PRACTICAL ARITHMETIC & PROBLEM SOLVING

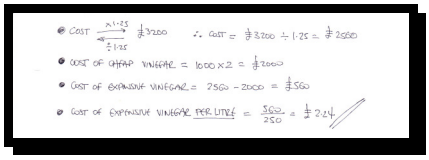
Question 1 (+)**

A wholesale vinegar merchant bought 1000 litres of vinegar at £2 a litre and 250 litres of a more expensive vinegar.

He mixed the two types of vinegar and sold it for £3200 altogether, making a profit of 25% .

Find how much he paid, per litre, for the more expensive vinegar.

£2.24



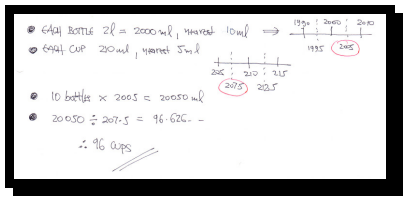
Question 2 (+)**

The juice of 10 cartons of orange, each containing 2 litres of juice, correct to the nearest 10 ml , is to be poured into cups.

Each cup holds 210 ml , correct to the nearest 5 ml .

Determine the largest number of cups that can be filled.

96



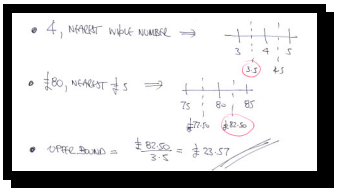
Question 3 (+)**

A builder paid £80 for the delivery of 4 m^3 of sand.

The amount he paid is known to be correct to the nearest £5 and the volume of sand is correct to the nearest m^3.

Determine the maximum cost of 1 m^3 of sand.

£23.57



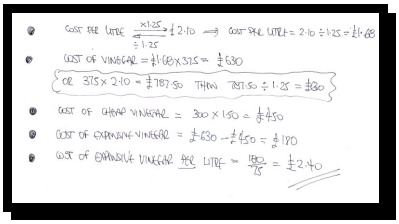
Question 4 (+)**

A wholesale vinegar merchant bought 300 litres of vinegar at £1.50 a litre and 75 litres of a more expensive vinegar.

He mixed the two types of vinegar and sold it for £2.10 per litre, making a profit of 25%

Find how much he paid per litre for the more expensive vinegar.

£2.40

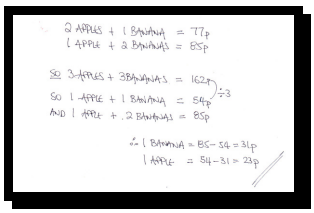


Question 5 (***)

- 2 apples and 1 banana cost 77 pence.
- 1 apple and 2 bananas cost 85 pence.

Find how much money each fruit costs.

Apple : 23p , Banana : 31p



Question 6 (***)

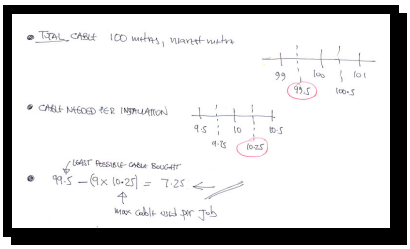
A telecom engineer bought a new reel of cable to use in his next few satellite installations.

The reel contains 100 metres of cable, correct to the nearest metre.

Each satellite installation uses 10 metres of cable, correct to the nearest half metre.

Determine the **least possible** amount of cable left in the reel after 9 satellite dish installations.

7.25 m



Question 7 (***)

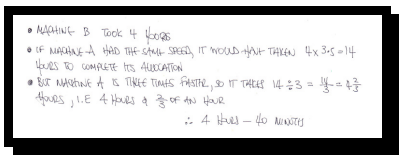
Machine A is three times as fast as machine B in soldering computer motherboards.

Machine A is allocated three and a half times as many motherboards to solder than is allocated to machine B.

Machine B took four hours to complete its allocation.

