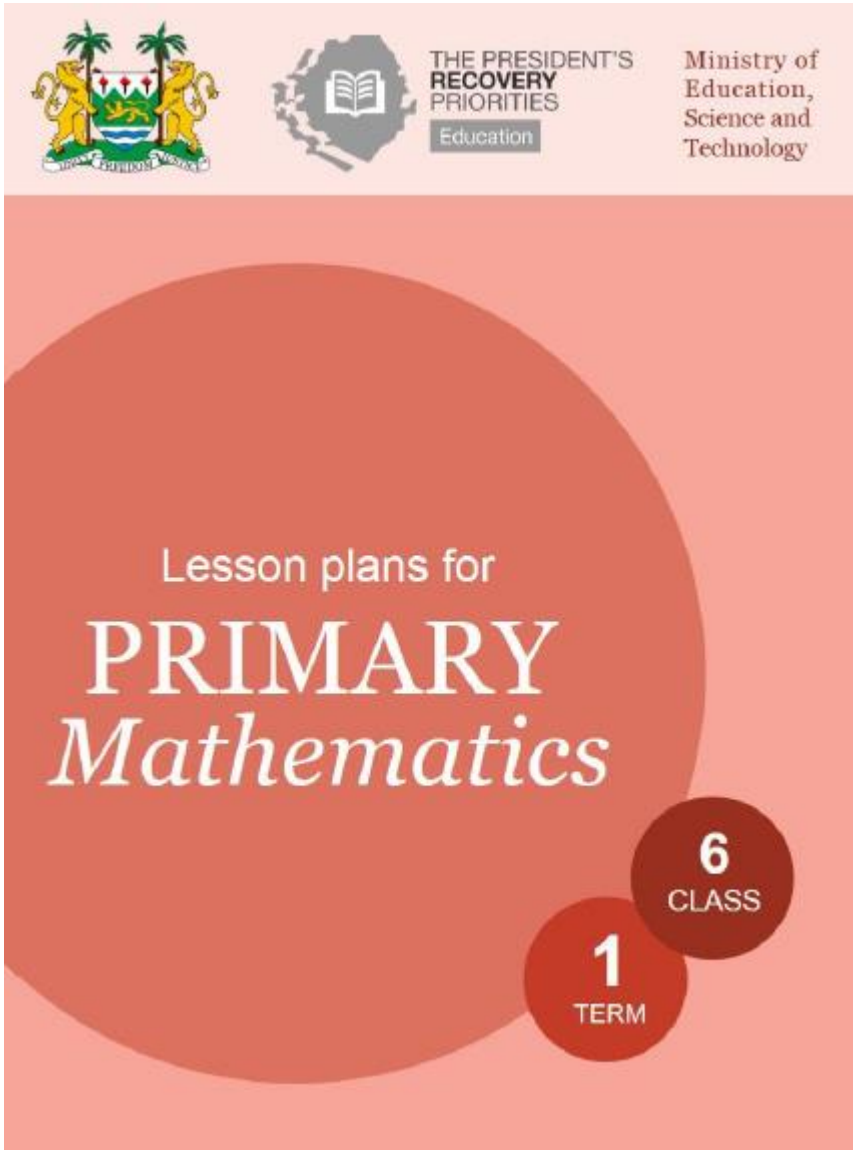

Sierra Leone
WINNING TEAMS: Mathematics

Topic Concept Charts

Primary 6 (Term 1) to support JSS1 Term 1

Leh Wi Lan
September 2022

(Amended March 2023)

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Primary 6 Topic Concept Charts (to support JSS1 pupils) TERM 1

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Primary 6 Topic Concept Charts (to support JSS1 pupils) TERM 1

Topic 1: Numbers, place value and counting (Term 1 M-06-001 to M-06-012)

Check that you know how to read, write and count numbers up to ten thousands.	**Do you understand these words?** Place value, digit, millions, hundred thousands, ten thousands, thousands, hundreds. tens. units.	*Refer to Primary Maths Class 6 page 1 – 12.*

CONCEPTS:

* Every digit in a number has a place value that depends on the position of the digit in the number. In the decimal number system, the place values are multiples of ten.
1 × 10 = 10; 10 × 10 = 100; 100 × 10 = 1000; 1000 × 10 = 10,000; 10,000 × 10 = 100,000; 100,000 × 10 = 1,000,000

Example 1

Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Units
1	3	6	5	0	2	9

Example 2

Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Units
4	2	0	8	6	5	0	1

Example 2:
This number is forty two million, eighty six thousand, five hundred and one.
Write it as 42,086,501.

Example 1:
The number 1,365,029 is made up of one million, 3 hundred thousands, 6 ten thousands, 5 thousands, no hundreds, 2 tens and 9 units.
* We read the numbers from left to right, grouping the digits in threes from the right.
* We read this number as one million, three hundred and sixty five thousand and twenty nine.
* The digit 6 represents 60 000. The digit 0 represents no hundreds in the number.
* The place value of the digit 3 is Hundred Thousands, so the value of 3 is 300 000.
* The place value of the digit 5 is Thousands, so the value of 5 is five thousand.

Example 3:
* Two million, five hundred and twenty-four thousand, six hundred and three.
* Read the number using the commas to tell you where the separators between hundreds, thousands and millions are.
* Write the number as 2,524,603.
* Listen for the words millions, hundred thousands, hundreds to indicate how to write the number down.

Counting in multiples of ten

* We can count in tens and multiples of ten, starting from any number. For example, using 1,365,029 as our starting number,
we can count in 10s forwards to get 1,365,0**2**9; 1,365,0**3**9; 1,365,0**4**9; 1,365,0**5**9; … The number in the tens column is increasing by 1 each time.
we can count in 100s backwards to get 1,365,0**2**9; 1,364,**9**49; 1,364,**8**49; 1,364,**7**49; … The number in the hundreds column is decreasing by 1 each time.
Note that 0 in the 100s became 9 and we subtracted 1 from the thousands column.

