LEVEL 4 – HINTS AND EXAMPLES

4.1 Recognise and describe patterns

- A list of numbers is called a sequence
- The numbers in the sequence are called terms
- A term to term rule tells you how to get from one term to the next

To continue a sequence, try to spot the pattern:

e.g $5 \quad 8 \quad 11 \quad 14$

Observe how the pattern is to $+3$ each time.

So the next term is: $14 + 3 = 17$

4.2 Multiples, factors and squares

- Factors are what divides exactly into a number

e.g. Factors of 10:

10×1

5×2

So the factors are $1, 2, 5, 10$

- Multiples are effectively the timetables of a number

e.g. multiples of 8 are:

$8 \quad 16 \quad 24 \quad 32 \quad 40 \quad etc$

- Square numbers are found by multiplying a number by itself

$1 \times 1 = \mathbf{1}$

$2 \times 2 = \mathbf{4}$

$3 \times 3 = \mathbf{9}$

e.g. 7th square number is **49** because

$7 \times 7 = \mathbf{49}$

4.3 Multiply or divide by 10 or 100

- To multiply by 10 move each digit one place to the left

e.g. $32 \times 10 = 320$

hundreds	Tens	Units
	3	2
3	2	0

- To divide by 10 move each digit one place to the right

e.g. $420 \div 10 = 42$

Hundreds	Tens	Units
4	2	0
	4	2

- To multiply by 100 move each digit two places to the left
- To divide by 100 move each digit two places to the right

4.4 i Fraction, decimal equivalence

0.1	$\frac{1}{10}$
0.25	$\frac{1}{4}$
0.5	$\frac{1}{2}$
0.75	$\frac{3}{4}$

e.g $0.3 = \frac{3}{10}$ or $0.7 = \frac{7}{10}$

4.4 ii Top-heavy fractions

$$\mathbf{3\frac{2}{5} = \frac{3 \times 5 + 2}{5} = \frac{15 + 2}{5} = \frac{17}{5}}$$

4.5 Ordering decimals

If asked to order the following decimals:

$$0.3 \quad 0.21 \quad 0.132$$

The trick is to put imaginary zeros to make them all have the same number of decimal places

$$0.300 \quad 0.210 \quad 0.132$$

We can now clearly see that the correct order is:

$$0.132 \quad 0.210 \quad 0.300$$

Or, back in their original form

$$0.132 \quad 0.31 \quad 0.3$$

4.6 Begin to understand ratio

- Suppose Jack has 20 red sweets and 12 blue sweets. We can write this as a ratio

$$20:12$$

- Ratios can be simplified:

$$20:12$$

Divide both terms by 2

$$10:6$$

Divide by 2 again

$$5:3$$

The ratio is 5:3 in its simplest form because we cannot divide any further

- Sharing ratios: Jack and Jill share money in the ratio 1:3. They receive £40 in total. How much did Jack receive?

For every £1 Jack gets, Jill gets £3.

$$£1 + £3 = £4$$

They need to get 10 lots of this to get £40 so Jack receives $10 \times £1 = £40$

4.8 division with decimals

e.g. To calculate $4.8 \div 4$

First, 'ignore' the decimal point

$$48 \div 4 = 12$$

So,

$$4.8 \div 4 = 1.2$$

4.10 simple decimal multiplying

e.g. to calculate 3.6×4

Do two separate calculations

- $3 \times 4 = 12$
- $0.6 \times 4 = 2.4$
- Add the answers to get 14.4

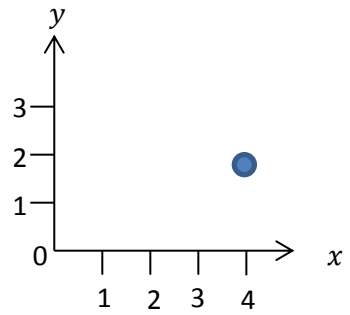
So, $3.6 \times 4 = 14.4$

4.14 Axes and coordinates

- Label the origin with an 0
- Have equal spaced dashes clearly numbered
- Label the horizontal axis x
- Label the vertical axis y

e.g. plot the coordinate $(4,2)$

a) Go across 4 and up 2 and mark with a dot



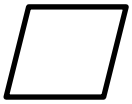
4.15 i key quadrilaterals

Learn the following:

Trapezium – one pair of parallel sides

Parallelogram – two pairs of parallel sides

Rhombus – a regular parallelogram (sides all the same length



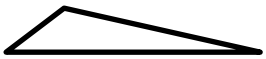
4.16 ii key triangles

Isosceles – one pair of equals angles and equal sides

Equilateral – all three sides the same length and all angles $60°$

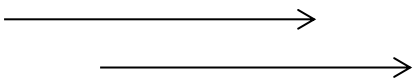
Right-angled triangle – one angle is $90°$

Scalene – a non-regular triangle

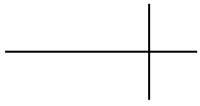


4.17 iii key language

Parallel lines – a constant distance apart (think train tracks)



Perpendicular lines – the lines cut at right-angles ($90°$)



4.18 key unit conversions

1 metre = 100cm
1cm = 10mm
1km = 1000m
1kg = 1000g
1 litre = 1000 ml

4.19 i perimeter

- To find the perimeter of a rectangle we measure the 4 sides and add together the measurements
- Remember the opposite sides will be the same length

e.g. (not drawn to scale)

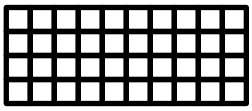
Perimeter is:

$8cm + 3cm + 8cm + 3cm = 22cm$

4.19 ii area

- We can find an area by counting squares

e.g.



The area is 40 unit squares

- If we know the width and the height then we just multiply these measurements together

e.g. A rectangle has a width of 12 squares and a height of 7 squares.

The area is $12 \times 7 = 84\ unit\ squares$

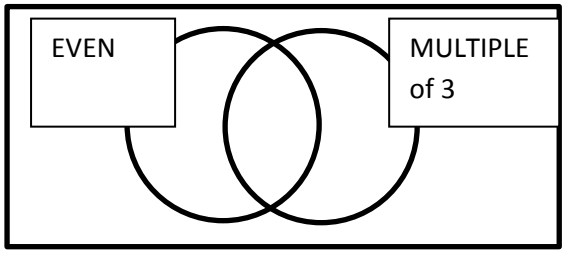
4.23 Venn Diagrams

- A Venn diagram is used to sort numbers according to at least two criteria

e.g.

Use the following VENN diagram to sort the numbers:

$$6 \quad 9 \quad 2 \quad 11 \quad 10$$



The left circle is used for even numbers

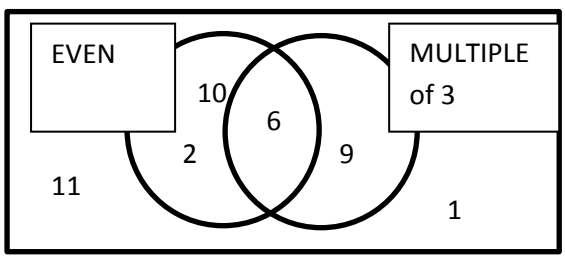
The right circle used for multiples of 3

The middle for numbers both even and a multiple of 3

The outside for numbers which are neither even nor a multiple of 3

The trick is to look at which of the given numbers satisfy the criteria:
EVEN are: $6 \quad 2 \quad 10$
MULTIPLE OF 3 are: $6 \quad 9$
BOTH: 6 - this goes in the central overlap
NEITHER: $11 \quad 1$ - these go anywhere around the outside

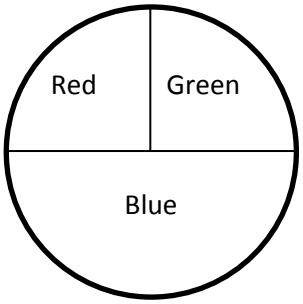
SOLUTION:



4.23 – interpreting pie charts

- A pie chart is used to represent categorical data
- Each section of the pie chart represents a different category
- The size of each of the sections must be in the correct proportion

e.g. 120 people were asked for their favourite colour. How many people said BLUE



It is evident that HALF the people said BLUE

$$120 \div 2 = 60 \; people$$

4.24 – mode and range

- The mode is the most frequent number

e.g. The mode of 4, 5, 9, 2, 4, 2, 11 is 4 because this occurs TWICE

e.g. The mode of 3, 7, 7, 3, 9, 3, 7 is both 3 and 7 because they BOTH appear three times

e.g. With the numbers 3, 6, 9, 2, 10, 11 there is no MODE because they all appear once

- The range is the largest minus the smallest number

e.g. Range of 3, 7, 11, 14, 22 is
$22 - 3 = 19$