

GCSE Mathematics

Practice Tests: Set 18

Paper 2H/3H (Calculator)

Time: 1 hour 30 minutes

You should have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- **Calculators may not be used.**
- Diagrams are NOT accurately drawn, unless otherwise indicated.
- You must **show all your working out.**



Information

- The total mark for this paper is 80
- Questions are in order of mean difficulty as found by students achieving Grade 7.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Answer ALL EIGHTEEN questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1** A solid aluminium cylinder has radius 10 cm and height h cm.

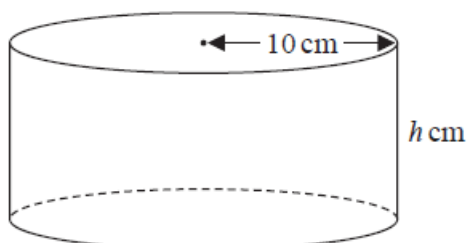


Diagram **NOT**
accurately drawn

The mass of the cylinder is 5.4 kg.

The density of aluminium is 0.0027 kg/cm^3

Calculate the value of h .

Give your answer correct to one decimal place.

$h = \dots\dots\dots$

(Total for Question 1 is 5 marks)

- 2 Victor buys 12 bottles of apple juice for a total cost of \$21
Victor sells all 12 bottles at \$2.45 each bottle.

Work out Victor's percentage profit.

.....%

(Total for Question 2 is 3 marks)

3 Ali and Badia each have 25 000 dollars to invest.

Cyclone Bank	Tornado Bank
Invest 25 000 dollars 4.5% compound interest per year for 3 years	Invest 25 000 dollars Receive 1150 dollars interest each year for 3 years

Ali invests in the Cyclone Bank for 3 years.

Badia invests in the Tornado Bank for 3 years.

By the end of the 3 years, Ali will have received more interest than Badia.

How much more?

Show your working clearly.

Give your answer correct to the nearest dollar.

..... dollars

(Total for Question 3 is 4 marks)

- 4 The table gives information about the amounts of money, in euros, that 70 of Anjali's friends spent last Saturday.

Money spent (S euros)	Frequency
$0 < S \leq 8$	6
$8 < S \leq 16$	14
$16 < S \leq 24$	19
$24 < S \leq 32$	25
$32 < S \leq 40$	6

One of Anjali's 70 friends is going to be chosen at random.

- (a) Find the probability that this friend spent more than 24 euros last Saturday.

.....
(1)

- (b) Work out an estimate for the mean amount of money spent by Anjali's friends last Saturday. Give your answer correct to 2 decimal places.

..... euros
(4)

(Total for Question 4 is 5 marks)

- 5 Write 3.6×10^3 as a product of powers of its prime factors.
Show your working clearly.

.....
(Total for Question 5 is 3 marks)

- 6 The diagram shows a regular octagon $ABCDHIJK$ and a pentagon $DEFGH$.

