Level 3

SAMPLE!
MATHEMATICS
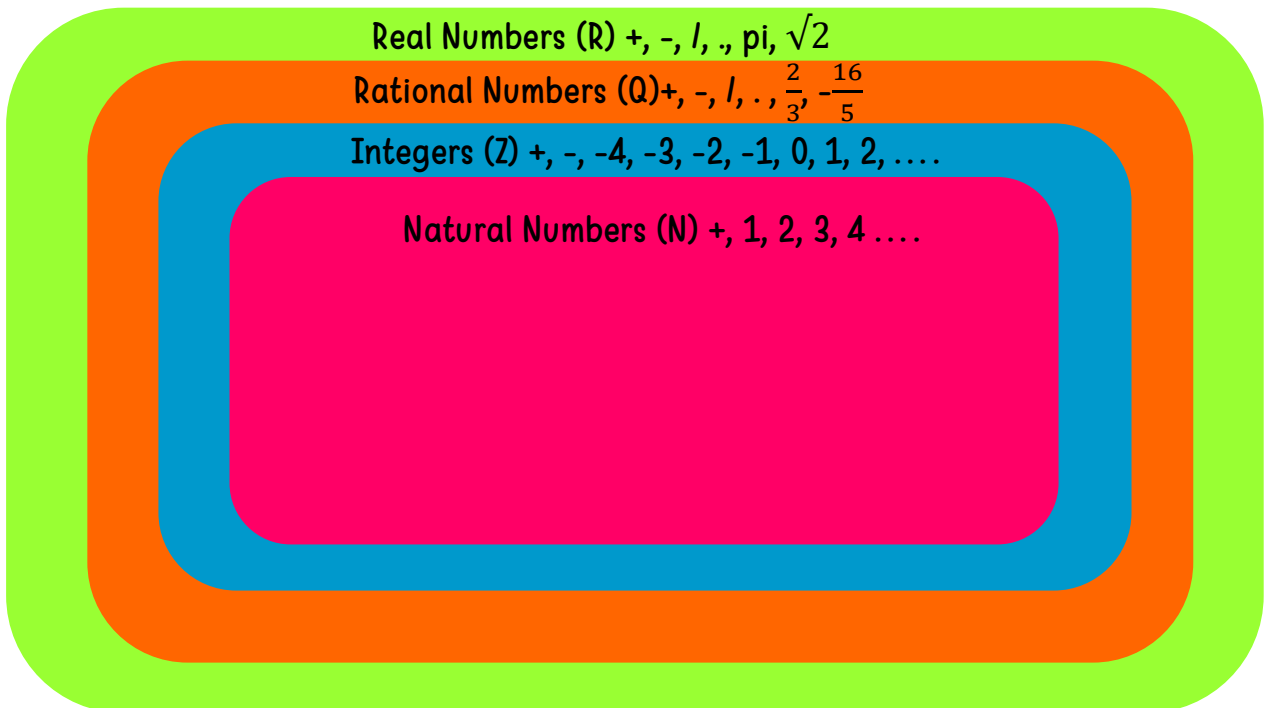## Student Worksheets

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CONTENTS

NUMBER SYSTEMS

I. Read the information and discuss the diagram.

Natural numbers (N) are the counting numbers {1, 2, 3, …} (positive integers) or the whole numbers {0, 1, 2, 3, …} (the non-negative integers).

Integers (Z) are the natural numbers and their negatives {… −3, −2, −1, 0, 1, 2, 3, …}.

Real numbers (R) are all the numbers on the continuous number line with no gaps. Every decimal expansion is a real number. Real numbers can also be positive, negative or zero. Examples: 1.5, -12.3, 99, √2, π

Real Numbers (R) +, -, /, ., pi, $\sqrt{2}$

Rational Numbers (Q)+, -, /, ., $\frac{2}{3}$, $-\frac{16}{5}$

Integers (Z) +, -, -4, -3, -2, -1, 0, 1, 2, ...

Natural Numbers (N) +, 1, 2, 3, 4 . . . .

www   *Look up similar diagrams on the Internet. There are slight differences in diagrams.

2. Answer the questions:

a. What is a natural number? Give an example.

_____

_____

b. What is an integer? Give an example.

_____

_____

c. What is a real number? Give an example.

_____

_____

d. What letter do we use to represent natural numbers? _____

3. List the first 5 even natural numbers.

_____

4. List the first 5 odd natural numbers

_____

5. List the elements of each of these sets:

a. {The positive whole numbers less than 12}

_____

b. {The even numbers between 7 and 19}

_____

c. {The whole numbers from 2 to 10 inclusive}

_____

Whole numbers are 0, 1, 2, 3, ...etc. They have no fractions!

