = 3{,}16$ j. $40\frac{1}{2} = 40\frac{5}{10} = 40.5$

WINNING TEAMS: Mathematics

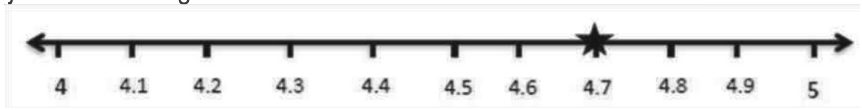
JSS1 Topic Progress Chart for Maths Captains (to support JSS2 pupils) TERM 1

Topic 6: Rounding decimals M-07-026 to M-07-029 p63 – 73

Check that you can:	**Do you understand these words?**	*Refer to JSS1 Pupil's Handbook (PHB) pages 68 – 76 and the Lesson Plans for further practice.*
Round whole numbers to the nearest 10 or 100 e.g. 45 to nearest 10 is 50 245 to nearest 100 is 200	Rounding/rounding off; decimal places; ≈ means 'is approximately equal to'; powers of 10	

CONCEPTS:

* Use a number line to help you round off e.g. 4.7 rounded to the nearest whole number is 5.



4.7 is closer to 5 than to 4.

* To round off a number, look at the place value just after the one you are rounding to.
* The digits 1, 2, 3, 4 round down
* The digit 5 rounds up
* The digits 6, 7, 8, 9 round up.

Example: 7.536 rounded to

- nearest whole number is 8 because **5** rounds up
- to one decimal place is 7.5 because **3** rounds down
- to two decimal places is 7.54 because **6** rounds up.

* To multiply whole numbers by powers of 10, we must add zeros e.g. $325 \times 10^2 = 32\,500$
* To divide whole numbers by powers of 10, we must subtract zeros e.g. $32\,500 \div 10^2 = 325$
* To multiply or divide decimals and whole numbers by powers of 10, we move the point to the right for multiplication and to the left for division (to change the place value of the digits). The power tells us the number of places to move

Examples:

$5.03 \times 10^3 = 5\,030$ $\quad$ $5.03 \div 10^3 = 0.00503$

Topic 6: Rounding Decimals

Exercise

1. Round these numbers to the nearest whole number:
   a. 33.17 b. 0.604 c. 1.51
   d. 0.028 e. 109.67 f. 99.48
2. Round these numbers to the number of decimal places shown
   a. 0.184 (to one decimal place) b. 0.0271 (to two decimal places)
   c. 0.2071 (to three decimal places) d. 3.8255 (to two decimal places)
   e. 3.8255 (to three decimal places) f. 3.8255 (to one decimal place)
   g. 80.705 (to two decimal places) h. 103.1004 (to three decimal places)
   i. 689.9828 (to two decimal places) j. 689.9828 (to one decimal place)
3. a. Round 5 853 to the nearest 100. b. Round 53.74 to the nearest 10.
   c. Round 5 853 to the nearest 10. d. Round 53.74 to the nearest unit.
   e. Round 5 853 to the nearest 1000. f. Round 53.74 to the nearest 100.
   g. Round 7 059 to the nearest 100. h. Round 7 059 to the nearest 1000.
   i. Round 7 059 to the nearest 10. j. Round 689.9828 to the nearest 100.
4. Four football players are weighed in kilograms as follows:
   98,60 kg 99,17 kg 98,06 kg 99,7 kg.
   Round off each weight to the nearest kilogram.
5. Calculate:
   a. 235×10^2 b. $235 \div 10^2$ c. $235 \div 10^3$ d. 235×10^3
   e. 0.09×10^2 f. $0.09 \div 10^2$ g. $0.09 \div 10$ h. 0.09×10
   i. 579.7×10^2 j. $579.7 \div 10^2$ k. $579.7 \div 10^3$ l. 579.7×10^3

Check your answers:

1a. 33 b. 1 c. 2
d. 0 e. 110 f. 99
2a. 0.2 b. 0.03 c. 0.207
d. 3.83 e. 3.826 f. 3.8
g. 80.71 h. 103.100
i. 689.98 j. 690.0

3a. 5 900 b. 50
c. 5 850 d. 54
e. 6 000 f. 100
g. 7 100 h. 7 000
i. 7 060 j. 700

4. 99 kg; 99 kg; 98 kg; 100 kg

5a. 23 500 b. 2.35
c. 0.235 d. 235 000
e. 9 f. 0.0009
g. 0.009 h. 0.9
i. 57 970 j. 5.797
k. 0.5797 l. 579 700

WINNING TEAMS: Mathematics

JSS1 Topic Progress Chart for Maths Captains (to support JSS2 pupils) TERM 1

Topic 7: Operations on decimals M-07-030 to M-07-033 p74 – 86

Check that you can:	**Do you understand these words?**		*Refer to JSS1 Pupil's Handbook (PHB) pages 77 – 89 and the Lesson Plans for further practice.*
• Add, subtract, multiply and divide with whole numbers.	Vertical adding /subtracting; order of operations		

CONCEPTS:

* Revise vertical adding and subtracting using place value of the digits

Examples:

```
   1
  6247
    13
+    8
------
  6268
```

```
  3476
-   35
------
  3441
```

* Revise multiplying and dividing using place value of the digits (in columns)

```
   32
 × 12
----
   64
+320
----
  384
```

```
    15
10|150
- 10↓
----
   50
-  50
----
    0
```

* Order of operations: BODMAS

Brackets, **O**f, **D**ivision & **M**ultiplication, **A**ddition & **S**ubtraction.

