www.freeapplicationsofmaths.co.uk

Practice Paper B
Paper 2

Name: _____

Class: _____

Teacher: _____

Date: _____

You may **NOT** use a calculator.

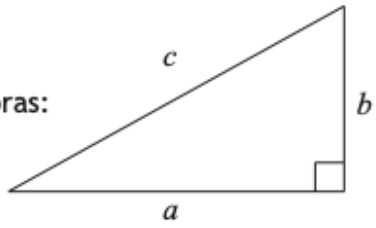
Full credit will be given only where the solution contains appropriate working.

FORMULAE LIST

Circumference of a circle: $C = \pi d$

Area of a circle: $A = \pi r^2$

Theorem of Pythagoras:



$a^2 + b^2 = c^2$

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

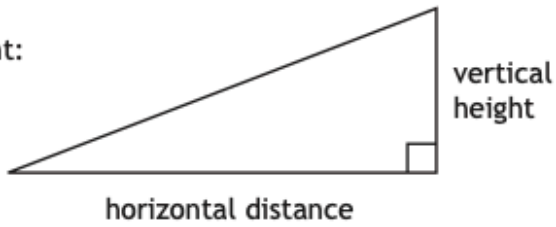
Volume of a prism: $V = Ah$

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

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

Standard deviation: $s = \sqrt{\frac{\Sigma(x-\bar{x})^2}{n-1}} = \sqrt{\frac{\Sigma x^2 - (\Sigma x)^2/n}{n-1}}$, where n is the sample size.

Gradient:



$$\text{gradient} = \frac{\text{vertical height}}{\text{horizontal distance}}$$

All questions should be attempted

Do not write in this margin.

Marks

1. Tyler is trying to decide which car to buy he looks at the following.

	Doors	Engine (L)	Turbo	Spare Wheel	SAT NAV	Monthly Price
A	3	1.2	No	Yes	No	140
B	3	1.4	Yes	Yes	No	180
C	5	1.4	No	Yes	Yes	200
D	5	1.4	Yes	Yes	No	220
E	5	1.6	Yes	No	No	250
F	5	2.0	No	No	Yes	320

Tyler wants

- 5 doors
- At least 1.4L engine
- For there to be a sat nav
- The car not to be turbo charged
- There to be a spare wheel

a) Which car will Tyler get and how much will he spend a month? **1**

b) Tyler can buy the car outright for £7564 after 4 years of paying the fixed price. If Tyler decides to take this offer, how much will he have spent in total on the car? **2**

Do not write in this margin.

Marks

2. The Smiths buy a house for £230 000

In the first 3 years of buying the house, the value decreases by 5% every year. The following 2 years, the value of the house increases by 7.5%.

Find the value of the house after 5 years to the nearest **hundred**.

5

3. Jen has to travel to her brother's house down the M6.

She arrives at her brother's house at 4.25pn
She travelled 310 miles at an average speed of 60mph
She also stopped at a service station for 45 minutes.

What time did Jen leave for her brother's house? **4**

Do not write in this margin.

Marks

4. Ryan earns £500 a week.
He plans to save up $\frac{1}{4}$ of his wages a week

a) How much money will Ryan have saved up after 8 weeks? **2**

Ryan is planning on buying a TV with his savings and he has 5 options

TV	Price	Size	Smart TV	HD ports
1	£1400	80”	YES	6
2	£750	70”	NO	2
3	£980	75”	YES	2
4	£840	75”	YES	4
5	£1100	70”	YES	4

Ryan would like

- A smart TV
- That is at least 75”
- Has at least 4 HDMI ports

b) Which TV is the most suitable for Ryan and how much money would he have left? **2**