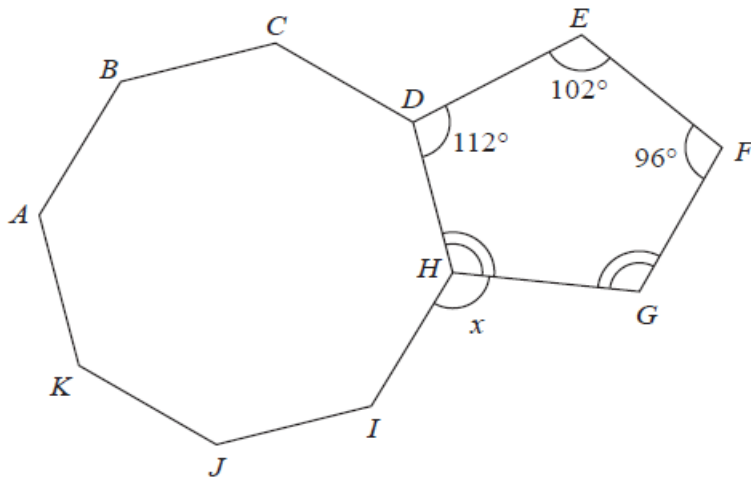


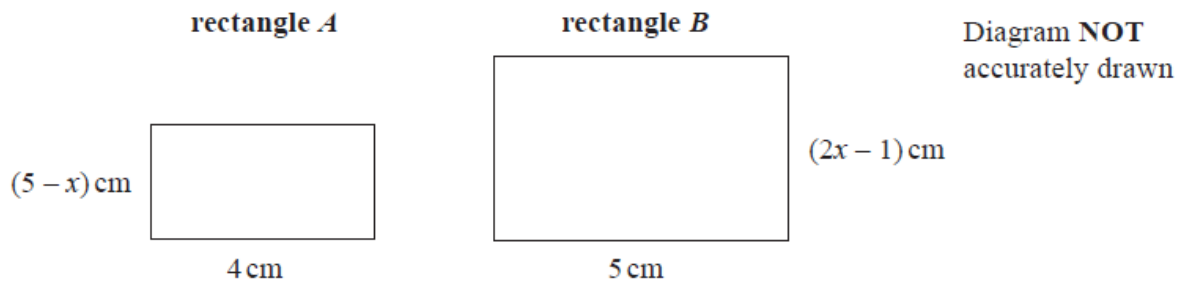
Diagram **NOT** accurately drawn

Angle $GHD =$ angle FGH .

Work out the size of the angle marked x .
Show your working clearly.

.....°
(Total for Question 6 is 5 marks)

7 Here are two rectangles, rectangle A and rectangle B .



The area of rectangle B is twice the area of rectangle A .

Work out the value of x .
Show your working clearly.

$x = \dots\dots\dots$

(Total for Question 7 is 4 marks)

- 8** In 2018, the population of Sydney was 5.48 million.
This was 22% of the total population of Australia.

Work out the total population of Australia in 2018
Give your answer correct to 3 significant figures.

..... million

(Total for Question 8 is 3 marks)

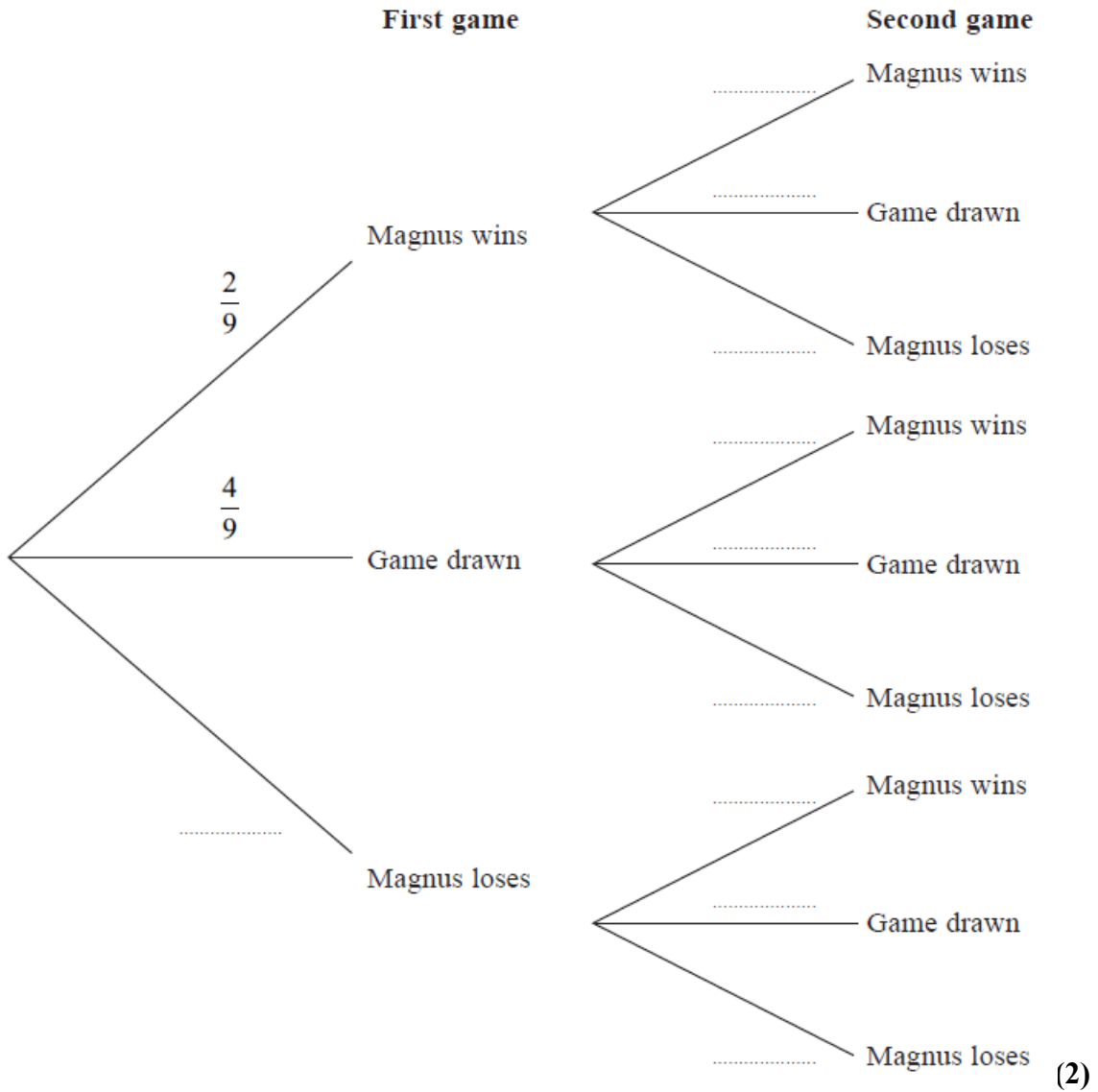
9 Magnus and Garry play 2 games of chess against each other.

