Monifieth High School

Mathematics Department

CfE Level 3

Revision for Exam (December of S1)

Revision of Whole Numbers

Remember to lay out the calculations carefully. Put in the column headings if they help. Also remember about the 'carry digit' when you are calculating answers, especially adding or multiplying

Rounding – when rounding to the nearest 10, 100 or 1000, think about which value your number is closer to: is 47 closer to 40 or closer to 50?

   It is closer to 50.

40   47   50

When the number is exactly in the middle, then we round up: 550 rounds up to 600 (to the nearest 100)

Estimating
It is useful to have some idea of the answer to a calculation before you start. For example, 789 + 812 is roughly 800 + 800 so the answer should be about 1600. Buying four items at £7.99 will cost approximately 4 × £8 = £32.

Powers and Indices
Square Numbers: A number multiplied by itself; 3 squared = 3^2 = 3 x 3 = 9

   6 squared = 6^2 = 6 x 6 = 36

We can use any number as a power and use repeated multiplication to work out its value: 5^3 = 5 x 5 x 5 = 125 2^6 = 2 x 2 x 2 x 2 x 2 x 2 = 64

1) 368
  + 37

2) 894
  + 277

3) 537
  + 66

4) 46
  - 13

5) 372
  - 45

6) 425
  - 189

7) 32
  x 6

8) 207
  x 4

9) _____
  4) 2408

10) _____
  7) 903

11) A company produces 45280 cakes in one hour. They put 8 cakes in a box. How many boxes can they fill in one hour?

12) Mr Smith is paid £1350 per month. How much does he earn in 6 months?

13) A car showroom sells 34 cars in June, 28 cars in July and 129 cars in August. How Many cars do they sell altogether?

14) Find the value of a) 4^3 b) 2^4

15) Last month a magazine sold 14732 copies. This month their sales were down by 974. How many magazines were sold this month?

16) How many days are there in total in September, October, November and December?

17) A school trip is going to Edinburgh zoo. There are 178 pupils and 9 teachers.

   a) How many 52 seater buses will be needed?

   b) How many empty seats will there be?

18) Last year, an estate agent sold 429 houses. This year, they doubled their house sales.
   How many houses did they sell this year?

19) Granny Smith won £8520 at the bingo. She wanted to share it equally between her six
   grandchildren. How much did each child get?

20) Jenny works every day from Monday to Friday. She was paid £68 per day. On
   Saturday she worked extra, as someone was off ill. She was paid £79 on Saturday.
   How much money did she make altogether for her work?

21) Which is larger: 4^5 or 5^4 ? Justify your answer by calculation

22) a) How many days are there in 3 years, if none of them are a leap year?

   b) How many days are there in 6 years, if two years have been leap years?

23) A survey showed that in one day, 29935 vehicles

   crossed over a busy bridge.

   a) Round this figure to the nearest 10?

   b) Round this figure to the nearest 100?

24) At a football match, the attendance was 19729.

   a) Round this figure to the nearest 100?   b) Round this figure to the nearest 1000?

25) A box of ChocoFlakes weighs 375 grams. Approximately, what is the weight of 18
   boxes?

26) Put these values in order of size, smallest to largest: 2^7, 7^2, 15^0, 10^3

27) A group of 8 people are going on holiday. They have a choice of booking family
   rooms costing £105 each (one room sleeps 4), double rooms costing £55 each (one
   room sleeps 2) or deluxe rooms costing £85 each (one room sleeps 3). You must book
   the same type of room for everyone. What is the cheapest option?

Order of Operations

When carrying out a calculation we do not necessarily start at the left and work to the right. BIDMAS reminds us to do brackets first, then indices (powers) then division and multiplication and, finally, addition and subtraction For example:-

$3 \times 4 + 5 \times 3$	$3 + 20 \div 5 + 5$	$(3 + 20) \div (5 + 5)$	$(2 + 3 + 4)^2$
$= 12 + 15$	$= 3 + 4 + 5$	$= 23 \div 10$	$= 9^2$
$= 27$	$= 12$	$= 2.3$	$= 81$

Now try these examples:-

28) $4 \times 5 - 6 \times 3$

29) $4 + 5 \times 6 + 3$

30) $20 \div 2 - 20 \div 10$

31) $20 + 20 \times 2 + 10$

32) $3 \times (4 + 5)$

33) $3 \times 4 + 5$

34) $20 + 10 \div 2$

35) $(20 + 10) \div 2$

36) $1^2 + 2^2 + 3^2$

37) $(1 + 2)^2 + 3^2$

38) $1^2 + (2 + 3)^2$

39) $(1 + 2 + 3)^2$

Revision of Graphs and Charts

Any graph or chart should always have a title, the axes labels and a sensible scale, clearly shown. Rulers should be used where necessary. In a Pie chart, sections should be labelled.