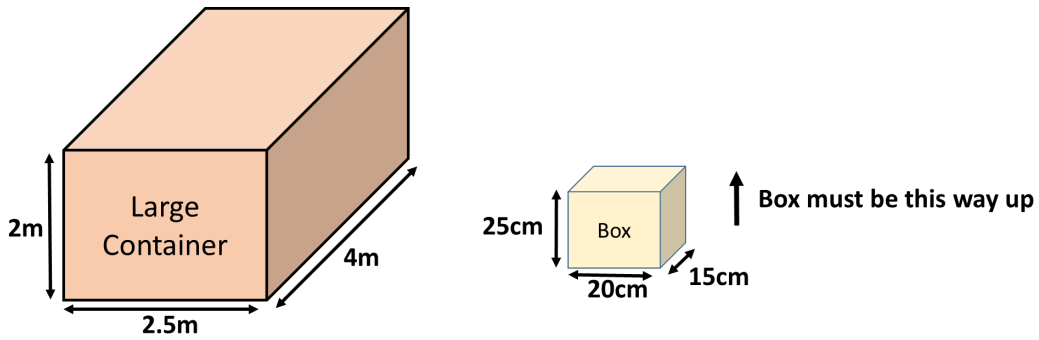
Ryan would also like to buy a new games console costing £480.

c) Using what money he has left over from buying the TV how many more weeks will Ryan have to save so he can also buy a games console? **2**

Do not write in this margin.

Marks

5. Boxes are being stacked into a larger container with dimensions as shown below.



a) What is the most number of boxes you can fit inside the large container. **3**

b) Barry is paid £9.20 an hour to pack the container. If Barry can pack away 80 boxes an hour. How much will he get paid for packing all of the boxes into the container? **2**

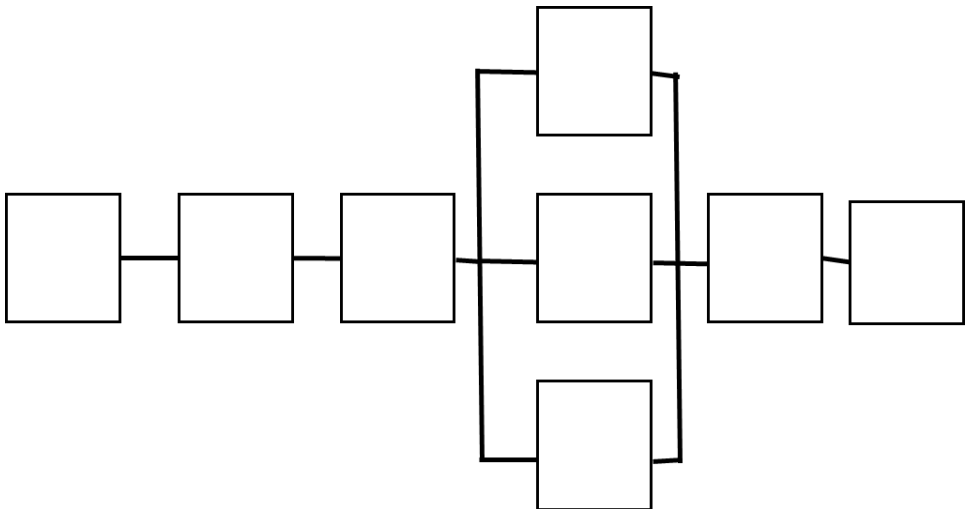
Do not write in this margin.

Marks

6. Marcus is setting the table and completes the following tasks;

	Task	**Preceding task**	**Time (seconds)**
A	Put on table cloth	E	40
B	Place mats around table	A	35
C	Remove plates	D	60
D	Serve and eat dinner	B,G,H	90
E	Put on table protector	F	30
F	Dust the table	None	65
G	Place cutlery and water on table	A	45
H	Light candles	A	25

a) Complete the following precedence table **2**



b) How many minutes and seconds will it take for Marcus to complete all of the tasks. **2**

Do not write in this margin.

Marks

7. Paula exchanges £3400 into Indian Rupees

She receives 320,000 rupees.

