GCSE Mathematics Practice Tests: Set 21

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 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 TWENTY questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1   An aeroplane travelled from New York City to Los Angeles.

The aeroplane travelled a distance of 3980 kilometres in 5 hours 24 minutes.

Work out the average speed of the aeroplane.
Give your answer in kilometres per hour correct to the nearest whole number.

.... kilometres per hour

(Total for Question 1 is 3 marks)

2 The diagram shows triangle *PQR*.
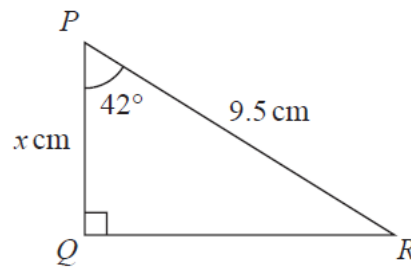
Diagram **NOT** accurately drawn

Work out the value of *x*

Give your answer correct to one decimal place.

$x = $ ....

(Total for Question 2 is 3 marks)

3 Behnaz makes 300 celebration cards so that

$$\text{number of birthday cards} : \text{number of anniversary cards} : \text{number of congratulations cards} = 7 : 5 : 3$$

$\dfrac{2}{5}$ of the birthday cards have numbers on them.
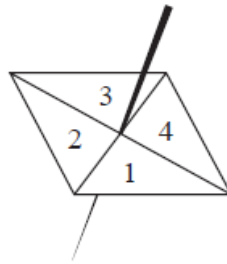
36% of the anniversary cards have numbers on them.

None of the congratulations cards have numbers on them.

Work out what fraction of the 300 cards have numbers on them.
Give your answer in its simplest form.

....

(Total for Question 3 is 5 marks)

4 Here is a biased 4-sided spinner.

The table gives the probabilities that, when the spinner is spun once, it will land on 1 or it will land on 3

Number	1	2	3	4
Probability	0.26		0.18	

The probability that the spinner will land on 2 is equal to the probability that the spinner will land on 4

Ravina is going to spin the spinner a number of times.

Ravina works out that an estimate for the number of times the spinner will land on 3 is 45

Work out an estimate for the number of times the spinner will land on 4

....

(Total for Question 4 is 4 marks)

5   Pasha invests £50 000 in a savings account for 4 years.
He gets 1.3% per year compound interest.

Work out how much money Pasha will have in his savings account at the end of 4 years.
Give your answer correct to the nearest dollar.

£..

(Total for Question 5 is 3 marks)

6 The diagram shows an 8-sided shape *ABCDEFGH*.
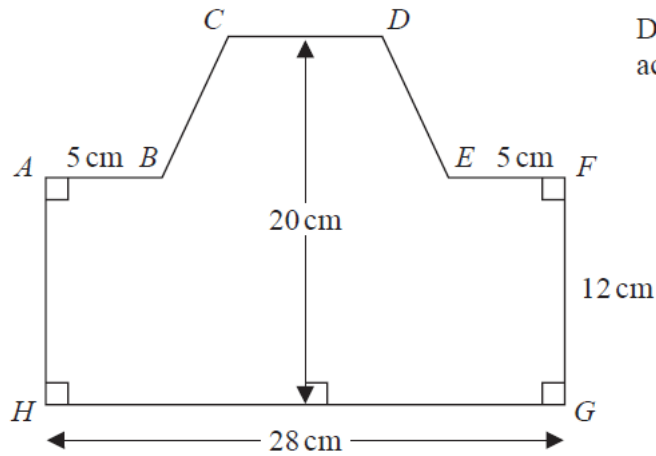

Diagram **NOT** accurately drawn

HG = 28 cm   *FG* = 12 cm   *AB* = *EF* = 5 cm
The height of the shape is 20 cm
CD is parallel to *HG*

The area of shape *ABCDEFGH* is 434 cm²

Find the length of *CD*.

.... cm

(Total for Question 6 is 4 marks)

7 (*a*) Find the highest common factor (HCF) of 56 and 84
Show your working clearly.

....

(2)

(*b*) Find the lowest common multiple (LCM) of 60 and 72
Show your working clearly.

....

(2)

(Total for Question 7 is 4 marks)

8 The diagram shows parts of three regular polygons, **A**, **B** and **C**, meeting at a point.
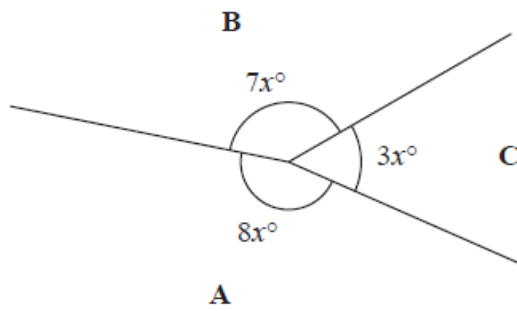
B

$7x°$

$3x°$ **C**

$8x°$

A

Diagram **NOT**
accurately drawn

Polygon **B** has n sides.

Work out the value of n.

$n =$ ....