CONCEPTS:

* To add or subtract with decimal numbers, use place value columns and keep the decimal point of each number lined up.

Examples:

```
  4.800
- 0.357
-------
  4.443
```

```
  5.91
+ 6.42
------
 12.33
```

* To multiply decimal numbers, the answer must have the total of the decimal places of the numbers being multiplied.

Examples:

$0.25 \times 0.3 = 0.075$

$2.5 \times 0.3 = 0.75$

```
   0.25
X  0.3
-------
   0.075
```

* To divide decimal numbers, first multiply by a power of 10 to make the divisor a whole number. Do the same to both numbers!

Example:

$1.671 \div 0.03 = \frac{1.671 \times \mathbf{100}}{0.03 \times \mathbf{100}} = \frac{167.1}{3} = 55.7$

WINNING TEAMS: Mathematics

JSS1 Topic Progress Chart for Maths Captains (to support JSS2 pupils) TERM 1

Topic 7: Operations on decimals

Exercise Do all calculations without using a calculator.

1. Calculate:
   a. 3.3 + 4.83 b. 9.4 + 3.7 c. 3.56 + 4.689 d. 9.43 – 3.21 e. 9.43 – 3.56
   f. 0.06 + 3.2 + 5.75 g. 0.07 + 4.21 – 4.2 h. 1 – 0.03 i. 100 – 0.03 j. 0.04 + 5.06
2. Calculate the following whole numbers:
   a. 3 187 + 2 063 + 1 985 b. 971 − 602 c. 35 × 44 d. 5 115 ÷ 5 e. 641 × 7
3. Add or subtract the decimal numbers.
   a. 6.93 + 9.41 b. 7.09 + 8.81 c. 1.3 − 0.96 d. 2.8 − 1.77
   e. 18.74 + 9.535 f. 54.8 − 19.063 g. 1.4 + 3.2 − 1.8
4. Fill in the missing value:
   a. 13.3 + 1.4 + ___ = 18.2 b. 25.31 – ___= 15.06 c. 14.9 + ____= 15
   d. 14.09 + ____= 15 e. 1 – ____= 0.3 f. 1 – _____= 0.78
5. Multiply and divide the decimal numbers.
   a. 0. 25 × 0.3 b. 1.68 ÷ 0.2 c. 5.9 × 0.4 d. 1.65 ÷ 0.05
   e. 0.05 × 0.23 f. 5.6 ÷ 0.7 g. 0.24 × 0.02 h. 1.341 ÷ 0.03
   h. 4×0.3 i. 0.02×0.3 j. $7.2 \div 9$ k. $(0.1)^2$
   l. $451.2 \div 0.02$ m. $2.1 \div 0.3$ n. $5.365 \div 0.05$ o. $1.44 \div 1.2$
   p. 0.8×3.81 q. $1{,}2 \times 3{,}4$
6. Calculate (without using a calculator):
   a. (5 + 3) × 2.5 b. $4^2 \times ½$ c. 5.1 × (6.2 – 3) d. $7 \times 2^3 \div 4$
   e. $15 \div 3 + 4^3$ f. $0.35 + 0.2 \times 0.1$ g. $0.42 \div 0.2 + 3.1 \times 3$
   h. $\frac{3.2 + 4.05}{0.05}$ i. $0.75 + 0.1 \times 2$ j. $0.24 \div 0.3 + 1.4 \times 2$ k. $\frac{3.4 + 4.92}{0.02}$
7. You are told $45 \times 24 = 1\,080$. Use this to determine: a. 4.5×2.4 b. 0.045×0.24 c. 0.45×240
8. You are told $23 \times 37 = 851$. Use this to determine: a. 2.3×3.7 b. 0.23×0.37 c. 0.23×370

Check your answers:

1a. 8.13 b. 13.1 c. 8.249 d. 6.22
e. 5.87 f. 9.01 g. 0.08 h. 0.97
i. 99.97 j. 5.1
2a. 7 235 b. 369 c. 1540 d. 1023
e. 4 487
3a. 16.34 b. 15.9 c. 0.34 d. 1.03
e. 28.275 f. 35.737 g. 2.8
4a. 3.5 b. 10.25 c. 0.1
d. 0.91 e. 0.7 f. 0.22
5a. 0.075 b. 8.4 c. 2.36
d. 33 e. 0.0115 f. 7
g. 0.0048 h. 44.7 i. 0.006
j. 0.8 k. 0.01 l. 22 560
m. 7 n. 107.3 o. 1.2
p. 3.048 q. 4.08
6a. 20 b. 8 c. 16.32 d. 14
e. 69 f. 0.77 g. 11.4 h. 145
i. 0.95 j. 3.6 k. 416
7a. 10.80 b. 0.01080 c. 108
8a. 8.51 b. 0.0851 c. 85.1

WINNING TEAMS: Mathematics

JSS1 Topic Progress Chart for Maths Captains (to support JSS2 pupils) TERM 1

Topic 8: Estimation & problem solving M-07-034 to M-07-035 p87 – 92

Check that you can: • Read and interpret story problems. • Use strategies to solve problems	**Do you understand these words?** estimate by rounding numbers *adding*: sum, total, increase, add, altogether *subtracting*: take away, difference, reduce, decrease *multiplying*: multiply, of, product *dividing*: share, quotient	*Refer to JSS1 Pupil's Handbook (PHB) pages 90 – 94 and the Lesson Plans for further practice.*

CONCEPTS:

* If we **estimate** by rounding numbers off, we get a math problem that we can solve mentally. This means we can estimate an answer very quickly.