Determine in hours and minutes the time it took machine A to complete its allocation.

$$\boxed{4 \text{ hours} - 40 \text{ minutes}}$$



Question 8 (*+)**

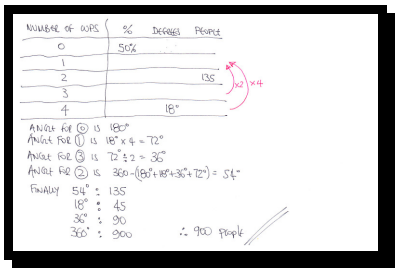
A sample of people were surveyed and asked how many cups of coffee they consumed in a typical day.

The following information is known for this survey.

- The replies were 0, 1, 2, 3 or 4 cups of coffee.
- 50% of the people surveyed consumed no coffee.
- 135 people consumed "2 cups a day".
- In a standard pie chart the sector that represents the "4 cups a day" is $18°$.
- The number of people that consumed "1 cup a day" is four times as large as that of those who consumed "4 cups a day".
- The number of people that consumed "1 cup a day" is twice as large as that of those who consumed "3 cups a day".

Determine the number of people that took part in the survey.

900



Question 9 (*+)**

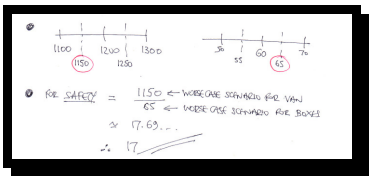
A courier is about to transport boxes in his van.

Each box has a label which reads "typical weight 60 kg", which is known to be correct to 1 significant figure.

The van has a safety notice which reads "maximum load 1200 kg", which is thought to be correct to 2 significant figures.

Find the **largest** number of boxes that can be **safely** loaded into the van.

$\boxed{17}$

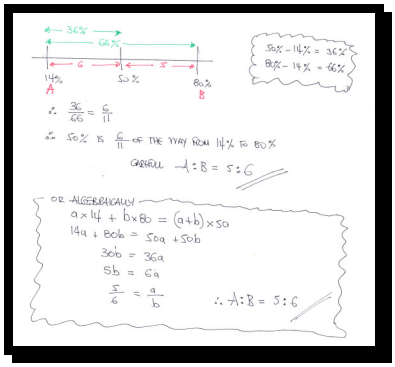


Question 10 (****)

Chemicals solutions A and B contain hydrochloric acid at concentrations of 14% and 80%, by volume.

In what ratio must the two solutions be mixed, so that the resulting solution has hydrochloric acid at a concentration of 50% by volume

$\boxed{A:B=5:6}$



Question 11 (****)

A painter and his helper agreed to complete a job in 35 days.

The helper does 60% of the amount of work that the painter does per day.

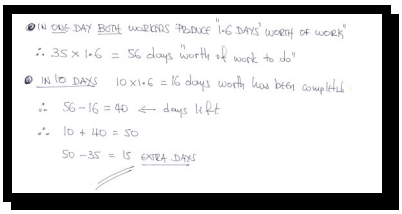
The painter produces the same amount of work every day. The helper produces the same amount of work every day.

The painter and his helper were working together until the end of the 10^{th} day.

The helper broke his hand and from the 11^{th} day onwards the painter was working by himself, continuing to work at the same rate as before.

Determine by how many days the job was delayed.

15



Question 12 (****)

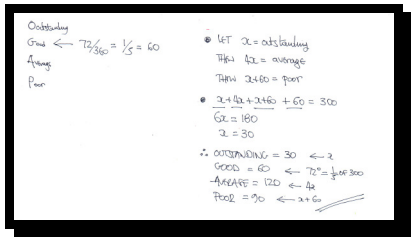
The 300 Year 11 pupils of a certain school are classed as "outstanding", "good", "average" or "poor".

The following information is also available about these pupils.

- In a standard pie chart the sector that represents the "good" pupils is $72°$.
- The "poor" pupils are as many as the "good" and "outstanding" pupils added together.
- There are four times as many "average" pupils as "outstanding" ones.

Determine the number of students in each class.

$$\boxed{O=30,\ G=60,\ A=120,\ P=90}$$

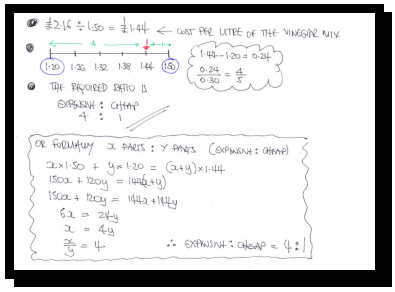


Question 13 (****)

A wholesale vinegar merchant bought some vinegar at £1.20 a litre and a more expensive vinegar at £1.50 per litre.