1. Read this:

> A multiple is the result of multiplying a number by an integer (not a fraction).
>
> Example:
>
> Multiples of 6:
>
> 0 × 6 = 0, so 0 is a multiple of 6
>
> 1 × 6 = 6, so 6 is a multiple of 6
>
> 2 × 6 = 12, so 12 is a multiple of 6 ....

2. Which of these are multiples of 12? Circle them.

1, 2, 3, 4, 6, 12, 18, 24, 32

3. List the first six multiples of 4.

_____

4. Write the multiples of 11 between 44 and 99.

_____

5. Write the multiples of 5 between 105 and 130.

_____

Example: Multiples of 7 are 0, 7, 14, 21, 28, 35, etc.

Find the Lowest Common Multiple of the following pair of numbers

a. 6 and 8

_____

b. 18 and 20

_____

26. Using only these numbers, write down the following:

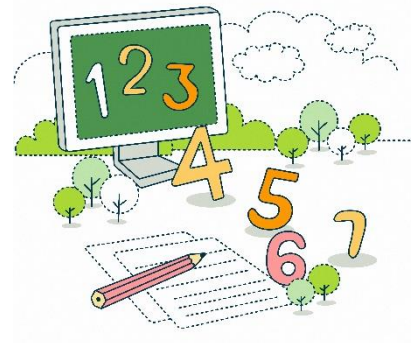8, 12, 4, 16, 5, 6, 3, 27

a. all the multiples of 6, ...
b. all the square numbers, ...
c. all the factors of 12, ...
d. a multiple of 9, ...

27. Here is a list of numbers.

2, 5, 7, 8, 9, 12

Write down a number from the list which is
a. a multiple of 6, ...
b. a factor of 15, ...
c. a square number, ...

28. Use a word from the list below to complete the following sentence.

factor, multiple, square, square root, half

10

10 is a .... of 5

Circle the number which is nearest in value to 750.

570   699   810   852   1050

10. Which of these numbers is nearest to 400? Circle it.

310   530   460   370   420

11. Write these numbers in order of size, from smallest to biggest.

456   299   901   472   575

_____

12. Order these numbers from the largest to the smallest.

43   343   434   23   4534   143

_____

13. Put a number that fits in the spaces provided.

a. 320 ‹ _____
b. 43 › _____
c. _____ › 600
d. 4530 ‹ _____
e. 100 › _____ › 60
f. 6700 ‹ _____ ‹ 6790
g. _____ › 134 ‹ _____ ‹ 200

Remember!

> = greater than, < = smaller than

4. Round numbers to the nearest 1000:

a. 1107_____   b. 7893_____

c. 8345_____   d. 4688_____

e. 2238_____   f. 2935_____

g. 1469_____   h. 9284_____

Example:

4219 to the nearest 1000 is 4000

---

5. Round the following numbers:

a. Round 223 to the nearest ten. _____

b. Round 44,769 to the nearest ten. _____

c. Round 76,340 to the nearest thousand. _____
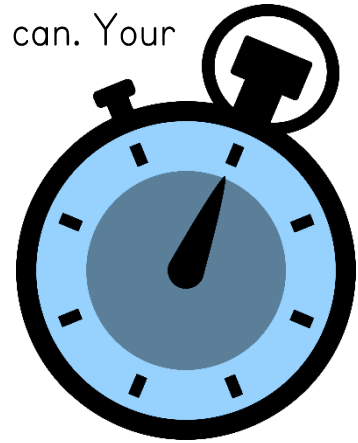
d. Round 924 to the nearest ten. _____