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Primary 6 Topic Concept Charts (to support JSS1 pupils) TERM 1

Topic 1: Numbers, place value and counting

Exercise

1. Write these numbers into the place value table provided:
   a. Two million, three hundred and fifty thousand, seven hundred and one.
   b. Thirteen million, sixty eight thousand, four hundred and ninety seven.

	Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Units
a.								
b.								

2. What is the place value and the value of the digit 6 in each of the following numbers?
   a. **6**2,107,325
   b. 4,**6**24,588
   c. 1,287,1**6**2
   d. 1,0**6**5,322
   e. 1,87**6**,210
3. What digit is in the thousands place for each number in question 2?
4. How many hundreds are there in the number 965,012?
5. Write down each of these numbers using digits in a place value table.
   a. Three hundred and fifty-two thousand, two hundred and ninety-three
   b. Nine hundred and twenty thousand, one hundred and eighty-two
   c. Eight hundred ninety-nine thousand, nine hundred and ninety-seven
   d. Five hundred and four thousand and forty-three

Check your answers:

1.

	Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Units
a.		2	3	5	0	7	0	1
b.	1	3	0	6	8	4	9	7

2a. place value 10 millions; value 60,000,000
b. place value 100 thousands; value 600,000
c. place value tens; value 60
d. place value 10 thousands; value 60,000
e. place value thousands; value 6,000
3a. 7 b. 4 c. 7 d. 5 e. 6
4. There are no hundreds.
5a. 352,293
b. 920,182
c. 899,997
d. 504,043

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Primary 6 Topic Concept Charts (to support JSS1 pupils) TERM 1

Topic 2: Factors and multiples (Term 1 M-06-041 to M-06-045)

Check that you know your times tables up to 12 × 12.	**Do you understand these words?** Even and odd numbers, factors, multiples, prime and composite numbers; prime factors; common factors.	*Refer to Primary Maths Class 6 Term 1*

CONCEPTS:

* **Even numbers:** If a number has a 2, 4, 6, 8 or 0 in the ones place, it is **even**. For example, 3**2**; 31**6** and 32,58**0** are all even numbers.
  Any number that has a whole answer and no remainder when it is divided by 2, is an even number.
* **Odd numbers** are any numbers that are not even. They have a 1, 3, 5, 7 or 9 in the ones place. For example, 2**3**; 21**1** and 32,58**9**
* Adding two even numbers has an even answer (e.g. 16 + 22 = 48). Adding two odd numbers has an even answer (e.g. 7 + 41 = 48).
  Adding an even number to an odd number has an odd answer (e.g. 18 + 13 = 31).
* **Prime and composite numbers**
  Composite numbers are numbers that are divisible by more than 2 numbers (e.g. 6 can be divided by 1, 2, 3 and 6)
  Prime numbers are divisible by exactly 2 numbers, 1 and itself (e.g. 13 can only be divided by 1 and 13)
  All even numbers are composite, except for the number 2. 2 is the *only* even prime number.
* **Factors** – if a number divides exactly into another number, then it is a factor of the given number.
  We find factors by dividing. Factors of a number are always smaller than or equal to the number.

  Example: 12 ÷ 4 = 3, so 4 and 3 are both factors of 12.
  72 ÷ 12 = 6, 12 and 6 are both factors of 72.

* **Prime factors:** Factors of a number that are prime numbers.

  Example: The prime factors of 12 are 2 and 3.
  Other factors of 12 are *not* prime (1, 4, 6, 12)

* **Multiples:** If a number is multiplied by another number, the answer is a multiple of the given number.
  We find multiples by multiplying. Multiples are always bigger than or equal to the given 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.

* **Common factors** of two numbers

Example: 3 and 6 are both common factors of 12 and 18.
The factors of 12 are 1 2 3 4 6 12
The factors of 18 are 1 2 3 6 9 18

Topic 2: Factors and multiples

Exercise:

1. *Without calculating* the answers, say if the answers will be odd or even.

   a. 28 + 34 b. 11 + 99 c. 85 + 36

   d. 14 + 78 e. 39 + 14 f. 13 + 65

2. Work out if the following numbers are composite numbers or prime numbers.

   a. 8 b. 17 c. 68 d. 37

   e. 39 f. 53 g. 91 h. 101

3. List the prime numbers between 10 and 30.
4. What number is a factor of all even numbers?
5. List all the factors of 32.
6. List the multiples a. of 5 from 40 to 65 b. of 8 between 10 and 40.

7. a. Is 5 a factor of 78? How do you know?

   b. Is 28 a multiple of 4? How do you know?

   c. Which of these numbers are factors of 36? 1, 2, 3, 4, 5, 6, 7, 8, 9.

   d. Which of these numbers are prime factors of 36? 1, 2, 3, 4, 5, 6, 7, 8, 9.

8. a. List the prime factors of 60.

   b. List the prime factors of 43.

   c. List the prime factors of 15.

   d. List the prime factors of 56.

9. Find the common factors of 18 and 48.
10. List three common multiples of 3 and 4.
11. Find the first three common multiples of: a. 12 and 9 b. 25 and 10
12. Look at this list of numbers: 1; 8; 16; 32; 64.

    a. Which numbers are factors of 32?

    b. Which numbers are multiples of 32?

    c. Which numbers are prime?

Check your answers:

1a. even b. even c. odd
d. even e. odd f. even

2a. composite b. prime
c. composite d. prime
e. composite f. prime
g. composite h. prime

3. 11, 13, 17, 19, 23, 29.

4. 2 because 2 divides into all even numbers.