At what ratio must he mix the two types of vinegar so he can sell it at £2.16 per litre, making a profit of 50%?

$$\boxed{4:1}$$

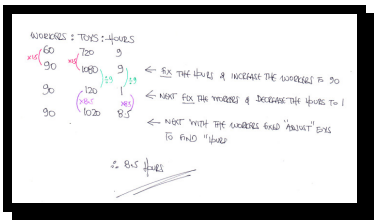


Question 14 (****)

In a factory it has been established that 60 workers produce 720 toys in 9 hours.

Determine in how many hours, will 90 workers produce 1020 toys.

8.5



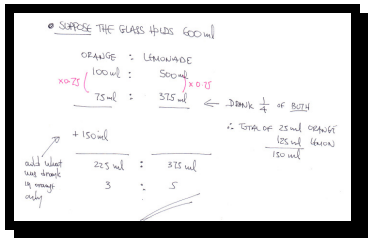
Question 15 (****)

Orange juice and lemonade are mixed in a glass in the ratio of $1:5$.

After one quarter of the contents of the glass were consumed, the glass was topped up with orange juice.

What is the new ratio of orange juice to lemonade?

3 : 5

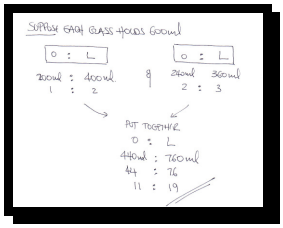


Question 16 (****)

Two glasses, with identical capacities, contain orange juice and lemonade at the ratios of $1:2$ and $2:3$, respectively.

What is the resulting ratio of orange juice to lemonade, if the contents of both glasses were poured into a bigger glass?

$\boxed{11:19}$



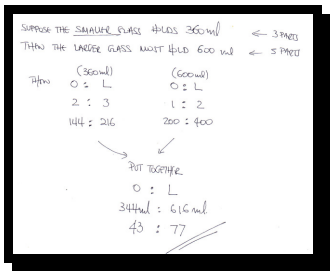
Question 17 (****)

The capacities of two glasses are in the ratio $5:3$.

The glasses contain orange juice and lemonade mixed in the ratios of $1:2$ and $2:3$, respectively.

What is the resulting ratio of orange juice to lemonade, if the contents of both glasses were poured into a bigger glass?

$\boxed{43:77}$



Question 18 (****)

In the Year 11 of a school there are twice as many boys doing triple science as girls.

$\frac{1}{4}$ of the boys that do triple science also do foreign languages.

$\frac{3}{5}$ of the girls that do triple science also do foreign languages.

a) Find the fraction of the students that do triple science that also do foreign languages.

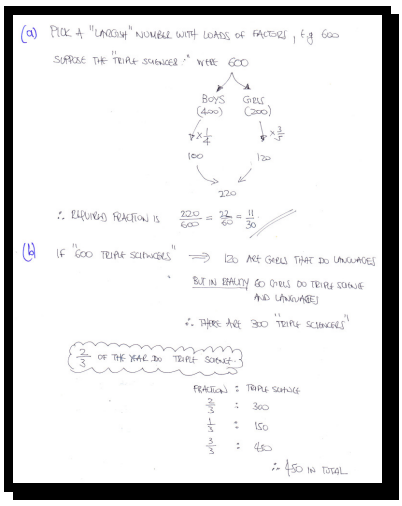
It is now given that …

… there are 60 girls doing triple science and foreign languages.

… $\frac{2}{3}$ of the total number of students in the year 11 do triple science.

b) Determine the total number of students in Year 11.

$\boxed{\frac{11}{30}}$, $\boxed{450}$



Question 19 (****)

Andrew and Bethany are preparing for a Mathematics exam by doing the same set of practice papers.