Examples:

308 + 1369

≈ 300 + 1400

≈ 1700 (to the nearest 100)

Estimate 237 + 568

237	+	568		Round the numbers to the Hundreds. Then add.
↓		↓		
200	+	600	=	800
237	+	568	≈	800

237 + 568 is approximately 800

Estimate 6719 – 4312

6719	-	4312		Round the numbers to the Thousands. Then subtract.
↓		↓		
7000	-	4000	=	3000
6719	-	4312	≈	3000

6719 - 4312 is approximately 3000)

*** Steps of problem solving:**

1. Read to understand & identify clue words
2. Represent the problem (e.g. diagram, table)
3. Identify which operation/s to use
4. Solve the problem
5. Check the units used (e.g. metres, money)
6. Check that your answer makes sense.

Example:

Sabatu has 1.5 litres of fuel in her motorbike. If she buys 2.8 more litres of fuel, how much will she have in total?

The question is about fuel in litres.

We want a total so we need to add.

1.5 litres + 2.8 litres = ***4.3 litres***

The answer makes sense:

2.8 is about 3 and we know that 3 + 1½ = 4½.

4.3 litres is close to 4½ litres.

Topic 8: Estimation and problem solving

Exercise

1. Estimate 7 143 – 5 794 to the nearest Thousands place.
2. Estimate 734 + 659 to the nearest hundred.
3. Estimate 7 619 – 3 412 to the nearest thousand.
4. Estimate 709 + 88 to the nearest Tens place
5. Estimate 22,397 – 2 074 to the nearest Thousands place.

6. At a supermarket, beef is sold at Le 2 880 for 100 grams.
   a. How much does 0.2 kg of beef cost?
   b. How much does 0.5 kg of beef cost?

7. Bananas cost Le 4.64 per kilogram.
   a. How much will 2 kilograms of bananas cost?
   b. How much will 200 grams of bananas cost?

8. Judy bought a carton with 40 fish inside.
   If the fish weighed 16 kg in total, around how much did each fish weigh?

9. Albert uses 5.2 g of sugar each day. He wants to buy enough sugar for a month (30 days).
   a. Sugar is sold in bags of 100 grams. How much should he buy?
   b. Sugar cost Le 20 000 for one kilogram. How much will Albert pay?

10. Musu and Albert are planting a rice farm together. They have 6 hectares of land, and Albert planted on 1.8 hectares.
    If Musu comes to plant on the rest, how many hectares will she plant on?

Check your answers:

1. 7 000 – 6 000 = 1000
2. 700 + 700 = 1 400
3. 8 000 – 3 000 = 5 000
4. 710 + 90 = 800
5. 22 000 – 2000 = 20 000
6a. 0.2 kg = 200 g.
2 880 × 2 = Le 5 760
b. 0.5 kg = 500 g.
2 880 × 5 = Le 14 400
7a. 2 × 4.64 = Le 9.28
200 g = 0.2 kg
0.2 kg × 4.64 = Le 0.928
8. 40 fish ÷ 16 kg = 2.5 kg each
9a. 5.2 g × 30 days = 156 g
Albert needs to buy 2 × 100 g
= 200 g of sugar.
b. $\frac{200}{1000} \times 20\,000 = 4\,000$
Albert will pay Le 4 000.
10. 6 – 1.8 = 4.2 hectares

WINNING TEAMS: Mathematics

JSS1 Topic Progress Chart for Maths Captains (to support JSS2 pupils) TERM 1

Topic 9: Percentage M-07-036 to M-07-038 p93 – 100

Check that you:

- understand fractions and decimal numbers
- can convert between hundredths and decimal numbers

Do you understand these words?
percentage

Refer to JSS1 Pupil's Handbook (PHB) pages 95 – 102 and the Lesson Plans for further practice.

CONCEPTS:

* 30 per cent means 30 per hundred or $\frac{30}{100}$. We write 30%.

* To convert a percentage to a fraction, place the numbers over a denominator of 100 and simplify

Example: 30% = $\frac{30}{100} = \frac{3}{10}$

* To express percentage as decimal, divide the percentage by 100.

Example: 30 ÷ 100 = 0.3.

* Use what you know about multiplying and dividing by powers of 10 and moving the point to change place value.