5. Factors of 32: 1, 2, 4, 8, 16, 32

6a. 40, 45, 50, 55, 60, 65.
b. 16, 24, 32

7a. 5 is not a factor of 78 because 78 ÷ 5 has a remainder.
b. 28 is a multiple of 4 because 7 × 4 = 28
c. 1, 2, 3, 4, 6, 9.
d. 2 and 3.

8a. Prime factors of 60: 2, 3 and 5
b. 43 is the only prime factor of 43.
c. 3 and 5
d. 2 and 7

9. 1, 2, 3 and 6

10. 12, 24, 36 (there are others)

11a. 36, 72, 108. b. 50, 100, 150.

12a. 1, 8, 16 and 32
b. 32, 64 c. None of them.

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Primary 6 Topic Concept Charts (to support JSS1 pupils) TERM 1

Topic 3: Squares, cubes and triangular numbers (Term 2 M-06-116 to M-06-120)

Check that you know:	**Do you understand these words?**	*Refer to Primary Maths Class 6, Term 2.*
* that we can find a pattern (or rule) in a sequence of numbers * how to multiply a number by itself e.g. 4 × 4 = 16	Sequence of numbers; square of a number; cube of a number; triangular number	

CONCEPTS:

* A **square number** is a number that is a square of another number

* 3 squared means 3 times by itself (3 × 3) = 9 — 9 is a **square number** because 9 = 3 × 3

* The sequence of the first ten square numbers in our counting system: — 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144

Example: Use squared numbers to complete this sequence: 2; 8; 18; 32; ____ ; _____ ; _____ . — 2 × 1 × 1 = 2; 2 × 2 × 2 = 8; 2 × 3 × 3 = 18; 2 × 4 × 4 = 32; 2 × 5 × 5 = **50**; 2 × 6 × 6 = **72**; 2 × 7 × 7 = **98**.

* When we **cube** a number, we multiply it by itself three times. For example, 2 × 2 × 2 = 8 — 8 is a **cubed number** because 8 = 2 × 2 × 2

* The sequence of the first ten cubed numbers in our counting system: — 1, 8, 27, 64, 125, 216, 343, 512, 729, 1000, 1,331, 1,728.

Example:

Use cubed numbers to help you complete this pattern: 3, 10, 29, ____, ____, ____ .

The pattern is the sequence of **cubed numbers plus 2** each time: 1 + 2 = 3; 8 + 2 = 10; 27 + 2 = 29; 64 + 2 = **66**; 125 + 2 = **127**; 216 + 2 = **218**.

* **Triangular numbers** are numbers that can be represented by dots in a triangle form. Triangular numbers give you the sequence 1, 3, 6, 10, 15, and so on.

1 3 6 10 15 21

Add another row to the bottom of the triangle for each new number.

Example: Use triangular numbers to complete this sequence: 3; 9; 18; ____ ; _____ ; _____ .

The pattern is the sequence of **3 × triangular number** each time: 3 × 1 = 3; 3 × 3 = 9; 3 × 6 = 18; 3 × 10 = **30**; 3 × 15 = **45**; 3 × 21 = **63**.

Topic 3: Squares, cubes and triangular numbers

Exercise

1. Fill in the missing numbers in this sequence of squared numbers:
   ___, 4, 9, 16, ___, 36, ___, ___, 81, ___
2. Fill in the missing numbers in this sequence of cubed numbers:
   ___ , ___ , 27, 64, ___, 216, ___ , ___ , 729, 1000, _____ , _____ .
3. Fill in the missing numbers in this sequence of triangular numbers:
   1, 3, 6, ____ , ____ , 21, ____ , ____ , 45.
4. A sequence is made of **1 plus squared numbers**. The first number is 2. Find the next five numbers in the sequence.
5. A sequence is made of cubed numbers subtract one. The first number is 0. Find the next five numbers in the sequence.
6. A sequence is made of 2 times triangular numbers. The first number is 2. Find the next five numbers in the sequence.
7. Complete the sequence of squared numbers up to 169: 25, 36, 49, ….
8. List the cubed numbers from 4 cubed to 9 cubed.
9. Describe each sequence of numbers below. First decide if the sequence uses squared numbers or cubed numbers.
   a. 8, 18, 32, 50, 72, 98, 128, 162, 200, 242.
   b. 12, 19, 28, 39, 52.
   c. $\frac{1}{3}$, $\frac{4}{3}$, 3, $\frac{16}{3}$, $\frac{25}{3}$
10. Complete the sequence using triangular numbers. 2, 4, 7, 11, _____ , _____ , _____ .

Check your answers:

1. **1**, 4, 9, 16, **25**, 36, **49**, **64**, 81, **100**.
2. **1**, **8**, 27, 64, **125**, 216, **343**, **512**, 729, 1000, **1,331**, **1,728**.
3. 1, 3, **6**, **10**, 15, 21, **28**, **36**, 45.
4. $2 = 1 + 1^2$; $1 + 2^2 = \mathbf{5}$; $1 + 3^2 = \mathbf{10}$; $1 + 4^2 = \mathbf{17}$; $1 + 5^2 = \mathbf{26}$; $1 + 6^2 = \mathbf{37}$. Sequence is 1, 5, 10, 17, 26, 37.
5. $1^3 - 1 = 0$. $2^3 - 1 = \mathbf{7}$; $3^3 - 1 = \mathbf{26}$; $4^3 - 1 = \mathbf{63}$; $5^3 - 1 = \mathbf{124}$; $6^3 - 1 = \mathbf{215}$ Sequence is 0, 7, 26, 63, 124, 215.
6. $1 \times 2 = 2$. $(1 + 2) \times 2 = 6$; $(1 + 2 + 3) \times 2 = 12$; $(1 + 2 + 3 + 4) \times 2 = 20$; $(1 + 2 + 3 + 4 + 5) \times 2 = 30$; $(1 + 2 + 3 + 4 + 5 + 6) \times 2 = 42$. Sequence is 2, 6, 12, 20, 30, 42.
7. 25; 36; 49; **64; 81; 100; 121; 144; 169**.
8. 64; 125; 216, 343, 512, 729.
9. a. 2 × squared numbers from 2 to 11.
   b. squared numbers plus 3 from 3 to 7.
   c. $\frac{1}{3}$ × squared numbers from 1 to 5.
10. Pattern is triangular number plus 1.
    2, 4, 7, 11, **16**, **22**, **29.**