e. Round 222,702 to the nearest ten thousand. _____

f. Round 82,321 to the nearest hundred. _____

g. Round 5,479 to the nearest hundred. _____

6. Do these mental calculations as quickly as you can. Your tutor/teacher will time you.

a. Add 3 and 5 and 54. ____
b. 2. 7 take away 2. ____
c. 4 plus 4 plus 113. ____
d. Half of 106. ____
e. 6 times 2 times 5. ____
f. Six less than a number is 6. Find the number. ____
g. Which is more: 179 or 182? ____
h. Add together seven, three & sixteen. ____
i. Write the number that is 7 less than 101. ____
j. What is 749 to the nearest hundred? ____
k. What is six multiplied by four multiplied by two? ____
l. Write the number four thousand and seven in figures. ____
m. A number diminished by 2 is 6. Find the number. ____
n. 324 x 100 = ____
o. Write nought point five as a fraction. ____
p. Change one & a half metres into centimetres. ____
q. A farmer has 15 cows, all but 8 die. How many does he have left? ____
r. What is two point seven multiplied by ten? ____
s. Write twenty-five thousand and fourteen in figures. _____
t. 12 + 3 x 2 = ____
u. Three days ago, yesterday was the day before Sunday. What day will it be tomorrow? _____
v. 78 − (10 x 7) = ____
w. Luke pays €3.85 at the shop for a cheese sandwich. If Luke started with €7.00, how much money does he have left? ____
x. Five more than a number is 13. What is the number? ____

7. Do these calculations without using a calculator. Show your

working out.

```
  2 7 7        7 2 2        6 1 5        8 6
 - 1 3 9      - 4 3 6      - 5 4         0
```

1

Example:

```
  2 8 2
 - 1 7 5
  1 0 7
```

8. Do these calculations without using a calculator. Show your
   working out.

91 X 74   39 X 66   75 X 60   67 X 49

Example:

```
    8 6
  X 2 5
    4 3 0
  1 7 2 0
  2 1 5 0
```
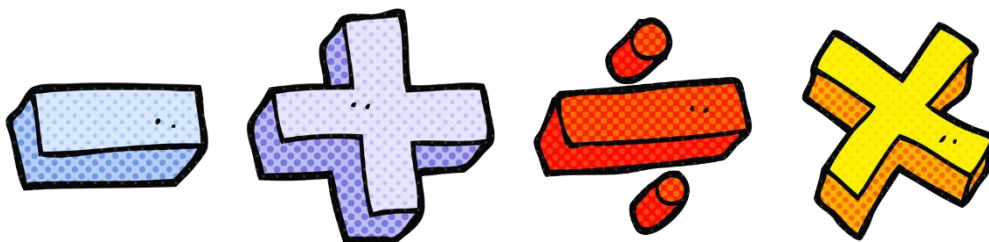
ORDER OF OPERATIONS

I. Use the correct order of operations to find the answers, without using the calculator: (Look out for the squared numbers in g) and h)!)

a) $7 \times 6 - 4 =$ _____

b) $9 \times 3 + 8 =$ _____

c) $31 - 10 \div 5 =$ _____

d) $16 + 7 \times 4 =$ _____

e) $31 + 2 \times 3 =$ _____

f) $6 \times 4 - 12 =$ _____

g) $(64 - 16) + 2^2 =$ _____

h) $2^2 \times (35 - 48) =$ _____

i) $5 + 7 + (6 - 9) + 3 \times 72 \div 3 =$ _____

j) $2 \times 21 + (6 \times 7) \times 7 - 9 + 2 =$ _____

> **"Operations"** mean things like add, subtract, multiply, divide, squaring, etc. If it isn't a number, it is probably an operation.
> Example:
> $7 + (6 \times 5^2 + 3)$
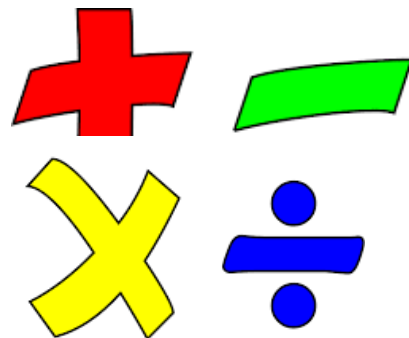> What should you work out first?
>
> Remember **BODMAS**.
> **B** Brackets first
> **O** Orders (i.e. Powers and Square Roots, etc.)
> **DM** Division and Multiplication (left-to-right)
> **AS** Addition and Subtraction (left-to-right)

Example: 3 + 6 x 2
= 3 + (6 x 2)
= 3 + 12
= 15

I. Write the correct order of operations.

_____

1. Write these decimals as fractions, in their simplest form:

0.2 = ... 0.5 = ...

0.7 = ...   0.02 = ...

0.05 = ... 0.25 = ...

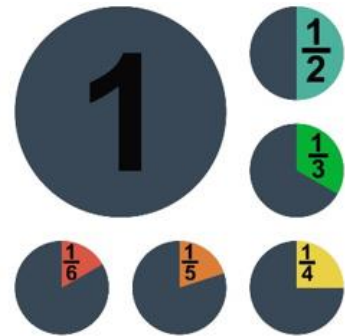0.37 = ... 0.125 = ...