1) Draw and label a neat bar graph for the following information about Primary 5 Pets.

Pet	Cat	Dog	Rabbit	Budgie	Rat	Fish
Number of Pupils	5	9	4	3	2	6

2) This pie chart shows favourite drinks in a class. Make a list of drinks from most popular to least popular.
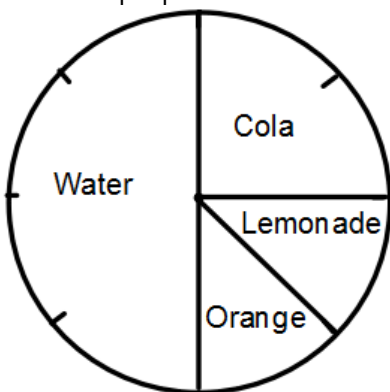
a) Write down the fraction of the class who liked water.
b) Write down the fraction of the class who liked lemonade.
c) If there are 20 children in the class, how many liked cola?

3) The charges for a delivery service are shown in the table.
   a) What is the charge for each of the following deliveries:-

   i) 3 kg delivered 4km?

   ii) 9kg delivered 14km?

   iii) 12kg delivered 8km?

Distance Weight	Under 5km	Between 5km – 10km	Over 10km
1 – 5 kg	£4.75	£6.50	£9.20
6 – 10kg	£6.50	£8.25	£10.85
Over 10kg	£9.25	£10.75	£13.15

   b) I pay £8.25 for a parcel delivery.
      Give an example of the weight of
      the parcel and how far it was
      delivered.

4) Draw and label a neat line graph to display the number of goals scored by the school
   football team each month.

Month	Aug	Sept	Oct	Nov	Dec	Jan
Goals	15	26	17	32	8	19

Revision of Equations and Expressions

Simplifying Expressions

We collect all 'like terms' together when we simplfy: $x + x$ becomes $2x$ (2 lots of x)

$3a + 5 + 2a - 1$ becomes $5a + 4$

$4x - 4y - 2x + y$ becomes $2x - 3y$

An expression is different from an equation as it does not have an equal sign with it. An equation always has two sides – even if one side is equal to zero.

Solving Equations
You can either use the 'cover up' method or the 'balancing sides' method. Layout of work is very important and you should always show all steps. Remember to get all the letters on one side of the equation and all the numbers on the other side.

$x + 5 = 12$ (what number add 5 gives12) $3x = 27$ (3 lots of what number makes 27)
$x \quad = 7$ $x = 27 ÷ 3$
                                                 $x = 9$

$4x + 6 = 98$ $5x – 1 = 2x + 11$
$4x \quad = 92$ $3x – 1 = 11$
$x \quad = 92 ÷ 4$ $3x \quad = 12$ (add 1 to both sides)
$x \quad = 23$ $x \quad = 4$

If you are given a problem to solve, try writing an equation to help. For example, four bottles of water plus 100ml equals 3060ml. How many millilitres are in one bottle of water? Let b be the amount of water in one bottle, so

$$4b + 100 = 3060$$
$$4b = 2960$$
$$b = 740ml$$

Now answer these questions.
1) Collect all the like terms to simplify these expressions
   a) 3x + 5x – 2x
   b) 7p – 2p + 11p
   c) 2x + 7 + 5x + 3
   d) 8x + 9y – 3x – 5 y
   e) 4a – b + 5a + 2b
   f) 7m – 3n – 8m + n

2) Solve the following equations
   a) x – 1 = 11
   b) x + 6 = 15
   c) 3x = 12
   d) 2x = 14
   e) 3x – 1 = 11
   f) 2x + 6 = 15
   g) 4x + 3 = 23
   h) 6w – 5 = 1
   i) 4t – 4 = 24
   j) 2k + 19 = 25
   k) 10p + 48 = 108
   l) 20h – 41 = 39
   m) 4f – 1 = f + 23
   n) 5x + 11 = 19 – 3x
   o) 5t – 2 = 2t + 16
   p) 6x + 1 = 4x + 13
   q) ½x + 4 = 10
   r) ¼y + 2 = 4
   s) 8 = ½b + 6
   t) ⅛x – 1 = 2

3) Four bags of flour plus 1kg have a total weight of 13kg. Find the weight of one bag of flour.
4) Six eggs in a 15 gram box weigh 285 grams. Find the weight of one egg.

Revision of Fractions, Decimals and Percentages

Fractions

A fraction $\frac{3}{5}$ consists of two parts: a numerator (the top number 3) and a denominator (the bottom number 5).