* To convert a fraction to a percentage:

Method 1: Make an equivalent fraction out of 100 and convert.

$$\frac{9}{20} = \frac{45}{100} = 45\%$$

Method 2: Multiply by $\frac{100}{1}$

$$\frac{9}{20} = \frac{9}{20} \times \frac{100}{1} = \frac{900}{20} = \frac{90}{2} = 45\%$$

WINNING TEAMS: Mathematics

JSS1 Topic Progress Chart for Maths Captains (to support JSS2 pupils) TERM 1

Topic 9: Percentage

Exercise

1. Write each of the following percentages as a fraction (in simplest form) and as a decimal:

   a. 1% b. 2% c. 30%
   d. 25% e. 75% f. 50%
   g. 45% h. 68% i. 40% j. 55%

2. Write each of the following decimals as percentages

   a. 0.04 b. 0.09 c. 0.6
   d. 0.27 e. 0.25 f. 0.8
   g. 0.32 h. 1 i. 0.295 j. 0.075

3. Write each of the following fractions as percentages

   a. ¼ b. ½ c. ¾
   d. $\frac{1}{25}$ e. $\frac{2}{25}$ f. $\frac{3}{20}$
   g. $\frac{12}{50}$ h. $\frac{7}{20}$ i. $\frac{3}{5}$ j. $\frac{9}{25}$

4. Write the following in ascending order (i.e. from smallest to biggest)

   a. $\frac{1}{5}$, 15% and 0.25 b. $\frac{1}{25}$, 5% and 0.02 c. $\frac{3}{10}$, 3% and 0.32

Check your answers:

1a. $\frac{1}{100}$ and 0.01 b. $\frac{1}{200}$ and 0.02
c. $\frac{3}{10}$ and 0.3 d. $\frac{1}{4}$ and 0.25
e. $\frac{3}{4}$ and 0.75 f. $\frac{1}{2}$ and 0.5
g. $\frac{45}{100} = \frac{9}{20}$ and 0.45 h. $\frac{68}{100} = \frac{17}{25}$ and 0.68
i. $\frac{40}{100} = \frac{2}{5}$ j. $\frac{55}{100} = \frac{11}{20}$ and 0.55

2a. 4% b. 9%
c. 60% d. 27%
e. 25% f. 80%
g. 32% h. 100%
i. 29.5% j. 7.5%

3a. 25% b. 50%
c. 75% d. 4%
e. 8% f. 15%
g. 24% h. 35%
i. 60% j. 36%

4a. 0.15; 0.20; 0.25 (15%; $\frac{1}{5}$; 0.25)

b. 0.04; 0.05; 0.02 (0,02; $\frac{1}{25}$; 5%)

c. 0.03; 0.3 0.32 (3%; $\frac{3}{10}$; 0.32)

WINNING TEAMS: Mathematics

JSS1 Topic Progress Chart for Maths Captains (to support JSS2 pupils) TERM 1

Topic 10: Percentage M-07-039 to M-07-040 p101 – 104

Check that you can:	**Do you understand these words?**	*Refer to JSS1 Pupil's Handbook (PHB) pages 103 – 107 and the Lesson Plans for further practice.*
• Convert between fractions, decimals and percentages	Percentage of an amount One quantity as a percentage of another	

CONCEPTS:

* Change the percentage to a fraction, and then multiply it by the given quantity. Simplify the answer.

Example: 15% of 500 = $\frac{15}{100} \times 500 = 75$

* To find one number as a percentage of another number, write it as a fraction and multiply by 100.

Example: 25 m as a percentage of 1 km:
Use 1 km = 1000 m

$$\frac{25}{1000} \times 100 = \frac{2500}{1000} = 2.5\%$$

Topic 10: Percentage

Exercise

1. Calculate:

   a. 10% of 600 b. 25% of 368 c. 75% of 328

   d. 20% of 125 e. 40% of 500 f. 30% of 12 300

2. Le 70,000 was shared between Amina and Binta.

   If Binta received 35%, what was Binta's share in Leones?

3. 75% of 96 acres of land was given to Hassan. Calculate the amount of land that was given to Hassan.

4. Musa was given 24% of Le 180,000. Calculate the amount given to Musa.

5. In a box of 250 mangoes, 220 are good. What percentage is good?

6. Express 150 grams as a percentage of 2 kilograms.

7. In a Mathematics examination, a girl scored 48 marks out of a total of 60 marks.

   What percentage did she score?

Check your answers:

1a. $\frac{10}{100} \times 600 = 60$

b. $\frac{25}{100} \times 368 = \frac{1}{4} \times 368$
$= 92$

c. $\frac{75}{100} \times 328 = \frac{3}{4} \times 328$
$= 82 \times 3 = 246$

d. $\frac{20}{100} \times 125 = \frac{1}{5} \times 125$
$= 25$

e. $\frac{40}{100} \times 500 = \frac{2}{5} \times 500$
$= 200$

f. $\frac{30}{100} \times 12\,300 = \frac{3}{10} \times 12\,300$
$= 3 \times 1\,230 = 3\,690$

2. $\frac{35}{100} \times 70\,000 = 24\,500$

3. $\frac{75}{100} \times 96 = 72$ acres

4. $\frac{24}{100} \times 180\,000 = Le\ 43\,200$

5. $\frac{220}{250} \times 100 = 88\%$

6. $\frac{150}{2000} \times 100 = 13.75\%$

7. $\frac{48}{60} \times 100 = 80\%$

WINNING TEAMS: Mathematics

JSS1 Topic Progress Chart for Maths Captains (to support JSS2 pupils) TERM 1

Topic 11: Percentage Increase/Decrease M-07-041 to M-07-045 p105 – 117

Check that you can:

- Convert between fractions, decimals and percentages
- Find a percentage of a quantity
- Find a number as a percentage of another number

Do you understand these words?