Examples:
0.8 = 8/10 = 4/5
3/5 = 0.6
50% = 0.5
25% = ¼
0.9 = 90%
7/10 = 70%

2. Write these fractions as decimals:

$\frac{7}{10}$ = ... $\frac{1}{5}$ = ... $\frac{2}{5}$ = ... $\frac{3}{4}$ = ...

$\frac{7}{8}$ = ... $\frac{2}{3}$ = ... $\frac{9}{20}$ = ... $\frac{7}{25}$ = ...

3. Write these percentages as decimals:

3% = ...   30% = ... 25% = ... 80% = ...

8% = ... 12% = ... 67% = ... 17.5% =.............

2. Do these calculations without using the calculator:

a. $(-14) + (-44) = $ _____
b. $(+80) + (-12) = $ _____
c. $(+67) + (+21) = $ _____
d. $(+19) + (-37) = $ _____
e. $(-21) + (+15) = $ _____

f. $(+52) - (-52) = $ _____
g. $(-20) - (+69) = $ _____
h. $(-81) - (-82) = $ _____
i. $(+99) - (+76) = $ _____
j. $(-27) - (-10) = $ _____

Examples:
$(-29) + (-10) = -39$
$(-25) - (-15) = -10$
$(-10) \times (+3) = -30$
$(+24) \div (-6) = -4$

k. $(-23) \times (+7) = $ _____
l. $(-35) \times (-6) = $ _____
m. $(+11) \times (+9) = $ _____
n. $(+67) \times (-4) = $ _____
o. $(-15) \times (-3) = $ _____

p. $(-18) \div (+6) = $ _____
q. $(-10) \div (-2) = $ _____
r. $(+96) \div (+4) = $ _____
s. $(+52) \div (-1) = $ _____
t. $(+48) \div (-6) = $ _____

Do these calculations without using a calculator:

a. 5.21 + 8.62 =

_____

_____

_____

b. 8.87 + 7.11 =

_____

_____

_____

a. 1.45 − 0.37 =

_____

_____

_____

b. 7.06 X 9 =

_____

_____

_____

c. 74.4 ÷ 4 =

_____

_____

_____

9. Write these real numbers in descending order.

$\frac{7}{8}$, 0.313, $\frac{9}{25}$, $\frac{3}{4}$, 0.81

_____

_____

1. Work out the answers to these questions. Show your working out.

a. Hannah ordered 9 pizzas for the class. Each pizza costs €13.95. How much does she need to pay?

_____
_____
_____
_____

b. Stephen bought 3 books which cost €12.30, €34.23 and €23.19 respectively. How much did he need to pay?

_____
_____
_____
_____

c. A shop keeper bought 26 apples for €37.70 from a fruit market. How much did each apple cost?

_____
_____
_____
_____

d. Kelly bought medicine which cost €78.12 in total. She gave €100 to the pharmacist. How much change did she receive?

_____
_____
_____
_____

ASSIGNMENT BRIEF 2

Module Title: Mathematics
Module Code: 3N0929
Assessment Technique: Collection of work
Assessment Number: 2
Title: Measurement & Capacity

Guidelines:

In this assignment you will be expected to:

1. Describe shape and space constructs using language appropriate to shape and space to include square, rectangle, circle, cylinder, angles, bisect, radius, parallel, perpendicular, etc.
2. Draw everyday objects to scale using a range of mathematical instruments.
3. Calculate the area of a square, rectangle, triangle, circle using the correct formula and giving the answer in the correct form.
4. Calculate the volume of a cylinder and cone using the correct formula and giving the answer in the correct form.
5. Demonstrate metric measurement skills using the correct measurement instrument, and vocabulary appropriate to the measurement, to accurately measure length/distance, capacity, weight, time.
6. Use simple scaled drawings to work out real distance, location and direction.

Assessment Criteria:

▪ All calculations must be accurate to two decimal places.
▪ All working out must be shown.
▪ All worksheets must be clearly and neatly completed.
▪ The correct order of operations must be followed.
▪ Show the application of principal mathematical functions: addition, multiplication, subtraction and division.
▪ Use correct mathematical vocabulary.
▪ Drawings must be clear and have a suitable scale.