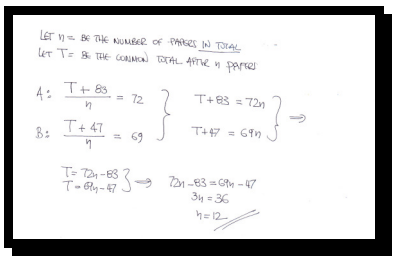
They both have one practice paper left to do and their mean scores are identical.

Andrew scores 83% on his last paper and his mean score is rises to 72%.

Bethany scores 47% on her last paper and her mean score is drops to 69%.

Determine the number of practice papers in the set.

$\boxed{n=12}$



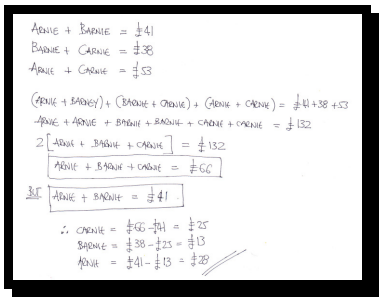
Question 20 (****)

Three children Arnie, Barnie and Carnie have been saving pound coins in their piggy banks. The following information is known about their savings.

- The total money Arnie and Barnie have saved is £41
- The total money Barnie and Carnie have saved is £38
- The total money Arnie and Carnie have saved is £53

Find how much money each kid saved.

Arnie : £28 , Barnie : £13 , Carnie : £25

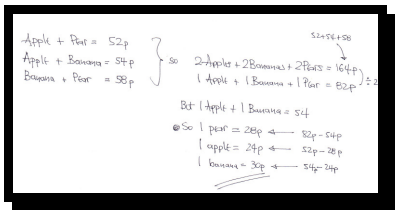


Question 21 (****)

- 1 apple and 1 pear cost 52 pence.
- 1 apple and 1 banana cost 54 pence.
- 1 banana and 1 pear cost 58 pence.

Find how much money each fruit costs.

Apple : 24p , Banana : 30p , Pear : 28p



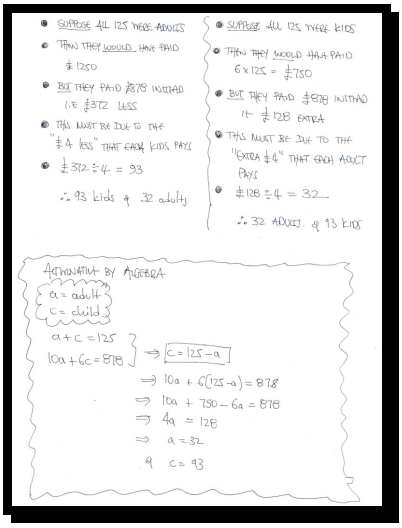
Question 22 (****)

In a cinema adult tickets cost £10 each while child tickets cost £6.

For a certain film there were 125 people in the cinema, having paid in total £878.

Find how many adults and how many children were watching this film?

93 children and 32 adults



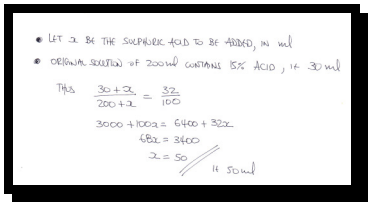
Question 23 (**+)**

Sulphuric acid is a colourless liquid which can be diluted with water.

Pure sulphuric acid is to be added to a 200 ml water solution, which also contains sulphuric acid of concentration 15% by volume.

How many ml of pure sulphuric acid must be added so that the resulting solution contains sulphuric acid of concentration 32% by volume.

50 ml



Question 24 (**+)**

Two towns, A and B, are connected by a straight direct road of length 400 km.

At $08:00$ a car leaves A, travelling with constant speed, arriving at B at $14:40$.

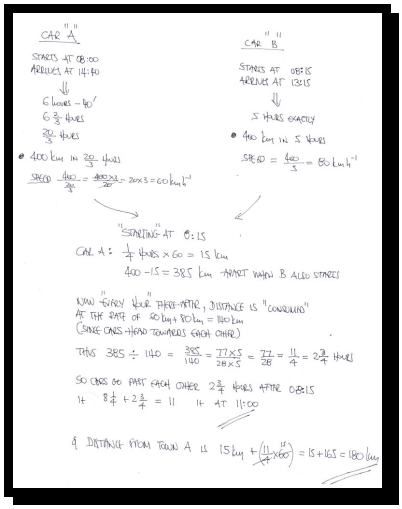
At $08:15$ another car leaves B, also travelling with constant speed, arriving at A at $13:15$.