Percentage increase
Percentage decrease
Given number
Changed quantity
Original quantity

Refer to JSS1 Pupil's Handbook (PHB) pages 108 – 114 and the Lesson Plans for further practice.

CONCEPTS:

* If a quantity *increases*, it becomes *more*. If a quantity *decreases*, it becomes *less*.

* To find the percentage increase or decrease, we need the *change in quantity* and the *original quantity*.
Then we substitute the numbers into the formula:

Percentage increase/decrease

$$= \frac{\textbf{change in quantity}}{\textbf{original quantity}} \times 100\%$$

* **Increase**: new quantity – original quantity
* **Decrease**: original quantity – new quantity
* If there is a percentage increase, it means we **add** to the original amount.
* If there is a percentage decrease, it means we **subtract** from the original

* To calculate a number given the percentage increase or decrease:

$$\text{New number} = \frac{100 + \text{percentage increase}}{100} \times \frac{\text{given number}}{1}$$

$$\text{New number} = \frac{100 - \text{percentage increase}}{100} \times \frac{\text{given number}}{1}$$

* State the increase or decrease in percent.
* For percent increase, *add* the percentage to 100%. For percent decrease, *subtract* the percentage from 100%.
Divide the answer by 100 to cancel the percentage.
Multiply the answer by the given number to give the new number.

Topic 11: Percentage increase/decrease

Exercise

1. The number 800 is increased by 20%. Calculate the new number.
2. The number 600 is decreased by 15%. Calculate the new number.
3. The price of milk increases from Le 28 500 to Le 32 775.

   By what percentage does the price of milk increase?
4. The number of people who attend a clinic monthly drops from 40 to 16.

   By what percentage does the number of people attending the clinic drop?
5. A shirt cost Le 180 000. I get 20% discount. How much do I pay?
6. A primary school in a village had 120 pupils.
   The next year, the number of pupils increased by 25%. Calculate the new number of pupils.
7. There were 900 people living in a village in 2016. By 2021, the population had grown by 10%.
   What was the population in 2021?
8. Mrs Bhyat had 500 DVDs for sale in her shop, but she sold 40% of them.
   How many DVDs remain in her shop?
9. I buy a car for Le 40 000 000 and sell it for Le 35 million. What is my percentage loss?
10. In Sierra Leone in 2016, 80 000 bicycles were donated to a bicycle project.

    Four years later, 100 000 bicycles were donated to the project.

    What is the percentage increase in the number of bicycles?
11. Fatmata buys a book for Le 30 000 in Freetown. The same book is available online for Le 75 000.
    How much more does the book cost online? What percentage increase is this?

Check your answers:

1. 120% × Le 800 = $\frac{120}{100} \times 800 = \frac{6}{5} \times 800 = 6 \times 160 = 960$
2. 85% × Le 600 = $\frac{85}{100} \times 600 = 510$
3. $\frac{32\,775 - 28\,500}{28\,500} \times 100 = 15\%$.
   The price of milk increases by 15%.
4. $\frac{40 - 16}{40} \times 100 = 60\%$. The number of people attending the clinic drops by 60%.
5. 20% of 180 000 = $\frac{20}{100} \times 180\,000 = 20 \times 1\,800 = 3\,600$.
   180 000 – 3 600 = 176 400. I pay Le 176 400.
6. 125% × 120 = 150.
   The new number of pupils is 150.
7. 110% × 900 = 990. The population had grown to 990 people.
8. 40% of 500 = $\frac{40}{100} \times 500 = 200$.
   Mrs Bhyat has 200 DVDs left.
9. $\frac{5 \text{ million}}{40 \text{ million}} \times 100 = 12.5\%$ decrease (loss)
10. $\frac{20\,000}{100\,000} \times 100 = 20\%$ increase.
11. $\frac{45\,000}{75\,000} \times 100 = 60\%$ increase.

WINNING TEAMS: Mathematics

JSS1 Topic Progress Chart for Maths Captains (to support JSS2 pupils) TERM 1

Topic 1: Ratio M-07-046 to M-07-050 p2 – 11

Check that you can	**Do you understand these words?**
* work with fractions, decimals and percentages	ratio; quantities; part-to-part; part-to-whole; express ratio as fraction/percent/decimal

Refer to JSS1 Lesson Plan Manual and Pupil's Handbook (PHB) pages 2 – 9.

CONCEPTS:

* A **ratio** compares two quantities of the same kind or units (for example, people, cups, kilometres)
* The **order** of a ratio is important.

Example:
A ratio of 3 cups of milk to every 2 cups of flour in a recipe can be written as **3 : 2**
2 cups of flour to every 3 cups of milk is a ratio of 2 to 3, written as **2 : 3.**

* A ratio can compare two parts of a whole or compare a part to the whole.