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Primary 6 Topic Concept Charts (to support JSS1 pupils) TERM 1

Topic 4: Decimal numbers, decimal fractions (Term 2 M-06-086 to M-06-090)

Check that you can: find equivalent fractions	**Do you understand these words?** Equivalent; denominator; digits, place value	*Refer to Primary Maths Class 6, Term 2.*

CONCEPTS:

Equivalent fractions with denominators of 10, 100, 1000.

* To find **equivalent fractions,** we must multiply or divide both the numerator and the denominator *by the same number*.

Example: Equivalent fractions to $\frac{2}{5}$

To get a denominator of 10, multiply the numerator and the denominator by 2. $\frac{2}{5} \times \frac{2}{2} = \frac{4}{10}$

To get a denominator of 100, multiply the numerator and the denominator by 20. $\frac{2}{5} \times \frac{20}{20} = \frac{40}{100}$

To get a denominator of 1000, multiply the numerator and the denominator by 200. $\frac{2}{5} \times \frac{200}{200} = \frac{400}{1000}$

Converting fractions to decimal numbers

* To change a fraction to a decimal, first find an equivalent fraction with a denominator of 10, 100 or 1000.

$\frac{13}{100}$ is 13 hundredths. So using the place value table, 13 hundredths is 0.13. $\frac{13}{10}$ = thirteen tenths = 1 and three tenths = 1.3

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

Example: Convert 0.214 to a fraction.

2 is in the tenths place value, (one decimal place).

1 is in the hundredths place value, (two decimal places).

4 is in the thousandths place value, (three decimal places). $\frac{214}{1000}$ = 0.214

Ordering and comparing

Example: Put these numbers in order from smallest to largest: 0.24, $\frac{13}{100}$, 0.031; $\frac{5}{10}$

First change all numbers to decimals or all to thousandths to compare. 0.24, 0.13, 0.031, 0.5

in order: 0.031, 0.13, 0.24, 0.5

Topic 4: Decimal numbers, decimal fractions

Exercise

1. Find equivalent fractions with denominators of 10, 100 and 1000 for each of the following fractions:
   a. $\frac{2}{4}$ b. $\frac{3}{5}$ c. $\frac{1}{4}$ d. $\frac{3}{4}$ e. $\frac{4}{5}$

2. Convert the following decimal numbers to fractions.
   a. 0.85 b. 0.825 c. 1.25 d. 0.005 e. 0.05

3. Convert the following fractions to decimal numbers.
   a. $\frac{3}{4}$ b. $\frac{12}{10}$ c. $\frac{4}{5}$ d. $\frac{12}{100}$ e. $\frac{12}{1000}$

4. Compare these numbers. Which is bigger?
   a. 0.35 or 0.305 b. $\frac{13}{1000}$ or $\frac{13}{100}$ c. 0.35 or $\frac{7}{20}$

5. Put these fractions in order from the biggest to the smallest:
   a. $\frac{5}{10}$; 0.82 $\frac{4}{5}$; 0.825; $\frac{5}{8}$

   b. $\frac{2}{5}$; 0.2 $\frac{3}{8}$; 0.45; $\frac{1}{2}$

6. Put these fractions in order from smallest to biggest:
   a. $\frac{3}{10}$; 0.311 $\frac{3}{8}$; 0.32; $\frac{1}{4}$

   b. $\frac{3}{4}$; 0.09 $\frac{7}{8}$; 0.99; $\frac{9}{10}$

   c. 0.65; $\frac{66}{100}$; 0.56 $\frac{3}{5}$; 0.606

Check your answers:

1a. $\frac{5}{10}$ $\frac{50}{100}$ $\frac{500}{1000}$

b. $\frac{6}{10}$ $\frac{60}{100}$ $\frac{600}{1000}$

c. $\frac{25}{100}$ $\frac{250}{1000}$ d. $\frac{75}{100}$ $\frac{750}{1000}$

e. $\frac{8}{10}$ $\frac{80}{100}$ $\frac{800}{1000}$

2a. $\frac{85}{100}$ b. $\frac{825}{1000}$ c. $\frac{125}{100} = 1\frac{25}{100}$

d. $\frac{5}{1000}$ e. $\frac{5}{100}$

3a. 0.75 b. 1.2 c. 0.8

d. 0.12 e. 0.012

4a. 0.350 > 0.305

b. $\frac{13}{1000} < \frac{13}{100}$

c. $0.35 = \frac{35}{100} = \frac{7}{20}$

5a. Convert all to decimals:

0.500; 0.820; 0.800; 0.825; 0.625 →

0.825; 0.820; 0.800; 0.625; 0.500 →

0.825; 0.82; $\frac{4}{5}$; $\frac{5}{8}$; $\frac{5}{10}$

b. $\frac{1}{2}$; 0.45; $\frac{2}{5}$; $\frac{3}{8}$; 0.2

6a. $\frac{3}{10} = 0.300; \frac{3}{8} = 0.375; \frac{1}{4} = 0.25$

Order: $\frac{1}{4}$; $\frac{3}{10}$; 0.311; 0.32; $\frac{3}{8}$

b. $\frac{3}{4} = 0.75$ $\frac{7}{8} = 0.875$ $\frac{9}{10} = 0.9$

Order: 0.09; $\frac{3}{4}$; $\frac{7}{8}$; $\frac{9}{10}$; 0.99

c. $\frac{66}{100} = 0.660$ $\frac{3}{5} = 0.600$

Order: 0.56; $\frac{3}{5}$; 0.606; 0.65; $\frac{66}{100}$;