Date Brief issued: Submission Date:

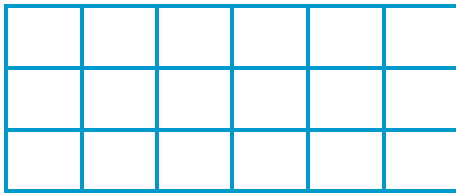**I confirm that this is my own work.**
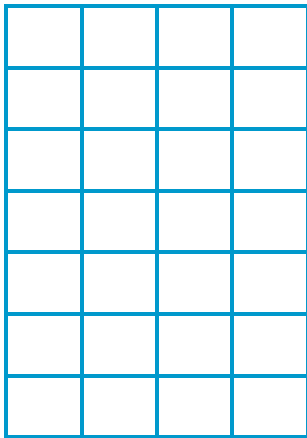
Signed: _____ Date: : _____

AREA OF A SQUARE, RECTANGLE, TRIANGLE AND CIRCLE
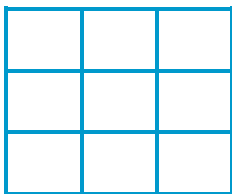
I. Calculate the area of each shape by counting the squares.
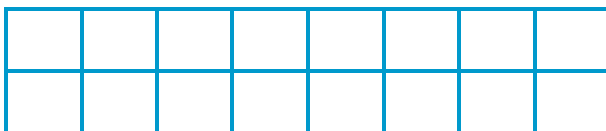
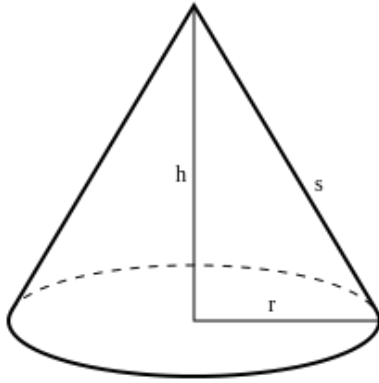$\square$ = Imm^2

Answer: _____

Answer: _____

Answer: _____

Answer: _____

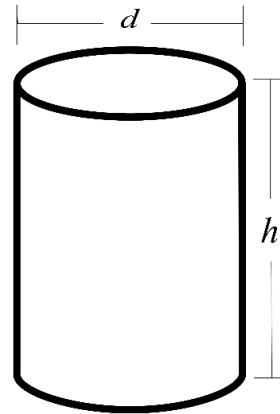**When calculating area, the answer is always squared! Example: 36m²**

VOLUME OF A CYLINDER AND CONE

I. Calculate the volume of a cylinder and cone using the correct formula and giving the answer in the correct form. Write the formula for each calculation. Use the calculator. (Use 3.14 for pi)

If h = 13 cm and r = 6 cm`   If h = 10 m and d = 4 m

_____

_____

_____

If h = 11 m and r = 3 m   If h = 13 mm and d = 10 mm

_____

_____

_____

If h = 15 mm and r = 3 mm   If h = 8 cm and d = 6 cm

_____

_____

_____

Formulae:

Volume of a cone: $V = \frac{1}{3}\pi r^2 h$

Volume of a cylinder: $V = \pi r^2 h$

When calculating volume, the answer is always cubed!
Example: 36m^3

1. I am making breakfast. How many of each of these will I need?
    Answer the questions.

a. I need 500 ml flour. How many of these will I need?

1 Cup

_____

_____

b. I need 125 ml cocoa. How many of these will I need?

1/2 CUP

_____

_____

c. I need 10 ml of baking powder. How many of these will I need?

1 TSP.

_____

_____

d. I need 1 litre of milk. How many of these will I need?

100
75
50
25
100 ml

_____

_____
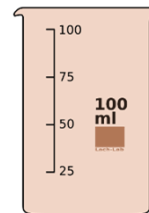
e. I need ½ litre of beef stock. How many of these will I need?

250
200
150
100
50
250 ml

_____

_____

www
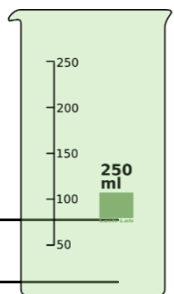
*Watch a cookery demonstration on YouTube. Take note of the ingredients and amounts!

MEASUREMENT PROBLEMS

1. Work out the answers to these questions.   Show how you got your answer and use your calculator if you need it.

a. An aeroplane flies with a constant speed of 600 km/h. How long will it take to travel a distance of 1800 kilometres?

_____

_____

_____

_____

b. John walked 2 kilometres after work.   His friend Kevin cycled 3000 meters after work. Who went a greater distance and how much greater was it? (answer in km)

_____

_____

_____

_____

c. Steven wakes up for work at 6:30 in the morning. If work starts at 9:00 am, how long does he have from the time he wakes up until work starts?