Determine …

… the time when the cars go past each other.

… the distance from A when the cars go past each other.

$\boxed{11:00}$, $\boxed{180\text{ km}}$

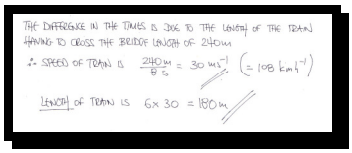


Question 25 (**+)**

A train travelling at constant speed, takes 14 seconds to cross a bridge of length 240 metres and 6 seconds to go past a lamp post.

Determine the speed and the length of the train.

$\boxed{\text{speed} = 12 \text{ ms}^{-1}}$, $\boxed{\text{length} = 180 \text{ m}}$



Question 26 (**+)**

40 soldiers in a camp, have food supplies which can last them for 30 days.

After 10 days 20 soldiers left the camp, without taking any food supplies.

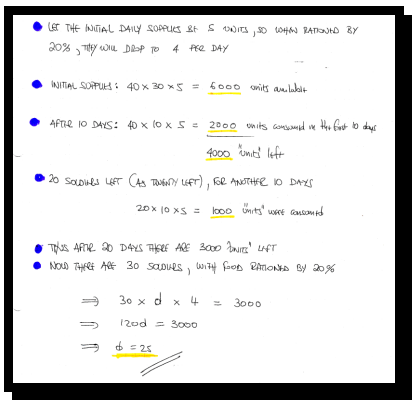
After a further period of 10 days, another 10 soldiers arrived in the camp, without bringing with them any food supplies.

The food supplies in the camp are now rationed by 20%, in order to sustain all the 30 soldiers for as long as possible.

The food supplies run out d days after the arrival of these 10 soldiers.

Determine the value of d.

$\boxed{}$, $\boxed{d = 25}$



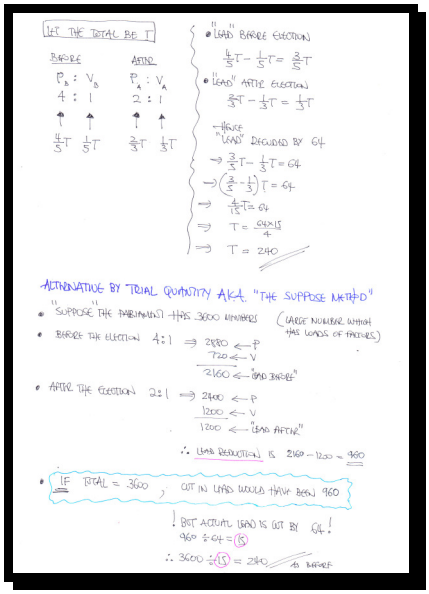
Question 27 (*****)

The parliament of a particular country consists entirely or representatives of two political parties, the Preservative Party and the Vapour Party.

Before last night's General Elections the Preservative Party had 4 times as many representatives as the Vapour Party. As a result of last night's General Elections the Preservative Party has 64 fewer representatives than before which now means that the Preservative Party had twice as many representatives as the Vapour Party.

Determine the total number of representatives in this parliament.

240



Question 28 (*****)

Two walkers, A and B, start their walk at the point P and at the same time.

They both walk in the same direction along a straight horizontal road, each with constant speed.

The points Q and R lies on that road so that $|PQ| = 1$ km and $|QR| = 3$ km.

Walker B passes through Q 60 s after walker A passed through Q.

When walker A passes through R, walker B is 400 m behind A.

Determine the speeds of the two walkers, in $\text{km}\,\text{h}^{-1}$.

$$\boxed{V_A = 6\tfrac{2}{3}\ \text{km}\,\text{h}^{-1}}, \quad \boxed{V_B = 6\ \text{km}\,\text{h}^{-1}}$$