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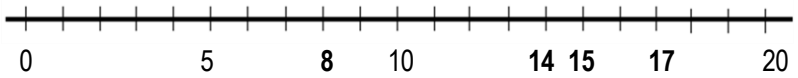
Primary 6 Topic Concept Charts (to support JSS1 pupils) TERM 1

Topic 5: Rounding off whole numbers and decimal fractions (Term 1 M-06-013 to M-06-015)

Check that you can:	**Do you understand these words?**	*Refer to Primary Maths Class 6, Term 1*
Round off whole numbers using a number line	Rounding (also called rounding off); To the nearest 10, 100, 1000 or 10,000; decimal places	

CONCEPTS:

When we round off numbers, we decide what useful or convenient numbers are close enough to the given number. It helps us with estimation and being able to judge approximate quantities. On a number line, it is easy to see that 8 is closer to 10 than to 0, so 8 is **rounded up** to 10; 14 is closer to 10 than to 20, so 14 is **rounded down** to 10; 17 is closer to 20 than to 10, so 17 is **rounded up** to 20. Numbers ending in 5 are rounded up, so 15 is **rounded up** to 20.



Without a number line, we can use **place value**. To round off, look at the **digit to the right** of the place we are rounding off to. For the number 13 rounded off to the nearest ten, we look at the 3. Since 3 is smaller than 5, we **round down** to 10. For the number 17 rounded off to the nearest ten, we look at the 7. Since 7 is bigger than 5, we **round up** to 20. The process for rounding off bigger numbers to the nearest 100, 1000 or million is the same.

* Example:

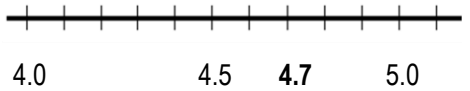
456,8**2**9 to the nearest hundred is 456,800 (2 in the tens place value is rounded down)

456,**8**29 to the nearest thousand is 457,000 (8 in the hundreds place value is rounded up)

45**6**,829 to the nearest ten thousand is 460,000 (6 in the thousands place value is rounded up)

Rounding off decimal numbers

* On a number line, we can see that 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 digits 5, 6, 7, 8, 9 round up

Example: 7.536 rounded to

- the nearest whole number is 8 because **5** rounds up
- one decimal place is 7.5 because **3** rounds down

- two decimal places is 7.54 because **6** rounds up

Topic 5: Rounding off whole numbers and decimal fractions

Exercise

1. Round off 36,953 to

   a. The nearest ten b. the nearest 100 c. the nearest 1000 d. the nearest 10,000

2. Round these numbers to the nearest whole number:

   a. 17.33 b. 0.560 c. 2.051

   d. 0.082 e. 101.37 f. 99.64

3. Round these numbers to the number of decimal places shown

   a. 0.184 (to two decimal places) b. 0.0271 (to three decimal places)

   c. 0.2071 (to one decimal place) d. 5.7059 (to three decimal places)

   e. 5.7059 (to two decimal places) f. 5.7059 (to one decimal place)

   g. 68.905 (to two decimal places) h. 68.905 (to one decimal place)

   i. 578.9426 (to two decimal places) j. 578.9426 (to one decimal place)

4. a. Round 25 176 to the nearest 100. b. Round 47.535 to the nearest 10.

   c. Round 25 176 to the nearest 10. d. Round 47.535 to the nearest unit.

   e. Round 25 176 to the nearest 1000. f. Round 47.535 to the nearest tenth.

   g. Round 47.535 to two decimal places. h. Round 47.535 to the nearest hundredth.

   i. Round 3 039 to the nearest 10. j. Round 986.7828 to two decimal places.

5. Round 53,709,426

   a. To the nearest ten b. To the nearest ten thousand.

   c. To the nearest thousand d. To the nearest million

   e. To the nearest 100 thousand f. To the nearest ten million

Check your answers:

1a. 36,950 b. 37,000
c. 37,000 d. 40,000
2a. 17 b. 1 c. 2
d. 0 e. 101 f. 100

3a. 0.18 b. 0.027
c. 0.2 d. 5.706
e. 5.71 f. 5.7
g. 68.91 h. 68.9
i. 578.94 j. 578.9

4a. 25 200 b. 50
c. 25 180 d. 48
e. 25 000 f. 47.5
g. 47.54 h. 47.54
i. 3 040 j. 986.78

5a. 53,709,43
b. 53,710,000
c. 53,709,000
d. 54,000,000
e. 53,700,000
f. 50,000,000

WINNING TEAMS: Mathematics

Primary 6 Topic Concept Charts (to support JSS1 pupils) TERM 1

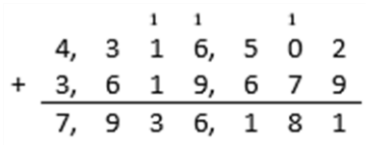
Topic 6: Number operations on whole numbers and decimal fractions (Term 1 M-06-016 to M-06-040)

Check that you know: how to add, subtract, multiply and divide with 2-digit numbers	**Do you understand these words?** Multiply, divide, digit, place value, decimal places, millions, ten millions		*Refer to Primary Maths Class 6, Term 1.*

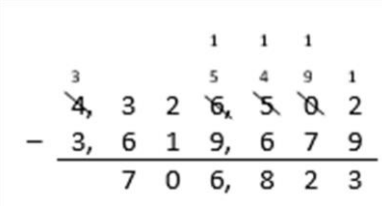
CONCEPTS:

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

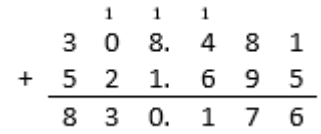
Add numbers up to millions



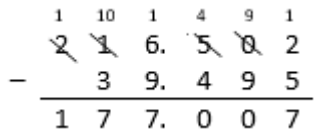
Subtract numbers up to millions



Add decimal numbers

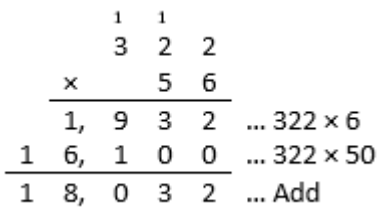


Subtract decimal numbers

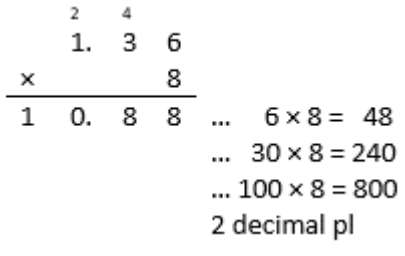


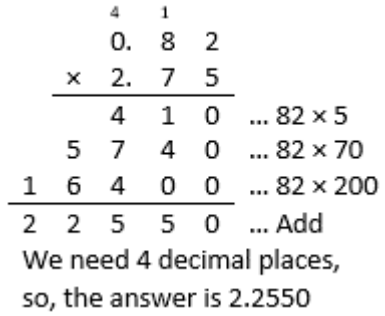
* To **multiply** decimal numbers, the answer must have the total of the decimal places of the numbers being multiplied.

Multiply up to 7-digit by 2-digit whole numbers



Multiplying decimal numbers:





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

1.671 ÷ 0.03 =1.671 × 1,000 ÷ 0.03 × 1,000 = 1,671 ÷ 30 = 55.7

Topic 6: Number operations on whole numbers and decimal fractions

Exercise

Do all calculations without using a calculator.

1. Calculate:

a. 3.03 + 4.83	b. 3.4 + 6.7	c. 6.52 + 3.609	d. 5.34 – 2.19	e. 9.85 – 4.60
f. 0.08 + 1.50 + 3.82	g. 0.03 + 2.71 – 1.8	h. 1 – 0.16	i. 100 – 2.3	j. 1.06 + 3.09

2. Calculate the following whole numbers:

a. 43,185 + 22,061	b. 1,909 − 602	c. 67 × 29	d. 10,140 ÷ 15	e. 901 × 8

3. Add or subtract the decimal numbers.

a. 106.93 + 19.41	b. 9.07 + 6.96	c. 11.3 − 10.96	d. 20.8 − 13.07
e. 180.74 + 29.505	f. 540.8 − 190.063	g. 11.54 + 33.52 − 21.9	

4. Multiply and divide the decimal numbers.

a. 0. 75 × 0.3	b. 1.96 ÷ 0.2	c. 3.2 × 0.7	d. 3.75 ÷ 0.03
e. 0.03 × 3.75	f. 9.8 ÷ 0.7	g. 0.42 × 0.2	h. 1.143 ÷ 0.003
i. 0.08×0.09	j. $7.2 \div 0.9$	k. $(0.3)^2$	

5. You are told $239 \times 124 = 29{,}636$. Use this to determine:
   a. 2.39×1.24 b. 23.9×0.124 c. 239×12.4

6. You are told $203 \times 137 = 27{,}811$. Use this to determine:
   a. 20.3×13.7 b. 0.203×1.37 c. 0.0203×0.137

Check your answers:

1a. 7.86 b. 10.1 c. 10.129
d. 3.15 e. 5.25 f. 5.4
g. 0.94 h. 0.84 i. 97.7
j. 4.15

2a. 65,246 b. 1,307
c. 1,943 d. 0,676 e. 7,208

3a. 126.34 b. 16.03 c. 0.34
d. 7.73 e. 210.245 f. 350.737
g. 23.16

4a. 0.225 b. 9.8 c. 2.24
d. 125 e. 0.1125 f. 14
g. 0.084 h. 381 i. 0.0072
j. 8 k. 0.09

5a. 2.9636 b. 2.9636 c. 2,963.6

6a. 278.11 b. 0.27811
c. 0.0027811

Topic 7: Fractions (Term 2 M-06-071 to M-06-075)

Check that you know:
what the denominator and the numerator of a fraction represent. e.g. $\frac{3}{5}$ is 3 equal parts out of 5 equal parts.

Do you understand these words?
numerator; denominator; equal parts; equivalent fractions; mixed numbers; improper fractions

Refer to Primary Maths Class 6, Term 2.

CONCEPTS:

Revision of fractions

* Fractions of shapes are **equal parts** of the shape e.g. two thirds is written as two equal parts out of three equal parts $\frac{2}{3}$ 
* 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.
  Example: 8 is bigger than 5, but $\frac{1}{8}$ is a smaller piece of the whole than $\frac{1}{5}$

one fifth one eighth

Equivalent fractions have different denominators, but they represent the same amount.

For example, $\frac{1}{2}$, $\frac{2}{4}$ and $\frac{4}{8}$ are equivalent.
We can see this in a diagram.

1 whole							
½				½			
¼		¼		¼		¼	
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$

To find fractions that are equivalent to $\frac{2}{5}$, we can multiply by $\frac{2}{2}$; $\frac{4}{4}$; $\frac{5}{5}$ etc.