_____

_____

_____

_____

I. Simplify the expressions.

Examples:
$6x + 2x = 8x$
$b + 2b + b + b = 5b$
$-3 - 3 + d + 6d = -6 + 7d$
$7p - p - 2p = 4p$

a. $c + (-9c) + c + c + c + c$

_____

b. $3z + 3z$

_____

c. $m + 4m + m + m$

_____

d. $-4z - z$

_____

e. $v + 10v + v + v$

_____

f. $-y + 10y$

_____

g. $7z + 3z$

_____

h. $-4 - 8n - 7 + 2n$

_____

i. $6p - 1 + 1 + 3p$

_____

j. $8p - p$

_____

k. $-6 - 9w - 6 + 8w$

_____

l. $5 - 9a - 2a + 1 - 6a$

_____

m. $z + (-3z) + z + z$

_____

n. $9x + (-3)x$

_____

Find the value of the expressions
for the given values of the variable(s).

Example:

abc, when a = 2, b = 3, c = 4

2 x 3 x 4 = 24

a. $7 - k$, when k = 2

_____

b. $r + g$, when r = 9 and g = 5

_____

c. $w + 6$, when w = 8

_____

d. $a - 8 + b$, when a = 5 and b = 6

_____
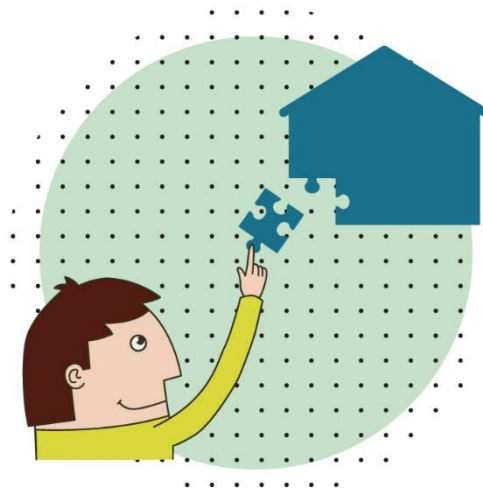
e. $x - y$, when x = 7 and y = 8

_____

f. $z + t$, when z = 10 and t = 4

_____

g. $\dfrac{4}{x}$ when x = 12

_____

h. $x - b$, when x = 5 and b = -8

_____

i. y^3, when y = 5

_____

WORD PROBLEMS

1. Use algebra to solve these problems.

x = 2y + 3

This is the formula for calculating the cost (x) of buying 2 packets of biscuits (y) and a box of tea for €3. Each packet of biscuits costs 95c. What is the total cost (x)?

_____

_____

_____

_____

2. I am making dinner for my friends. I have a formula to work out how much wine I must buy. For every person (n) I am planning 2 glasses of wine (w). n X 2w

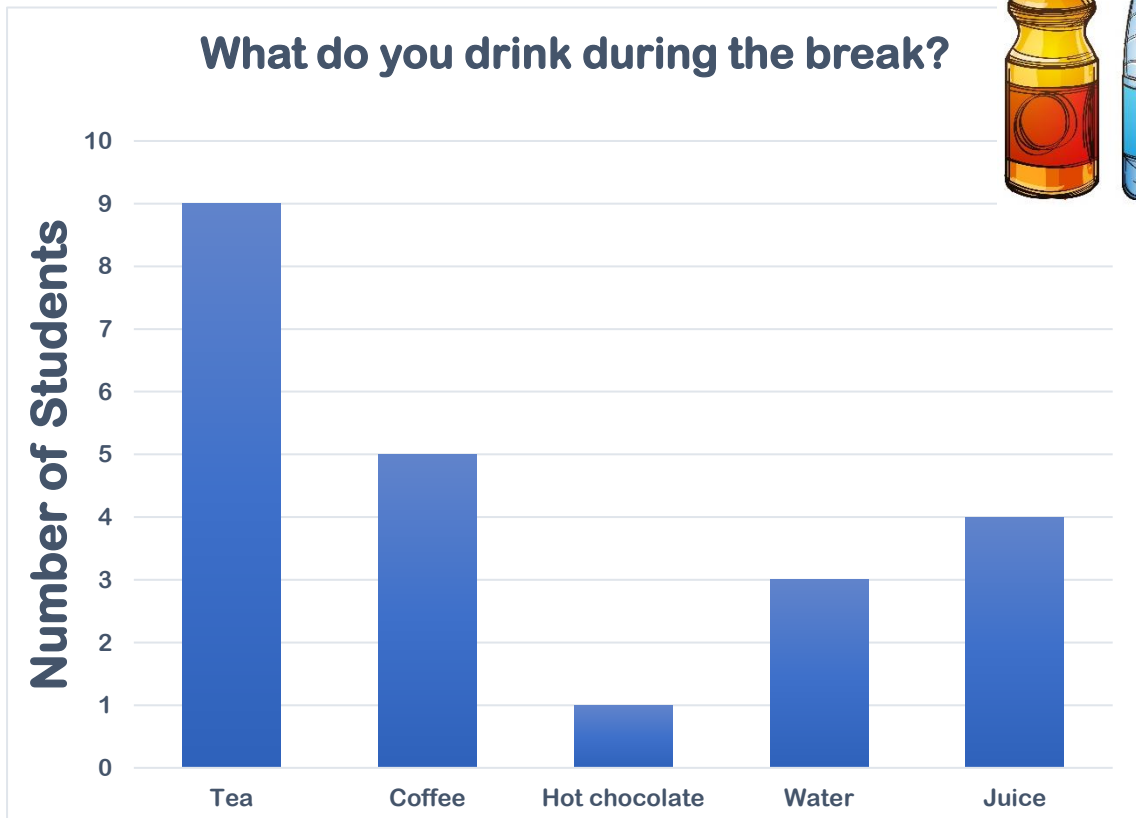a. How many glasses of wine will I need for 8 guests?