Example:
10 mangoes and 8 pineapples in a fruit basket -
Mangoes : Pineapples = **10 : 8 = 5 : 4**
All fruit : Mangoes = **18 : 10 = 9 : 5**
Pineapples : All fruit = **8 : 18 = 4 : 9**

* We can also write ratios as **fractions**:

Example:
$\frac{\text{mangoes}}{\text{pineapples}} = \frac{10}{8} = \frac{5}{4}$ or $\frac{\text{mangoes}}{\text{all fruit}} = \frac{10}{18} = \frac{5}{9}$

* **Percentage** is a ratio that compares a number to 100.

Example:
25% = 25 : 100

* To express a ratio as a percent, express the ratio as a fraction and then multiply the fraction by 100

Example:
$2 : 5 = \frac{2}{5} = \frac{2}{5} \times \frac{20}{20} = \frac{40}{100} = 40\%$

Ready to work with pupils.

WINNING TEAMS: Mathematics

JSS1 Topic Progress Chart for Maths Captains (to support JSS2 pupils) TERM 1

Topic 1: Ratio

Exercise

1. Binta has 5 pencils and 6 pens. Write down:
   a. The ratio of **pencils** to **pens** in three forms. b. The ratio of **pens** to **pencils.**
2. A farmer has some animals on his farm. These include 16 chickens, 13 goats, 12 cows and 21 sheep. Write down and simplify the ratio of:
   a. cows to goats to chickens to sheep b. sheep to cows to chickens to goats
   c. chickens to all animals d. sheep to all animals on the farm
3. Sahr went to her garden and picked 25 fruit. She counted 15 mangoes, 12 pineapples and the rest were oranges. Write down and simplify the ratio of:
   a. mangoes to pineapples to oranges b. The ratio of mangoes to all fruit
   c. The ratio of pineapples to all fruit d. The ratio of oranges to all fruit
4. Express the ratio of 36 girls to 24 boys as a fraction in its lowest term.
5. Mabinty bought 40 fruits from the market. 32 are oranges and the rest are mangoes. Write the following as fractions and simplify:
   a. the ratio of mangoes to oranges b. the ratio of mangoes to all of Mabinty's fruit
   c. the ratio of oranges to all of Mabinty's fruit
6. Express 75 rabbits to 600 mice as a fraction in its lowest term.
7. Hawa got these marks in the following subject in the last examination:
   Mathematics 65%, Science 72% and History 40%.
   Express Hawa's mark for each subject as a ratio.
   Change the ratios for Hawa's marks to fractions in their lowest terms.
8. Express these percent as ratios: a. 55% b. 70% c. 75%
9. Express these ratios as percent: a. 7 : 25 b. 36 : 40
10. Express a. 7 days : 28 days as a decimal. b. Express 300 cm : 500 cm as a decimal.
12. Express 350 m : 1000 m. as a fraction, decimal, and percentage.

Check your answers:

1a. pencils : pens = 5 : 6 5 is to 6
For every 5 pencils, there are 6 pens.
b. pens : pencils = 6 : 5
2a. cows : goats : chickens : sheep
= 12 : 13 : 16 : 21
b. sheep : cows : chickens : goats
= 21 : 12 : 16 : 13
c. chickens : all animals = 16 : 60 = 4 : 15
d. sheep : all animals = 21 : 60 = 7 : 20
3a. mangoes : pineapples : oranges = 15 : 12 : 8
b. mangoes : all fruit = 15 : 25 = 3 : 5
c. pineapples : all fruit = 12 : 25
d. oranges : all fruit = 8 : 25
4. girls : boys = 36 : 24 = 3 : 2
5a. mangoes : oranges = 8 : 32
b. mangoes : fruit = 8 : 40 = 1 : 5
c. oranges : fruit = 32 : 40 = 4 : 5
6. rabbits : mice = 75 : 600 = 3 : 24 = 1 : 8
7. Mathematics $65 : 100 = \frac{65}{100} = \frac{13}{20}$
Science $72 : 100 = \frac{72}{100} = \frac{18}{25}$
History $40 : 100 = \frac{40}{100} = \frac{2}{5}$
8a. 55 : 100 = 11 : 20 b. 70 : 100 = 7 : 10
c. 75 : 100 = 3 : 4
9a. 28 : 100 = 28% b. 18 : 20 = 90 : 100 = 90%
10. 7 : 28 = 1 : 4 = 0.25 11. 3 : 5 = 0.60
12. 35 : 100 = 0.35 = 35% and $7 : 20 = \frac{7}{20}$

WINNING TEAMS: Mathematics

JSS1 Topic Progress Chart for Maths Captains (to support JSS2 pupils) TERM 1

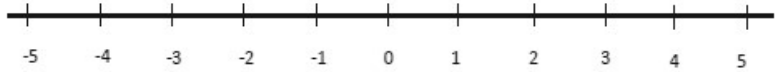
Topic 3: Integers M-07-056 to M-07-058 p24 – 32

Check that you:	**Do you understand these words?**	*Refer to JSS1 Lesson Plan Manual and Pupil's Handbook (PHB) pages 19 - 25.*
* know that the positive whole numbers, zero and the negative whole numbers are all called integers	integers; positive & negative numbers; temperature; metres above/below sea level; degrees below zero Celsius; greater than (>), less than (<)	

CONCEPTS:

* Numbers less than zero are called negative numbers
* Negative numbers can be used to describe:
  - money owed
  - steps backwards on a number line,
  - temperatures below 0°C
  - metres below sea level.