(Total for Question 8 is 4 marks)

9 Larry is a delivery man.
He has 7 parcels to deliver.
The mean weight of the 7 parcels is 2.7 kg

Larry delivers 3 of the parcels.
Each of these 3 parcels has a weight of W kg

The mean weight of the other 4 parcels is 3.3 kg

Work out the value of W

$W = $ ....

(Total for Question 9 is 3 marks)

10 Antoine is going on holiday.

He makes 3 separate payments to cover the total cost of his holiday.

The following table shows how much money Antoine pays to the holiday company.

Payment	Amount paid
Payment 1	$\dfrac{3}{8}$ of the total cost
Payment 2	45% of the total cost
Payment 3	£406

Work out how much Antoine has to pay for Payment 2

£ ....

(Total for Question 10 is 5 marks)

11   Change a speed of 81 kilometres per hour to a speed in metres per second.

.... metres per second

(Total for Question 11 is 3 marks)

12 Here is triangle *ABC*
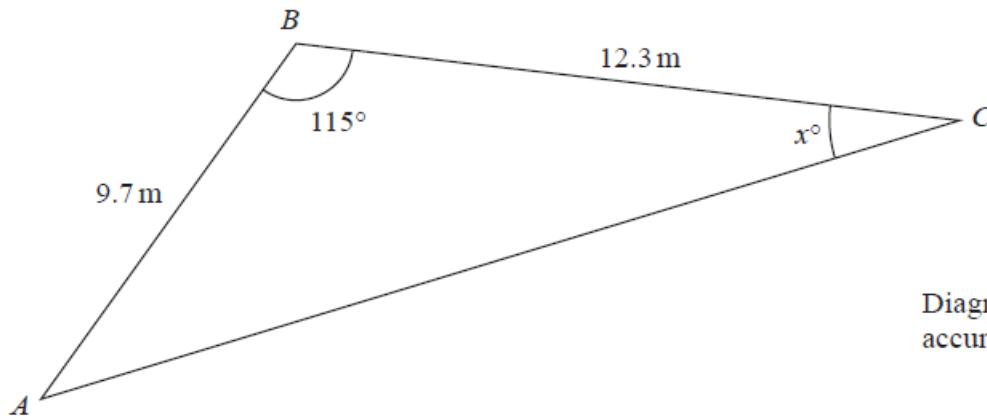
Work out the value of *x*
Give your answer correct to 3 significant figures.

x = ...

(Total for Question 12 is 5 marks)

13 A cylinder is placed on the ground.
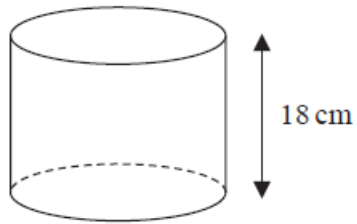

The height of the cylinder is 18 cm.

The force exerted by the cylinder on the ground is 72 newtons.
The pressure on the ground due to the cylinder is 1.4 newtons / cm^2

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

Work out the volume of the cylinder.
Give your answer correct to 3 significant figures.

.... cm^3

(Total for Question 13 is 4 marks)

14 *M* varies directly as the cube of *h*
  M = 4 when *h* = 0.5

Find the value of *h* when *M* = 500

....

(Total for Question 14 is 4 marks)

15 Abraham is going to play a computer game.

Abraham can win the game, draw the game or lose the game.

For any game that Abraham plays

the probability that he wins the game is 0.3
the probability that he draws the game is 0.5
the probability that he loses the game is 0.2

When Abraham wins a game, he scores +10 points.
When Abraham draws a game, he scores 0 points.
When Abraham loses a game, he scores −5 points.

Abraham plays 3 games and the points he scores in each of the 3 games are added together to get his total score.

Work out the probability that when he has played 3 games his total score is 0 points.

....

(Total for Question 15 is 4 marks)

16 Asha bought an apartment.

The table gives information about the value of apartments, in euros, and the annual service charge band.

Value (*x* euros)	Service charge band
$x \geq 700\ 000$	A
$600\ 000 \leq x < 700\ 000$	B
$500\ 000 \leq x < 600\ 000$	C
$400\ 000 \leq x < 500\ 000$	D
$0 < x < 400\ 000$	E

In 2021, the value of Asha's apartment was 634 400 euros.

The value of Asha's apartment had increased by 4% from its value in 2020

(*a*) Has the annual service charge band changed for Asha's apartment?
Show your working clearly.

(3)

Pam bought a boat.

In each year after Pam bought the boat, the value of the boat depreciated by 15%

(*b*) Work out the total percentage by which the value of the boat had depreciated by the end of the second year after Pam bought the boat.

.... %

(3)

(Total for Question 16 is 6 marks)

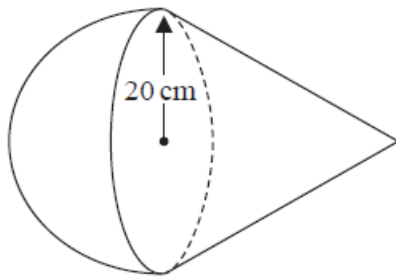**17** A solid is made from a cone and a hemisphere.

