RATIO AND PROPORTION

QUESTION 1

Robert buys a total of 360 shirts and blouses, where

number of shirts : number of blouses = 5 : 7

Robert pays £11 for each shirt.
He sells each shirt for £13.

Robert pays £7 for each blouse.
He sells each blouse for £12.

Robert sells all of the shirts and blouses.

Work out Robert's percentage profit.
Give your answer correct to 1 decimal place.
You must show all your working.

.....%

(5 marks)

QUESTION 2

Keisha has some small bottles, some medium bottles and some large bottles.
She has a total of 600 bottles.

$\frac{3}{5}$ of the 600 bottles are green.

For the green bottles,

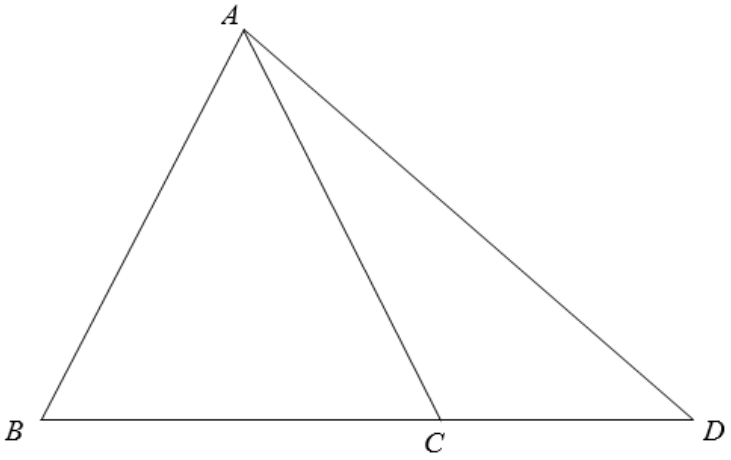
number of small bottles : number of medium bottles = 4 : 3
number of medium bottles : number of large bottles = 3 : 5

Work out the percentage of Keisha's bottles that are medium green bottles.

.....%

(5 marks)

QUESTION 3



ABC and DAB are similar isosceles triangles.

$AB = AC$
$AD = BD$

$BC : CD = 9 : 7$

Find the ratio $AB : AD$

.....

(3 marks)

QUESTION 4

There are only red sweets, orange sweets and yellow sweets in a jar.
There are 36 orange sweets in the jar.

Hannah is going to take at random a sweet from the jar.

The probability that the sweet will be orange is 0.18

the number of red sweets : the number of yellow sweets = 1 : 3

Work out the number of yellow sweets in the jar.

[4]

QUESTION 5

Aaron, Lucy and Tom share some money in the ratio 4 : 9 : 14

Tom gives $\frac{2}{7}$ of his money to Aaron.

Tom then gives 10% of the rest of his money to Lucy.

Tom says,

"Now all three of us have the same amount of money."

Is Tom correct?
You must show how you get your answer.

(4 marks)

QUESTION 6

There are only blue counters and orange counters in bag **A**.

number of blue counters : number of orange counters = 3 : 7

There are only pink counters and yellow counters in bag **B**.
The number of counters in bag **B** is half the number of counters in bag **A**.

Given that there are x blue counters in bag **A**,

use algebra to show that the total number of counters in bag **A** and bag **B** is $5x$

[4]

Question 7

William, Yvonne and Zak share some money in the ratio 4 : 5 : 3
Yvonne gets £150

Zak then gives some of his share to Yvonne.
The money that William, Yvonne and Zak each have is now in the ratio 3 : 4 : 2

How much money did Zak give to Yvonne?

£.....

(4 marks)

Question 8

A company orders a large number of widgets from a factory.

It would take 42 hours to make all the widgets using 6 machines.

How many machines are needed to make all the widgets in 7 hours?

..... **(2)**

Question 9

Given that $\frac{3a^2 + 2b^2}{29a^2 - 5b^2} = \frac{2}{3}$ where $a > 0$ and $b > 0$

find, in its simplest form, the ratio $a : b$

.....**(4)**

Question 10

Last month a farmer sold 900 kg of vegetables.
65% of these vegetables were turnips and parsnips.

weight of turnips : weight of parsnips = 9 : 4

Calculate the weight of parsnips the farmer sold.