_____

_____

_____

_____

b. A large glass of wine holds 250 ml. How much wine will I need in millilitres?

_____

_____

c. If a bottle of wine is 750 ml, how many bottles of wine will I need?

_____

_____

3. Read the graph below:

What do you drink during the break?

Number of Students

10	
9	Tea: 9
8	
7	
6	
5	Coffee: 5
4	Juice: 4
3	Water: 3
2	
1	Hot chocolate: 1
0	

Tea   Coffee   Hot chocolate   Water   Juice

a. What is the graph heading?

_____

b. What do the numbers in the graph refer to? _____

c. What is the least popular drink? _____

d. How many students are there in the class? _____

e. How many students drink tea? _____

f. Which drink is more popular – juice or water?

_____

g. What is the difference between the most popular and least popular drink? _____

h. What do you drink during the break? _____

A graph helps you to see the information clearly and quickly.

EVERYDAY PROBLEM-SOLVING

1. Give at least 3 examples of everyday situations where maths can be used to solve problems.

_____

_____

_____

2. Using your knowledge of place value, solve the following problems. You should not need a calculator for these!

a. A box contains 6 breakfast bars. How many breakfast bars are there in 10 boxes?

_____

b. Each fish tank in a pet shop holds 16 tropical fish. How many fish are there in the 100 tanks?

_____

c. In the factory, if there are 420 drums on 10 shelves, how many drums are there on each shelf?

_____

a. I bring 12 muffins to the bake sale. 6 of my friends bring the same amount. How many muffins did we bring altogether?

_____

b. If cans of corn are packed in boxes of 100, how many cans will there be in 12 boxes?

_____

3. Look at these examples. Discuss them as a group:

a.   There are 21 students going on a tour of Croke Park. The cost is €12 per student for the bus, €8 per person for the tour and €9.50 for the lunch. How much money does the tutor have to collect from the students altogether?

_____

_____

_____

_____

b. Maggie had 2 boxes of eggs, with 6 eggs in each box. She used 3 eggs at breakfast time and she used 4 eggs baking a cake. She needs 6 eggs for dinner. Does she need to buy more eggs?

_____

_____

_____

_____
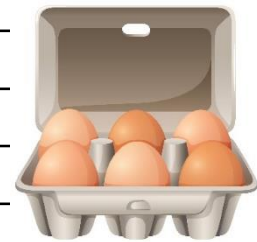
c.   An online maths class begins at 9:15 a.m. It lasts for 4 hours and 30 minutes. At what time will the class end?