Find the exchange rate Paul got for pounds into rupees to 2 decimal places **2**

8. A shop sells bags of grass supplement in two sizes.

Size 1: 9kg bag for 22.95
Size 2: 30kg bag for £72

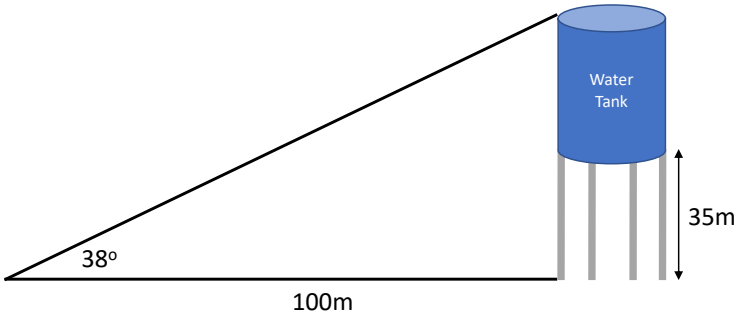
Which is the better deal? **3**

Do not write in this margin.

Marks

9. A water tower in Dubai is built in the shape of a cylinder.

A sketch of the tower is shown below. While standing a distance of 100m from the tower, there is an angle of 38° between the ground and the top of the water tower.



a) Using a scale of 1cm = 10m, construct a scale drawing of the dimensions of the triangle above. **3**

Do not write in this margin.

Marks

b) Given the cylinder is 35m off the ground,

i) What is the height of the cylinder? **3**

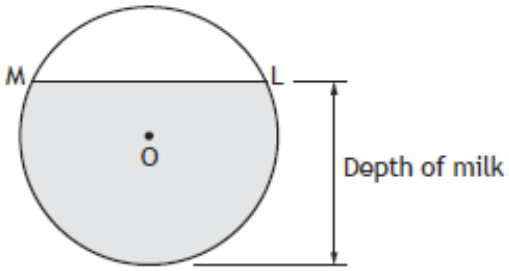
The cylinder has a radius of 6m

ii) Hence calculate the volume of the cylinder to **2 significant figures**. **3**

Do not write in this margin.

Marks

10. The diagram below shows the circular cross section of a milk tank.



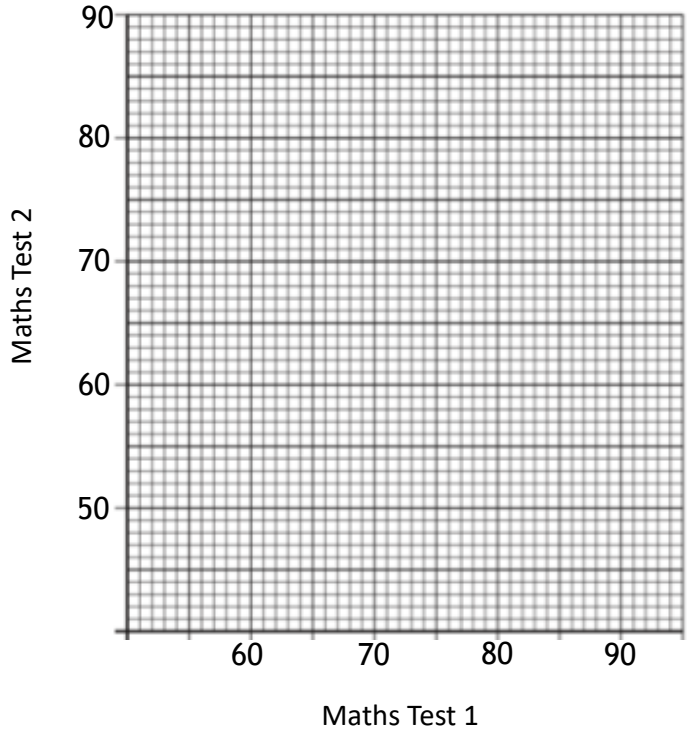
The radius of the circle, centre 0, is 3 metres.
The width of the surface of the milk in the tank (ML) is 4.4m.
Calculate the depth of the milk in the tank. **4**

Do not write in this margin.