* The number line shows negative numbers, zero and positive numbers:



* Negative numbers are always written with the – sign.
  Sometimes the + is not written before positive numbers.
* Numbers to the right on a number line are bigger than numbers to the left.
  The farther positive integers are to the right of zero, the greater their value, so 10 > 5
  The farther negative integers are to the left of zero, the lesser the value, –10 < –5.
  Zero is greater than negative numbers (0 > –5) and smaller than positive numbers (0 < 5)

Examples:

Arrange 4, –2 , –5 , 3, –1 in ascending order (from least to most)

–5, –2, –1, 3, 4.

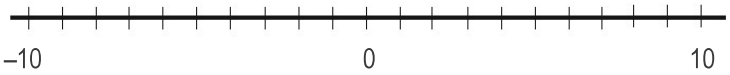
Arrange 31, –31 , –15 , 30, 0, –5 in descending order (from most to least)

31, 30, 0, –5 , –15, –31

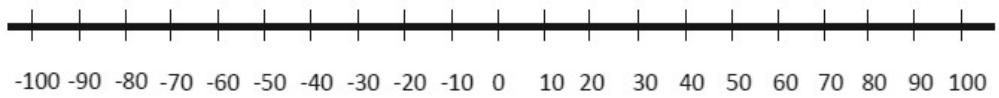
Ready to work with pupils.

Topic 3: Integers

Exercise

1. 

a. Place the following numbers on the number line: –7, 7, –3, 4, –1, 2
b. Which number is bigger?
–7 or –3 –1 or 2 –1 or –3

2. 

Use the number line to complete the following with > or <:

a. 0 ____ –10 b. –10 ____ –20 c. –20 ____ 10 d. –90 ____ –100

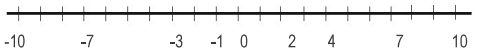
e. 0 ____ 10 f. –50 ____ 0 g. 70 ____ 20 h. –60 ____ –30

3. List these integers in order from greatest to least: –3, 4, 11, –4, –11, 2

4. List these integers in order from least to greatest: 25, –30, 40, –40, –25, –10, 10.

5. The bigger positive integers are, the _____ their value.
The bigger negative integers are the _____ their value.

Check your answers:

1. 

b.

a. 0

e. 0

5. The bigger positive integers are, the greater/more their value.
The bigger negative integers are the lesser their value.

Topic 4: Adding and subtracting integers M-07-059 to M-07-061 p33 – 41

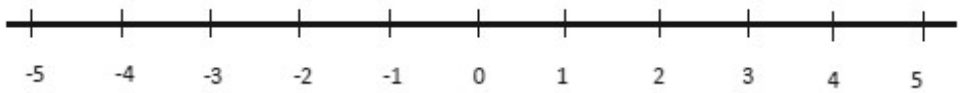
Check that you know that:
* the positive whole numbers, zero and the negative numbers are all called integers

VOCABULARY:
No new vocabulary

Refer to JSS1 Lesson Plan Manual and Pupil's Handbook (PHB) pages 26 – 31.

CONCEPTS:

* A number line helps us to add and subtract integers.



$(+) + (+) = +$

$(-) + (-) = -$

$(+) + (-) = -$ or $+$

* Find the first integer on the number line.

* To add a positive integer, move to the right.

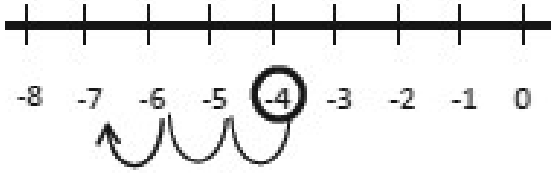
* To subtract a positive integer, move to the left.

* To add a negative integer, move to the left.

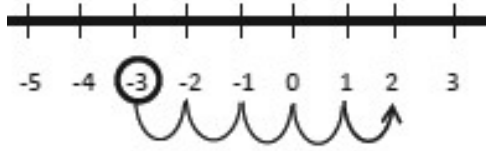
* To subtract a negative integer, move to the right.

Examples:

$-4+(-3) = -7$ or $-4-3 = -7$



$-3+(+5) = +2$ or $-3+5 = +2$



$+4-(+6) = 4-6 = -2$

$-8-(-9) = -8+9 = +1$

Ready to work with pupils.