If you want to compare fractions, you need to get the denominators to be the same number first, before deciding which fraction is greater e.g. $\frac{1}{4}$ and $\frac{5}{12}$

Change the denominator from 4 into 12 by multiplying by 3 and do the same to the top number as well $\frac{1}{4}$ becomes $\frac{3}{12}$, then compare: $\frac{5}{12}$ is greater

Equivalent fractions
The same fraction can be written several ways, but usually try to work with the simplest form: $\frac{1}{3} = \frac{2}{6} = \frac{3}{9} = \frac{4}{12} = \frac{5}{15}$ and so on…

Fractions of a quantity
To find a fraction of a quantity, divide by the denominator and then multiply by the numerator.
$\frac{1}{4}$ of 24 = 24 ÷ 4 = 6 $\frac{1}{7}$ of 252 = 252 ÷ 7 = 36

$\frac{3}{5}$ of 45 = 45 ÷ 5 = 9 x 3 = 27 $\frac{7}{8}$ of 448 = 448 ÷ 8 = 56 x 7 = 392

Now answer these questions – remember to show all working where necessary.

1) Write out four equivalent fractions to   a) $\frac{1}{5}$ b) $\frac{2}{5}$ c) $\frac{3}{7}$

2) Simplify the following fractions   a) $\frac{3}{15}$ b) $\frac{2}{40}$ c) $\frac{75}{100}$

3) Which fraction is greater   a) $\frac{2}{5}$ or $\frac{1}{2}$ b) $\frac{3}{4}$ or $\frac{5}{7}$

4) Calculate   a) $\frac{1}{5}$ of 65   b) $\frac{1}{6}$ of 120   c) $\frac{1}{4}$ of 52   d) $\frac{1}{3}$ of 72

5) Calculate a) $\frac{2}{5}$ of 75   b) $\frac{2}{3}$ of 81   c) $\frac{3}{7}$ of 406   d) $\frac{7}{9}$ of 1107

6) There are 495 people in an office building. $\frac{5}{9}$ of them are women. How many women are there? How many men are there?

7) I spent $\frac{1}{5}$ of my money on a magazine and still had £10.20 left. How much must I have started with?

8) Jim drove $\frac{2}{5}$ of the way from Dundee to Perth. He still had 12 miles to go. How far is it from Dundee to Perth?

Decimals and Percentages

A decimal is a value which includes tenths or hundredths of a unit.
3.14 = 3 units, 1 tenth and 4 hundredths, or 3 units and 14 hundredths. It is important to be able to use these to help convert fractions into percentages. One percent is one out of one hundred

0.5 = 0.50 = 50 hundredths = $\frac{50}{100}$ = 50%   0.01 = 1 hundredth = $\frac{1}{100}$ = 1%

Finding a percentage without a calculator
Always find 10% first – just divide the given number by 10: 10% of 640 = 640 ÷ 10 = 64
     If your need 30% - it is 3 times 10%, so 30% of 640 = 3 x 64 =192
Then find 1% - just divide your answer for 10% by 10: 1% of 640 = 64 ÷ 10 = 6.4
     If you need

To use a calculator, change the percentage into the decimal equivalent, then multiply by the given number: 35% of 640 = 0.35 x 640 = 224

To convert a score into a percentage, divide the numerator by the denominator and then multiply by 100: $\frac{21}{24}$ in geography is a percentage of 87.5% (21÷ 24 x 100)

Now try these:-

1) Calculate, without a calculator, 10%, 20%, 50% 75% of 830
2) Calculate, without a calculator, 10%, 20%, 25%, 50% 75% and 80% of 5400

Use a calculator for the following questions (write out as in the example above)
3a) 17% of £90   b) 4% of £305   c) 89% of £1200
4a) 58% of £120   b) 7% of £2456   c) 63% of £12,345

5) 380 people work in a building. 70% are men. How many men work in the building?
6) A TV cost £450, but a special discount was offered of 15%. How much money was taken off the price of the TV? How much did the TV now cost?
7) A college noticed that 18% of its new students dropped out by the end of the first year. If there were 1450 new students, how many dropped out?
8) The diameter of Mars is only 55% of the diameter of Earth. If the diameter of Earth is 13000km, what is the diameter of Mars?
9) My bank charges me 3% to change my holiday money into dollars. If I change £1200 into dollars, how much am I charged?
10) My cotton shirt is actually made up of 7% polyester. If my shirt weighs 720grams, what weight of polyester is there?
11) 56% of the population of Scottown are senior citizens. If Scottown has 16 700 inhabitants, how many are senior citizens?
12) Convert these scores into percentages and then decide which is Jen's best subject.