The probability that Magnus beats Garry in any game is $\frac{2}{9}$

The probability that any game between Magnus and Garry is drawn is $\frac{4}{9}$

The result of any game is independent of the result of any other game.

(a) Complete the probability tree diagram.



For each game of chess,

the winner gets 2 points and the loser gets 0 points,
when the game is drawn, each player gets 1 point.

- (b) Work out the probability that, after 2 games, Magnus and Garry have the same number of points.

.....
(3)

(Total for Question 9 is 5 marks)

10 A box contains 15 counters.

There are 4 red counters, 5 green counters and the rest are yellow counters.

Niklas takes at random a counter from the box and writes down the colour of his counter.
He then puts the counter back into the box.

Sasha then takes at random a counter from the box and writes down the colour of her counter.

Work out the probability that the counters taken by Niklas and Sasha both have the same colour.

.....
(Total for Question 10 is 3 marks)

11 Here is a quadrilateral $ABCD$.

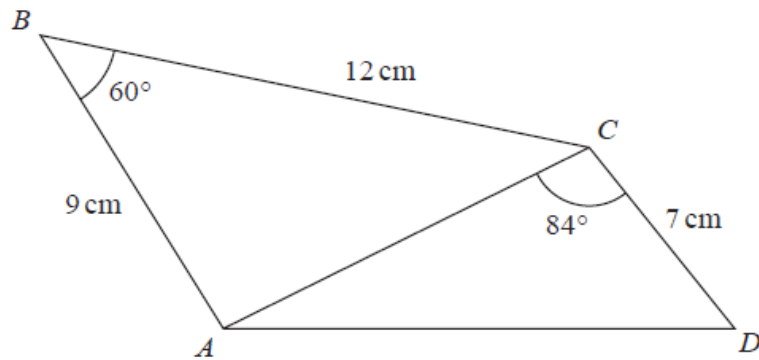


Diagram **NOT** accurately drawn

Calculate the area of quadrilateral $ABCD$.
Give your answer correct to 3 significant figures.
Show your working clearly.

..... cm^2

(Total for Question 11 is 5 marks)

12 There are 54 fish in a tank.
Some of the fish are white and the rest of the fish are red.

Jeevan takes at random a fish from the tank.

The probability that he takes a white fish is $\frac{4}{9}$

(a) Work out the number of white fish originally in the tank.

.....
(2)

Jeevan puts the fish he took out, back into the tank.
He puts some more white fish into the tank.

Jeevan takes at random a fish from the tank.

The probability that he takes a white fish is now $\frac{1}{2}$

(b) Work out the number of white fish Jeevan put into the tank.

.....
(2)

(Total for Question 12 is 4 marks)

- 13 The diagram shows the front of a wooden door with a semicircular glass window.

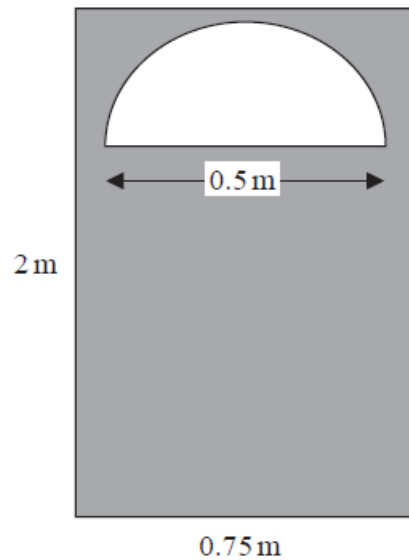


Diagram **NOT** accurately drawn

Julie wants to apply 2 coats of wood varnish to the front of the door, shown shaded in the diagram.