..... kg **(3)**

Question 11

$9a : 7c = 4 : 7$
$3b : 5c = 5 : 3$

Show that $a + b : b + c = 29 : 34$

(3)

Question 12

It takes 24 hours for 9 identical pumps to fill a swimming pool.

How many hours would it take 15 of these pumps to fill another swimming pool of the same size?

..... hours **(3)**

Question 13

Ian writes down three numbers a, b and c

$$a : b = 2 : 3$$
$$b : c = 9 : 4$$

(a) (i) Find $a : b : c$

.....

(2)

(ii) Express b as a fraction of the total of the three numbers a, b and c

.....

(2)

Cilla writes down three numbers p, q and r

$$q = 5p$$
$$r = 3q$$

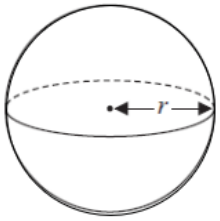
(b) Find $p : r$

.....

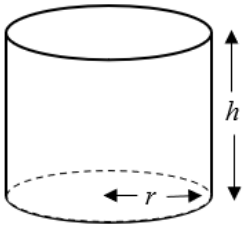
(2)

Question 14

Here is a solid sphere and a solid cylinder.



Volume of sphere = $\frac{4}{3}\pi r^3$



Volume of cylinder = $\pi r^2 h$

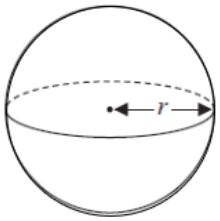
All measurements are in cm.

The volume of the sphere is equal to the volume of the cylinder.

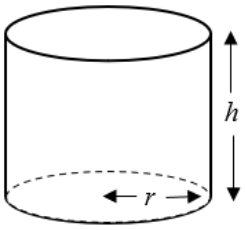
(*a*) Find $r : h$
Give your answer in its simplest form.

.....(2)

Here is a different solid sphere and a solid cylinder.



Surface area of sphere = $4\pi r^2$



Surface area of cylinder = $2\pi r h + 2\pi r^2$

All measurements are in cm.

The surface area of the sphere is equal to the **total** surface area of the cylinder.

(*b*) Find $r : h$
Give your answer in its simplest form.

(4)

Question 15

Jane, Katie and Lucy grow tomatoes.

number of tomatoes Jane has : number of tomatoes Katie has : number of tomatoes Lucy has = 3 : 8 : 14

Lucy has 18 more tomatoes than Katie.

Lucy has more tomatoes than Jane.
How many more?

.....

(3 marks)

Question 16

Nadiya makes spinach flans in a restaurant.

She mixes spinach, cheese and potato so that

weight of spinach : weight of cheese : weight of potato = 4 : 2 : 9

Nadiya needs to make 9000 g of spinach flans.

Cheese costs £3.25 for 240 g.

Work out the cost of the cheese needed to make 9000 g of spinach flans.

(4)

Question17

On Monday, 54 people took 6 hours to prepare a number of hotel rooms.
On Tuesday, 36 people prepared the same number of hotel rooms.

Assuming that all the people worked at the same rate,

work out how many hours the 36 people took to clean the cars.

..... hours

(2)

Question 18

Ossie and Jessie have in total a third as many sweets as Fred and Greta have in total.

Fred and Greta share their sweets in the ratio 4 : 1
Ossie and Jessie share their sweets in the ratio 7 : 3

Fred got a sweets.
Greta got b sweets.
Ossie got c sweets.
Jessie got d sweets.

Find, in its simplest form, $a : b : c : d$

.....

(4 marks)

Question 19

Given that $\frac{a}{b} = \frac{2}{3}$ and $\frac{b}{c} = \frac{4}{5}$

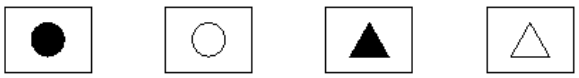
find $a : b : c$

.....(3)

QUESTION 20

There are four types of cards in a game.

Each card has a black circle or a white circle or a black triangle or a white triangle.



number of cards with a black shape	:	number of cards with a white shape	=	3 : 8
number of cards with a circle	:	number of cards with a triangle	=	2 : 5

Express the total number of cards with a black shape as a fraction of the total number of cards with a triangle.

(3)