Marks

11. The scores of different pupils in a Maths class were taken on how they did in two different tests.

Test 1	55	62	84	92	83	75	69
Test 2	45	54	73	81	74	64	58



a) On the grid, draw a Scatter Graph of the results **2**

b) Draw a line of best fit **1**

Harry gets 65% in test 2

c) Use your line of best fit to estimate his score in test 1 **1**

Do not write in this margin.

Marks

12. Sabrina earns £42, 360 a year

National Insurance is calculated on a person's salary before deductions.

National Insurance Contributions	
Up to £9280	0%
From £9280 to £45 061	12%
Over £45 061	4%

a) Calculate Sabrina's annual national insurance payment **2**

Sabrina's annual income tax payment is £4957.20
She also pays 18% of her annual wage into her pension.

b) Calculate Sabrina's monthly net pay **3**

c) Sabrina is saving up to buy a new car. This requires a deposit of £3200. Sabrina would like to save this up in 10 months.

i) How much will Sabrina save each month? **1**

ii) What percentage of her monthly income is this to **one decimal place**? **2**

Do not write in this margin.

Marks

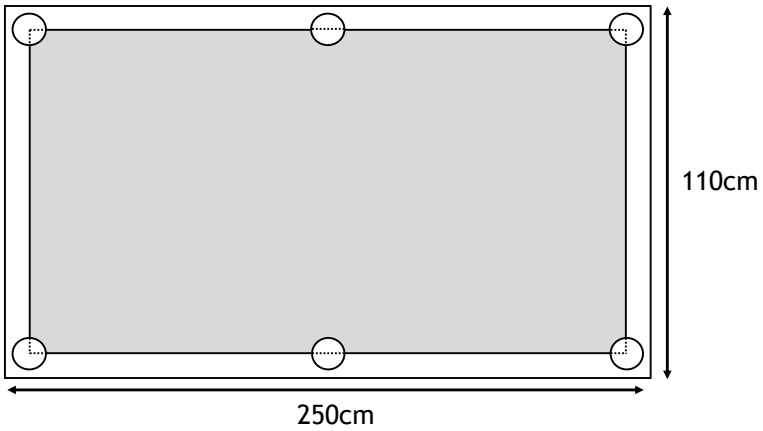
13. Ralph buys a pool table.

As he plays he uses chalk on his pool cue. The chalk is a cube but as he uses it a hemisphere is formed and removed from the cube.

Given that the hemisphere has a radius of 0.75cm.

a) Find the current volume of chalk left. **4**

A drawing of Ralph's table is shown below with the following dimensions.

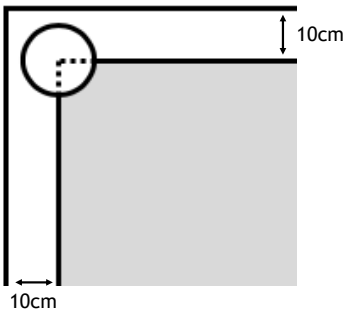


The **cloth** is the **shaded area** on the table which the game is played on.

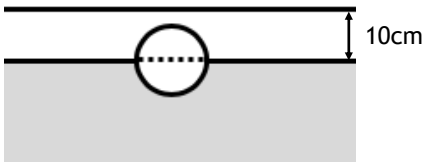
- The cloth is **rectangular** with space for the 6 pockets removed.
- 4 of these are corner pockets as shown below (quarter of a circle removed from the cloth)

Do not write in this margin.

Marks



- 2 are pockets in middle of the table as shown below (half a circle has been removed from the table.



- All the pockets have a **radius** of 6.5cm.

b) Calculate the area of the cloth on the pool table. **4**

This is the end of the paper.