** Hint: Keep a number line in your mind, even if you don't draw one!*

Topic 4: Adding and subtracting integers

Exercise

Calculate:

1a.	8 – 10	b. 5 – 12	c. – 8 – 3
2a.	– 5 – 2	b. – 7 + 3	c. – 8 + 10
3a.	6 – (–3)	b. 8 + (–12)	c. 12 – (–2)
4a.	9 + (–3)	b. 12 – (–4)	c. 39 + (–4)
5a.	240 – (–45)	b. –36 – 42	c. –124 + 235
6a.	23 – 46	b. 36 – 58	c. 3 – 5 + 7
7a.	– 12 – 15	b. –32 + 14	c. –5 – 2 + 7
8a.	26 + (–14)	b. 28 + (–32)	c. –23 + 27 – (–4)
9a.	48 – (–3)	b. –12 – (–15)	c. 2 + (–10) – 24
10a.	–14 + (–27)	b. 143 – 189	

11. Complete the following calculations

a. ☐ + (–3) = 12 b. 15 + ☐ = 6 c. 15 – ☐ = 6 d. ☐– (–7) = –1

e. ☐– (–5) = 9 f. 235 + ☐ = 189

12. You may only use the following numbers to answer the questions:

–7; –5; –2; 2; 5; 7.

a. Use two of the numbers to make the largest possible result. ☐ + ☐ =

b. Use two of the numbers to make the smallest possible result. ☐ + ☐ =

c. Use two of the numbers to make the largest possible result. ☐ – ☐ =

d. Use two of the numbers to make the smallest possible result. ☐ – ☐ =

13. The temperature in Freetown was 17°C at 6 pm in the evening. By 6 am the next morning, it had dropped by 2°C. By noon it had risen to 28° C.
How many degrees warmer was it at noon than at 6 pm the day before?

Check your answers:
1a.

WINNING TEAMS: Mathematics

JSS1 Topic Progress Chart for Maths Captains (to support JSS2 pupils) TERM 1

Topic 5: Multiplying and dividing integers M-07-062 to M-07-065 p42 – 51

* **Check that you know that:** the positive whole numbers, zero and the negative numbers are all called integers	**VOCABULARY:** No new vocabulary	*Refer to JSS1 Lesson Plan Manual and Pupil's Handbook (PHB) pages 30 – 31.*

CONCEPTS:

* If the two integers have the same sign, their product is positive.
* If the two integers have different signs, their product is negative.

Remember:

positive × positive = positive
positive × negative = negative
negative × positive = negative
negative × negative = positive

positive ÷ positive = positive
positive ÷ negative = negative
negative ÷ positive = negative
negative ÷ negative = positive

Examples:

(−100) × (−3) = +300 100 × 3 = +300

(−49) ÷ 7 = −7 (49) ÷ −7 = −7

Problem solving with integers:

To solve problems with integers, we use problem solving steps:

1. Read the problem to understand the context and to find clue words for add, subtract, multiply, divide.
2. Represent the problem with a diagram if you can.
3. Identify the operations you need to use.
4. Write a number sentence for the problem.
5. Solve the problem.

Example:

Mohamed is a certain age. He is 4 years older than Finda and Finda is one third of David's age. If David is 30 years old, how old is Mohamed?

Let Mohamed by x years old. Then Finda is x – 4.

So $x - 4 = \frac{1}{3} \times 30$

$x = 10 + 4 = 14$. David is 14 years old

Ready to work with pupils.

Topic 5: Multiplying and dividing integers

Exercise

Calculate:

1a.	$\square - (-72) = -64$	b.	$145 - \square = 136$	c.	$\square + (-13) = 22$
2a.	$\square \times (-5) = 15$	b.	$2 \times \square = 10$	c.	$7 \times \square = 21$
3a.	$\square \times 4 = -12$	b.	$-120 \div \square = 20$	c.	$\square \times -12 = 84$

For questions 4 to 6, test different integers until you find one that works!

4. Two numbers have a sum of –6 and a product of –16. What are the two numbers?
5. Two numbers have a sum of –17 and a product of 72. What are the two numbers?
6. Two numbers have a quotient of 3 and a product of 12. Give all possible values for the two numbers.
7. If it is 25°C in Freetown and –2°C in Johannesburg, what is the temperature difference between the two cities?
8. David didn't have money, but he earned 50,000 Leones.
   However, he owes 2 different people 35,000 Leones each and needs to pay them.
   What is the balance of David's money?
9. Finda has borrowed 600,000 Leones. She has 6 children.
   She bought each of her children shoes on credit. Each pair of shoes cost 90,000 Leones.
   What is the balance of her money?
10. A bird is flying 12m above the sea and a fish is directly below the bird −14m under the sea.
    What is the distance between the bird and fish?
11. The air temperature is 33°C and a box of frozen fish is –4°C.
    What is the difference in temperature between the air and the frozen fish?

Check your answers:

1a. $\square + 72 = 64$ $\square = -136$
b. $145 \quad \square = 136$ $\square = 9$
c. $\square = 35$
2a. $\square = -3$ $\square = 5$ c. $\square = 3$
3a. $\square = -3$ b. $\square = -6$ c. $\square = -7$
4. Two numbers are 2 and –8.
$2 + (-8) = -6$ and $2 \times -8 = -16$
5. Two numbers are –8 and –9.
$-9 + (-8) = -17$ and $-9 \times -8 = 72$
6. Two numbers are 2 and 6, or –2 and –6
$6 \div 2 = 3$ and $6 \times 2 = 12$
$-6 \div -2 = 3$ and $-6 \times -2 = 12$
7. 25°C 2°C) = 27°C
8. Le $50,000 - 2 \times 35,000$
$= 50,000 - 70,000 = -20,000$
9. $6 \times 90,000$ = Le 540,000
She has Le 60,000 left.
10. $12 - (-14) = 26$ m
between the fish and the bird.
11. 33°C °C) = 37°C difference