History $\frac{13}{20}$ ICT $\frac{15}{25}$ French $\frac{14}{21}$ English $\frac{12}{17}$

Revision of Multiples, Factors and Primes

Multiples
A multiple of a number is the number multiplied by any other value. Usually we think of the 'times tables'
e.g. Multiples of 5 are:- 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60 etc.
     Multiples of 12 are:- 12, 24, 36, 48, 60, 72, 84, 96 etc.
The **lowest common multiple** of two numbers is the lowest number that appears in both multiple lists: l.c.m. of 5 and 12 is 60.

Factors
Factors are numbers that divide exactly into a given value.
e.g. Factors of 9 are:- 1, 3, 9
     Factors of 24 are:- 1, 2, 3, 4, 6, 8, 12, 24
Factors of a number always include 1 and the number itself.
The **highest common factor** is the highest factor that appears in both lists: h.c.f. of 9 and 24 is 3.

Prime Numbers

A prime number is a number that only has TWO factors: 1 and the number itself.

e.g. 3 is a prime number as only 1 and 3 are its factors.

The only even prime number is 2.

Now try to answer the following questions

1) List the first ten multiples of 8   2) List the first five multiples of 15
3) Find the l.c.m. of 6 and 8   4) Find the l.c.m. of 10 and 7
5)Find the l.c.m. of 2, 3 and 4   6) Write down the factors of 28
7) Write down the factors of 100   8) Find the h.c.f. of 20 and 30
9) Find the h.c.f. of 24 and 36   10) Write down the first five prime numbers.
11)Explain why 9 is not a prime number.
12) For each number, list all of its factors and say whether it is a prime number or not.
   a) 10   b) 21   c) 47   d) 1

Answers

Whole Numbers

1)405   2) 1171   3) 603   4) 33   5) 327   6) 236   7) 192
8) 828   9) 602   10) 129   11) 5660   12) £8100   13) 191 cars 14a) 64
14b) 16   15) 13758   16) 122 days 17a) 4 buses   17b) 21 seats   18)858 houses
19) £1420   20) £419   21) 4^5 is larger   22a) 1095 days   22b) 2192 days
23a) 29940   23b) 29900   24a) 19700   24b) 20000   25) 6750g   26) 15^0, 7^2, 2^7, 10^3
27) Family rooms £210 28) 2   29)37   30) 8   31)70   32) 27   33) 17   34) 25   35) 15   36) 14   37) 18
38) 26   39) 36

Graphs and Charts

2a) ½   2b) 1/8   2c) 5 children   3ai) £4.75   3aii) £10.85   3aiii) £10.75
3b) 6-10kg going 5-10km

Equations and Expressions

1a) 6x   b) 16p   c) 7x + 10   d) 5x +4y   e) 9a + b   f) –m – 2n
2a) x = 12   b) x = 9   c) x = 4   d) x = 7   e) x = 4   f) x = 4.5
g) x = 5   h) w = 1   i) t = 7   j) k = 3   k) p = 6   l) h = 4
m) f = 8   n) x = 1   o) t = 6   p) x = 6   q) x = 12   r) y = 8
s) b = 4   t) x = 24
3) bag = 3kg   4) egg = 45g

Fractions

1a)$\frac{2}{10}$, $\frac{3}{15}$, $\frac{10}{50}$, $\frac{5}{25}$ b) $\frac{4}{10}$, $\frac{20}{50}$, $\frac{3}{15}$, $\frac{8}{20}$ c) $\frac{6}{14}$, $\frac{9}{21}$, $\frac{12}{28}$, $\frac{30}{70}$
2a) $\frac{1}{5}$ b) $\frac{1}{20}$ c) $\frac{3}{4}$
3a) $\frac{1}{2}$ b) $\frac{3}{4}$
4a) 13   b) 20   c) 13   d) 24
5a) 30   b) 54   c) 174   d) 861
6) 275 women, 220 men   7) £12.75   8) 20 miles

Decimals and Percentages

1) 83, 166, 415, 622.5   2) 540, 1080, 1350, 2700, 4050, 4320   3a) £15.30   b) £12.20
c) £1068   4a) 69.60   b) 171.92   c) £7777.35   5)266 men   6) £67.50 off,
new price = £382.50   7) 261 students   8) 7150 km   9) £36   10) 50.4g
11) 9352   12) History 65%   ICT 60%   French 67%   English 71%

Multiples, Factors and Primes

1) 8, 16, 24, 32, 40, 48, 56, 64, 72, 80   2) 15, 30, 45, 60, 75   3) 24   4) 70
5) 12   6) 1, 2, 4, 7, 14, 28   7) 1, 2, 4, 5, 10, 20, 25, 50, 100   8) 10   9) 12
10) 2, 3, 5, 7, 11   11) 9 has 3 as a factor   12a) 1, 2, 5, 10 not prime   b) 1, 3, 7, 21 not prime
c) 1, 47 prime   d) 1, not prime, only one factor