Diagram **NOT**
accurately drawn

The circular plane face of the hemisphere coincides with the circular base of the cone.
The radius of the hemisphere and the radius of the circular base of the cone are both 20 cm.
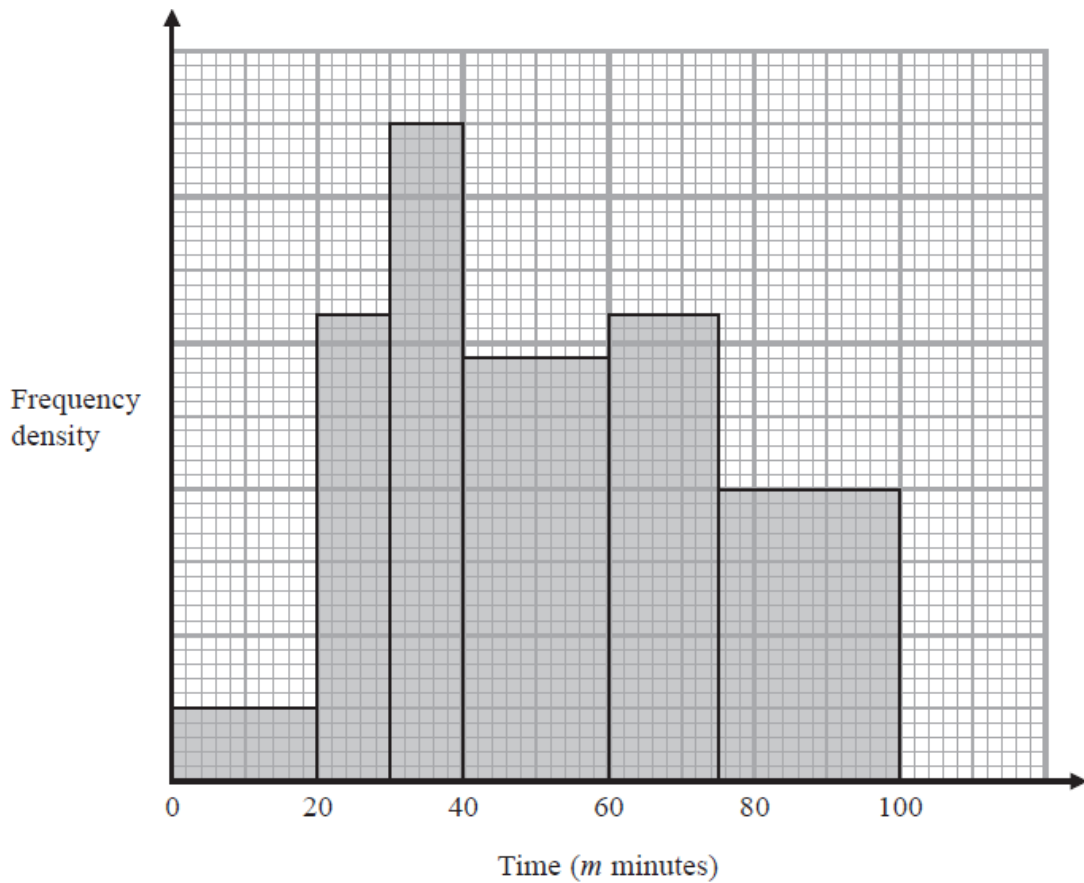
The curved surface area of the cone is 580π cm^2

The volume of the solid is $k\pi$ cm^3

Work out the exact value of k

$k =$ ....

(Total for Question 17 is 5 marks)

18 The histogram shows information about the total time, m minutes, taken by each child in a school to walk to school every day for one week.

There are no children for whom $m > 100$
There are 10 children for whom $m \le 20$

Work out an estimate for the number of children for whom $50 < m \le 80$

....

(Total for Question 18 is 3 marks)

19 Two circles, C_1 and C_2, are drawn on a centimetre grid, with a scale of 1 cm for 1 unit on each axis.

The centre of circle C_1 is at the point with coordinates (–1, 3) and the radius of C_1 is 13 cm.

The centre of circle C_2 is at the point with coordinates (7, 18) and the radius of C_2 is 6 cm.

(*a*) Work out the distance between the centre of C_1 and the centre of C_2

.... cm

(3)

(*b*) Explain why circle C_1 intersects circle C_2

....

....

(1)

(Total for Question 19 is 4 marks)

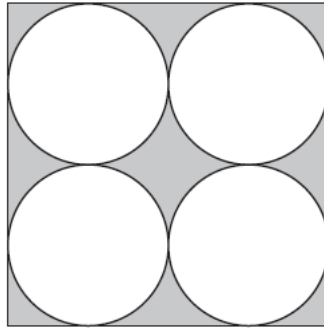20 The diagram shows four identical circles drawn inside a square.

Diagram **NOT** accurately drawn

Each circle touches two other circles and two sides of the square.

The region inside the square that is outside the circles, shown shaded in the diagram, has a total area of 40 cm^2

Work out the perimeter of the square.
Give your answer correct to 3 significant figures.

.... cm

(Total for Question 20 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS

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