250 millilitres of wood varnish covers 4 m^2 of the wood.

Work out how many millilitres of wood varnish Julie will need.
Give your answer correct to the nearest millilitre.

..... millilitres

(Total for Question 13 is 5 marks)

- 14** Alison buys 5 apples and 3 pears for a total cost of £1.96
Greg buys 3 apples and 2 pears for a total cost of £1.22

Michael buys 10 apples and 10 pears.

Work out how much Michael pays for his 10 apples and 10 pears.
Show your working clearly.

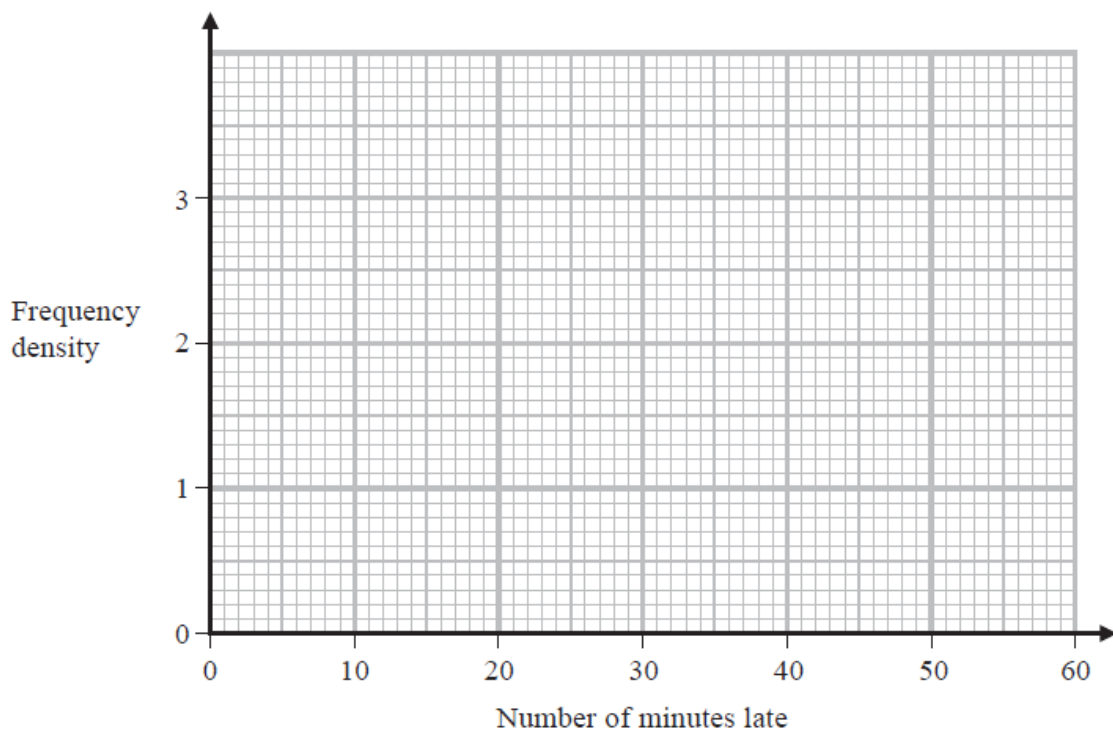
£.....

(Total for Question 14 is 5 marks)

- 15 Manuel collected information about the flights that arrived late at an airport last month. The table gives information about the number of minutes that these flights were late.

Minutes late (L minutes)	Frequency
$0 < L \leq 10$	8
$10 < L \leq 15$	13
$15 < L \leq 25$	19
$25 < L \leq 40$	24
$40 < L \leq 60$	6

- (a) On the grid, draw a histogram for this information.



(3)

Manuel selected at random a flight that was late by 25 minutes or less from his results.

- (b) Work out an estimate for the probability that this flight was late by 5 minutes or less.

.....
(2)

(Total for Question 15 is 5 marks)

16 A rainwater tank contains 2.4×10^7 raindrops.
The rainwater tank also contains 1.75×10^6 bacteria.

- (a) Work out the number of bacteria per raindrop in the tank.
Give your answer in standard form correct to 2 significant figures.

.....
(3)

A drop of rainwater contains 5.01×10^{21} atoms.