_____

_____

_____

_____

_____

_____

MAPPING OF LEARNING OUTCOMES

Number

1.1 Explain the concepts of natural numbers (N), integers (Z), and real numbers (R) Pages 7 to 10 (number sets, natural numbers, integers, real numbers), Pages 12 to 21 (numbers vocabulary – prime numbers, factors, HCF, multiples, LCM), Pages 22 to 27 (place value, including multiplying/dividing by 10 and 100 by changing place values, ordering numbers)

1.2 Demonstrate equivalence between common simple fractions, decimals and percentages by conversion e.g. 1/2=0.5=50% Pages 51 to 60 (equivalences between fractions, decimals and percentages)

1.3 Express simple ratios as fractional ratios e.g. 1:2=1/3:2/3 Pages 63 to 66 (ratios)

1.4 Give approximations by using strategies including significant figures and rounding off large natural numbers Pages 28 to 30 (rounding off), Pages 31 to 33 (estimation), Pages 34 and 35 (significant figures)

1.5 Use a calculator to perform operations requiring functions such as addition, subtraction, multiplication, division, percent, memory keys and the clear key Pages 48 to 50 (calculator skills), throughout the course where the calculator can be used

1.6 Demonstrate accuracy of calculation by applying the principal mathematical functions, i.e. addition, subtraction, multiplication, division, to natural numbers (N), integers (Z), and real numbers (R), simple fractions, and decimal numbers to two places of decimal. Pages 36 to 45 (addition, subtraction, multiplication, division of natural numbers N), Pages 46 and 47 (order of operations), Pages

61 to 63 (addition, subtraction, multiplication, division of fractions), Pages 67 to 71 (addition, subtraction, multiplication, division of integers), Pages 72 to 78 (addition, subtraction, multiplication, division of decimal numbers)

2 Measurement and Capacity

2.1 Describe shape and space constructs using language appropriate to shape and space to include square, rectangle, circle, cylinder, angles, bisect, radius, parallel, perpendicular etc. Pages 81 to 88 (language of shape, e.g. shape names, angles, degrees, perpendicular, properties of shapes, faces, etc.)

2.2 Draw everyday objects to scale using a range of mathematical instruments Page 111 (drawing objects to scale)

2.3 Calculate the area of a square, rectangle, triangle and circle using the correct formula and giving the answer in the correct form Pages 89 to 92 (area of a square, rectangle, triangle and circle)

2.4 Calculate the volume of a cylinder and cone using the correct formula and giving the answer in the correct form Pages 94 and 95 (volume of a cylinder and cone)

2.5 Demonstrate metric measurement skills using the correct measurement instrument, and vocabulary appropriate to the measurement, to accurately measure length/distance, capacity, weight, time Pages 96 to 108 (measurement skills, including instruments, units of measurement, estimating measurement, length, capacity, mass, conversions, time, calendar, etc.), Pages 112 to 114 (measurement word problems), Pages 102 and 103 and Page 115 (measurement conversions)

2.6 Use simple scaled drawings to work out real distance, location, and direction. Pages 109 to 111 (scaled drawings)

3 Algebra

3.1 Describe familiar real-life situations in algebraic form Page 120 (everyday examples)

3.2 Simplify basic algebraic expressions by applying the principal mathematical functions i.e. addition, subtraction, multiplication, division, to algebraic expressions of 1 or 2 variables Pages 118 to 122 (algebra basics), Pages 123 to 125 (simplifying expressions)

3.3 Solve basic algebraic equations of 1 variable, by using the variable to solve mathematical problems where the solution is N. Pages 126 to 128 (finding the value of the unknown – basic), Pages 129 to 134 (solving equations), Pages 135 to 137 (algebra word problems)

4 Data Handling

4.1 Describe the presence of data in everyday situations Page 140 (everyday situations where data is present), Pages 140 to 146 (data handling examples in everyday life, data handling practice, e.g. reading bar graph, pie graph, completing graphs, using tally chart, etc.)

4.2 Conduct a simple survey using a variety of data collection methods Page 147 (practice in formulating questions for survey), Pages 148 to 150 (creating questionnaire, carrying out survey, drawing graphs, describing findings, interpreting findings, supplying reasons for findings)

4.3 Display data using appropriate classifications on bar charts or pie charts Page 142, 144, 145 and 146 (completing graphs), Page 149 (drawing bar/pie graph to display findings of group survey)

4.4 Describe findings, to include interpretation of results, and suggesting reasons for findings. Page 150 (from survey – describing findings, interpreting findings, supplying reasons for findings)

5 Problem Solving

5.1 Describe everyday situations in terms of quantitative descriptions Pages 153 to 155 (giving examples of everyday problem-solving, working out everyday quantitative problems as a group)

5.2 Calculate solutions to real life quantitative problems by applying appropriate mathematical techniques Pages 156 to 159 (finding solutions to problems)

5.3 Describe how a quantitative solution to a problem may be applied in a limited range of contexts. Pages 160 to 166 (solving quantitative problems, naming how the strategies can be used to solve other problems)