So $\frac{2}{5} = \frac{4}{10} = \frac{8}{20} = \frac{10}{25}$

$$\frac{2 \cdot 2}{5 \cdot 2} = \frac{4}{10}$$

$$\frac{2 \cdot 4}{5 \cdot 4} = \frac{8}{20}$$

$$\frac{2 \cdot 5}{5 \cdot 5} = \frac{10}{25}$$

Convert between mixed numbers and improper fractions

Example: Mixed number to improper fraction $2\frac{1}{3} = \frac{3\times2+1}{3} = \frac{7}{3}$

Improper fraction to mixed number $\frac{7}{3} = \frac{3}{3} + \frac{3}{3} + \frac{1}{3} = 2\frac{1}{3}$

Reduce a fraction to the lowest form

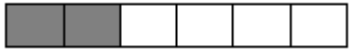
Keep dividing the numerator and the denominator by the same factor until you find the lowest form of the fraction.

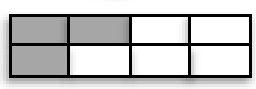
Example: $\frac{12}{36} \div \frac{3}{3} = \frac{4}{12} \div \frac{4}{4} = \frac{1}{3}$

Topic 7: Fractions

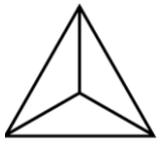
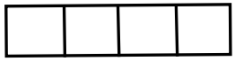
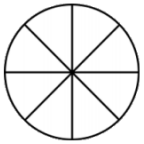
Exercise

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. Complete the equivalent fractions

a. $\frac{1}{2} = \frac{}{8}$ b. $\frac{2}{3} = \frac{6}{}$ c. $\frac{16}{} = \frac{4}{5}$ d. $\frac{33}{77} = \frac{}{7}$ e. $\frac{21}{} = \frac{7}{8}$

4. Convert the mixed numbers to improper fractions.

a. $3\frac{2}{3}$ b. $1\frac{3}{7}$ c. $5\frac{5}{8}$ d. $10\frac{2}{5}$ e. $4\frac{7}{12}$

5. Convert the improper fractions to mixed numbers.

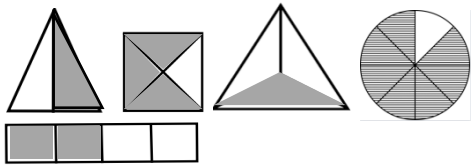
a. $\frac{20}{3}$ b. $\frac{32}{7}$ c. $\frac{15}{8}$ d. $\frac{37}{5}$ e. $\frac{67}{12}$

6. Reduce the fractions below to their lowest form:

a. $\frac{10}{30}$ b. $\frac{14}{56}$ c. $\frac{15}{25}$ d. $\frac{28}{44}$ e. $\frac{6}{27}$ f. $\frac{240}{480}$.

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. 

3a. $\frac{1}{2} = \frac{4}{8}$ b. $\frac{2}{3} = \frac{6}{9}$ c. $\frac{16}{20} = \frac{4}{5}$

d. $\frac{33}{77} = \frac{3}{7}$ e. $\frac{21}{24} = \frac{7}{8}$

4 a. $\frac{11}{3}$ b. $\frac{10}{7}$ c. $5\frac{5}{8}$

d. $\frac{52}{5}$ e. $\frac{55}{12}$

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

d. $7\frac{2}{5}$ e. $5\frac{7}{12}$

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

d. $\frac{7}{11}$ e. $\frac{2}{9}$ f. $\frac{1}{2}$.

WINNING TEAMS: Mathematics

Primary 6 Topic Concept Charts (to support JSS1 pupils) TERM 1

Topic 8: Calculations with fractions (Term 2 M-06-076 to M-06-080)

Check that you can:
Find equivalent fractions

Do you understand these words?
equivalent, common factor, simplify, inverse, reciprocal

Refer to Primary Maths Class 6, Term 2.

CONCEPTS:

*** Adding fractions**

We can only add fractions together if they have the same denominator.

Example 1: $\frac{1}{2} + \frac{1}{3}$

To add $\frac{1}{2}$ and $\frac{1}{3}$, we need to find equivalent fractions with the same denominators. $\frac{1}{2} = \frac{3}{6}$ and $\frac{1}{3} = \frac{2}{6}$ $\frac{3}{6} + \frac{2}{6} = \frac{5}{6}$

Example 2: $3\frac{1}{2} + 4\frac{1}{3}$ make improper fractions

$= \frac{7}{2} + \frac{13}{3}$ find equivalent fractions

$= \frac{7}{2} \times \frac{3}{3} + \frac{13}{3} \times \frac{2}{2}$ make a common denominator of 6

$= \frac{21}{6} + \frac{26}{6} = \frac{47}{6} = 7\frac{5}{6}$

*** Subtracting fractions**

Example 3:

$\frac{1}{3} - \frac{1}{4}$

$= \frac{1}{3} \times \frac{4}{4} - \frac{1}{4} \times \frac{3}{3}$ find equivalent fractions

$= \frac{4}{12} - \frac{3}{12}$ common denominator of 12

$= \frac{1}{12}$ subtract numerators

*** Multiplying fractions**

First convert mixed fractions to improper fractions, then multiply the numerators and also multiply the denominators.

Example 4: $\frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$

Example 5: $2\frac{5}{9} \times 1\frac{3}{5} = \frac{23}{9} \times \frac{8}{5} = \frac{184}{45} = 4\frac{4}{45}$

*** Dividing fractions**

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

To divide, convert mixed fractions to improper fractions first

Then **multiply by the reciprocal** of the second fraction (flip numerator and denominator).