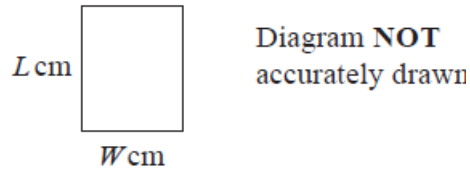
In a drop of rainwater the number of atoms is 3 times the number of molecules.

- (b) Work out the number of molecules in the rainwater tank.
Give your answer in standard form correct to one significant figure.

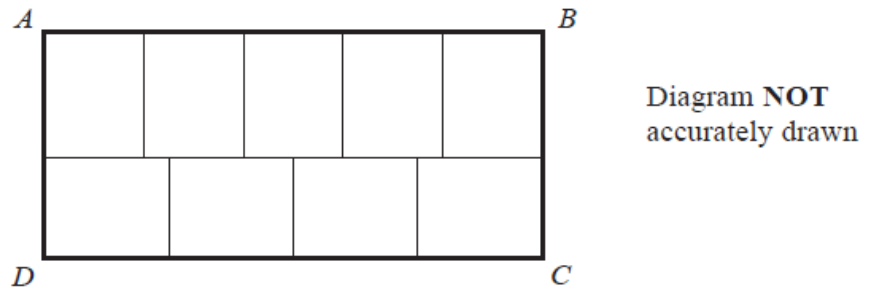
..... molecules
(2)

(Total for Question 16 is 5 marks)

- 17 Yasmin has some identical rectangular tiles.
Each tile is L cm by W cm.



Using 9 of her tiles, Yasmin makes rectangle $ABCD$, shown in the diagram below.



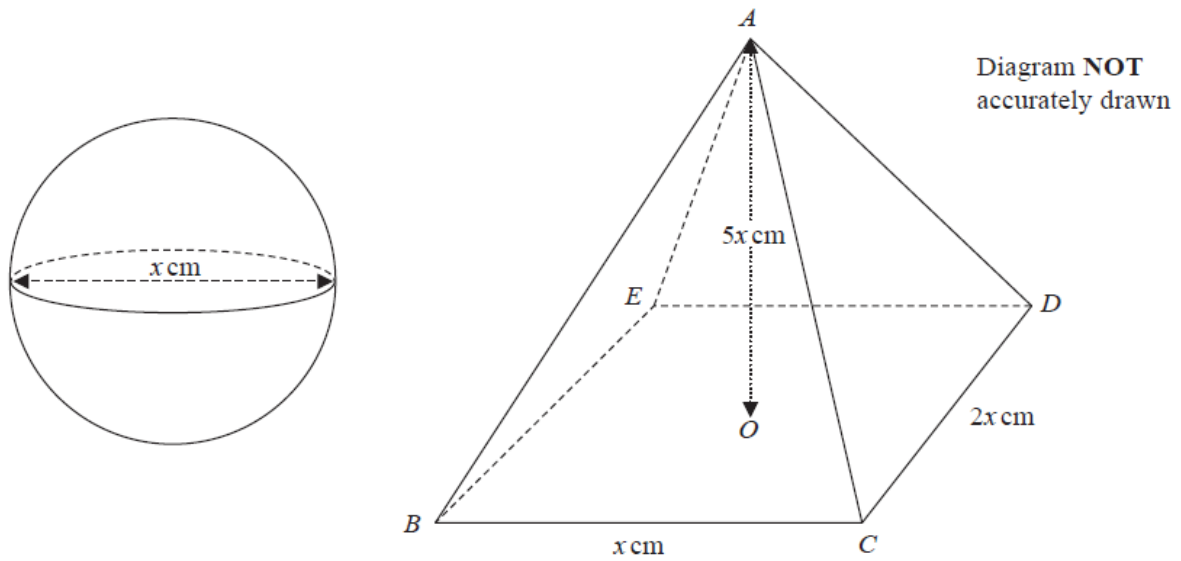
The area of $ABCD$ is 1620 cm^2

Work out the value of L and the value of W .

$L = \dots\dots\dots W = \dots\dots\dots$

(Total for Question 17 is 5 marks)

- 18 The diagram shows a sphere of diameter x cm and a pyramid $ABCDE$ with a horizontal rectangular base $BCDE$.



The vertex A of the pyramid is vertically above the centre O of the base so that $AB = AC = AD = AE$.

$BC = x$ cm, $CD = 2x$ cm and $AO = 5x$ cm.

The volume of the sphere is 288π cm³

Calculate the total surface area of the pyramid.
Give your answer correct to the nearest cm²

..... cm²

(Total for Question 18 is 6 marks)

TOTAL FOR PAPER IS 80 MARKS

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