Example 6:

$2\frac{5}{9} \div 1\frac{3}{5} = \frac{23}{9} \div \frac{8}{5}$ improper fractions

$= \frac{23}{9} \times \frac{5}{8}$ multiplication sign and invert second fraction

$= \frac{115}{72}$ multiply out

$= 1\frac{43}{72}$ convert answer to a mixed fraction

WINNING TEAMS: Mathematics

Primary 6 Topic Concept Charts (to support JSS1 pupils) TERM 1

Topic 8: Calculations with fractions

Exercise

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

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

   e. $\frac{5}{6}+\frac{3}{4}$ f. $\frac{2}{9}+\frac{4}{3}$ g. $\frac{15}{24}-\frac{1}{6}$ h. $\frac{7}{9}+\frac{5}{18}$

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

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

   a. $\frac{1}{5}\times\frac{2}{3}$ b. $\frac{5}{11}\times\frac{33}{45}$ c. $\frac{20}{21}\times\frac{3}{5}$

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

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

   a. $9\div\frac{3}{5}$ b. $5\frac{1}{3}\div\frac{8}{9}$ c. $\frac{7}{8}\div 3$

   d. $2\frac{1}{8}\div 1\frac{1}{4}$ e. $2\frac{2}{3}\div 1\frac{5}{9}$

Check your answers:

1 a. $\frac{7}{8}$ b. $\frac{3}{9}$

c. $\frac{8}{3}+\frac{6}{5}=\frac{40}{15}+\frac{18}{15}=\frac{58}{15}=3\frac{13}{15}$

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

e. $\frac{20}{24}+\frac{18}{24}=\frac{38}{24}=\frac{19}{12}=1\frac{7}{12}$

f. $\frac{2}{9}+\frac{12}{9}=\frac{14}{9}=1\frac{5}{9}$

g. $\frac{15}{24}-\frac{4}{24}=\frac{11}{24}$

h. $\frac{14}{18}+\frac{5}{18}=\frac{19}{18}=1\frac{1}{18}$

2a. $1\frac{3}{5}-\frac{1}{6}=1\frac{18}{30}-\frac{5}{30}=1\frac{13}{30}$

b. $\frac{13}{4}-\frac{4}{3}=\frac{39}{12}-\frac{16}{12}=\frac{23}{12}=1\frac{11}{12}$

c. $\frac{11}{3}-\frac{5}{6}=\frac{22}{6}-\frac{5}{6}=\frac{17}{6}=2\frac{5}{6}$

3a. $\frac{2}{15}$ b. $\frac{1}{3}$ c. $\frac{4}{7}$

d. $\frac{12}{5}\times\frac{8}{3}=\frac{4}{5}\times\frac{8}{1}=\frac{32}{5}=6\frac{2}{5}$

e. $\frac{16}{5}\times\frac{7}{4}=\frac{4}{5}\times\frac{7}{1}=\frac{28}{5}=5\frac{3}{5}$

4a. $\frac{9}{1}\times\frac{5}{3}=15$

b. $\frac{16}{3}\times\frac{9}{8}=6$ c. $\frac{7}{8}\times\frac{1}{3}=\frac{7}{24}$

d. $\frac{17}{8}\times\frac{4}{5}=\frac{17}{10}=1\frac{7}{10}$

e. $\frac{8}{3}\times\frac{9}{14}=\frac{24}{14}=\frac{12}{7}=1\frac{5}{7}$

Topic 9: Fractions, decimals and percentages (Term 2 M-06-096 to M-06-100)

Check that you can: convert fractions to decimals and decimals to fractions out of 100.	**Do you understand these words?** Percentage, decimal, long division, fraction, denominator, convert		*Refer to Primary Maths Class 6, Term 2.*

CONCEPTS:

Percentage

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

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

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

* To express a **percentage as a decimal**, divide the percentage by 100 and use the place value. Example: 30% = $\frac{30}{100}$ = 0.30

* To convert a **fraction to a percentage**, make an equivalent fraction out of 100 and convert. Example: $\frac{4}{5} = \frac{80}{100} = 80\%$

* To convert a **decimal to a percentage**, first make a fraction out of 100. Example: 0.3 = $\frac{3}{10}$ = $\frac{30}{100} = 30\%$

* Sometimes we need to use **long division** to convert a **fraction to a decimal**:

  Example: $\frac{7}{8}$ is "7 divided by 8".

  Long division gives us a decimal of 0.875.

```
      0.  8  7  5
   ┌──────────────
 8 │ 7.  0  0  0
 − 6  4
   ──────
      6  0
   −  5  6
      ──────
         4  0
      −  4  0
         ──────
```

Topic 9: Fractions, decimals and percentages

Exercise

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

a. 3%	b. 12%	c. 40%	
d. 35%	e. 95%	f. 60%	
g. 45%	h. 68%	i. 40%	j. 55%

2. Write each of the following decimals as percentages

a. 0.07	b. 0.09	c. 0.61	
d. 0.37	e. 0.29	f. 0.08	
g. 0.35	h. 1	i. 0.495	j. 0.085

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. $\frac{9}{25}$

Check your answers:

1a. $\frac{3}{100}$ and 0.03 b. $\frac{12}{100} = \frac{3}{25}$ and 0.12

c. $\frac{40}{100} = \frac{2}{5}$ and 0.4 d. $\frac{35}{100} = \frac{7}{20}$ and 0.35

e. $\frac{95}{100}$ and 0.95 f. $\frac{60}{100} = \frac{3}{5}$ and 0.6

g. $\frac{45}{100} = \frac{9}{20}$ and 0.45 h. $\frac{68}{100} = \frac{17}{25}$ and 0.68

i. $\frac{40}{100} = \frac{2}{5}$ and 0.4 j. $\frac{55}{100} = \frac{11}{20}$ and 0.55

2a. 7% b. 9%

c. 61% d. 37%

e. 29% f. 8%

g. 35% h. 100%

i. 49.5% j. 8.5%

3a. 25% b. 50%

c. 75% d. 4%

e. 8% f. 15%

g. 24% h. 35%

i. 60% j. 36%