GCSE Mathematics Practice Tests: Set 8

Paper 2F (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
- 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 questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Write 0.63 as a fraction.

Converting FDP

$$= \frac{63}{100}$$

$$\frac{63}{100}$$
....

(Total for Question 1 is 1 mark)

2 Write 46 821 correct to the nearest 100.

Rounding

2 rounds down = 46 800

46800
....

(Total for Question 2 is 1 mark)

3 Write 73.654 correct to 1 decimal place.

Rounding

5 rounds up. = 73.7

73.7
....

(Total for Question 3 is 1 mark)

4 Write 0.09 as a percentage.

Converting FDP

$$= \frac{9}{100} = 9\%$$

9
....%

(Total for Question 1 is 1 mark)

5   Write $7 \times 7 \times 7 \times 7 \times 7$ as a power of 7.

$$7^5$$

....

(Total for Question 5 is 1 mark)

6   Show that 64 is both a square number and a cube number.   *Types of Number*

$$8^2 = 8 \times 8 = 64 \qquad \text{or} \ \sqrt{64} = 8$$

$$4^3 = 4 \times 4 \times 4 = 64 \qquad \text{or} \ \sqrt[3]{64} = 4$$

(Total for Question 1 is 2 marks)

7   Find the value of 11^3 *Calculator Skills*

....

(Total for Question 7 is 1 mark)

                                                        Calculator Skills

8   Find the value of $\sqrt{98.01}$

....

(Total for Question 8 is 1 mark)

9 3 kg of potatoes and 2 kg of apples cost a total of £7.33.
4 kg of potatoes cost £3.80.

Work out the cost of 1 kg of apples.

(÷4) 4kg potatoes = £3.80
      1kg potatoes = £0.95

      3kg potatoes + 2kg apples = £7.33
      3 × £0.95   + 2kg apples = £7.33
      £2.85   + 2kg apples = £7.33

(−2.85)   2kg apples = £4.48
(÷2)   1kg apples = £2.24

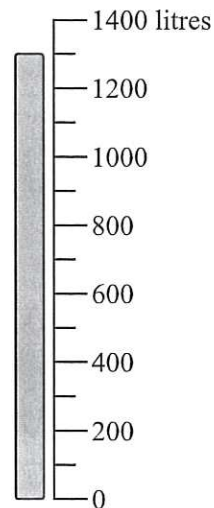£.................................

(Total for Question 9 is 4 marks)

10   Joseph buys some heating oil.
      He puts it in his oil tank.

      The scales show the numbers of litres of oil in the tank immediately before and
      immediately after Joseph puts the oil in the tank.
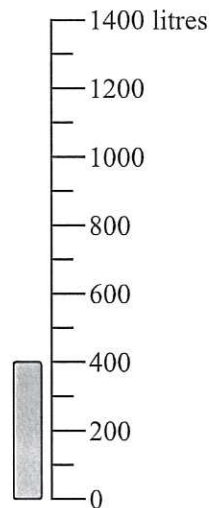
      before   **after**

      The oil Joseph buys costs 0.40 euros per litre.

      Work out the total cost of the oil that Joseph buys.

      Oil bought: | 1300L − 400L = 900L

      1L = €0.40 | (×900)   900L = €360

                                                      360
      .... euros

      (Total for Question 10 is 3 marks)

Calculator Skills

11 (*a*) Work out the value of $\dfrac{10.4}{5.1-2.7}+\dfrac{6.8-3.2}{9.5}$

Give your answer as a decimal.
Write down all the figures on your calculator display.

4.712280702

(2)

(*b*) Give your answer to part (*a*) correct to 3 significant figures.
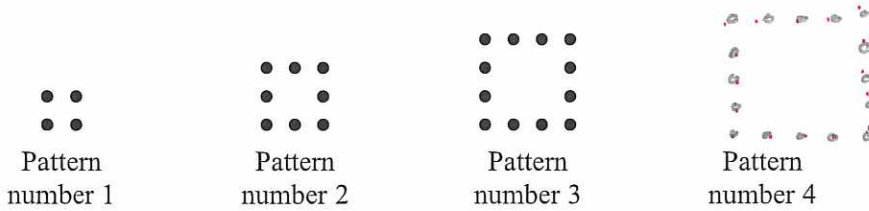
Rounding

4.71|2280702

2 rounds down ... = 4.71

4.71

(1)

(Total for Question 11 is 3 marks)

12 Here is a sequence of patterns made from dots.

| Pattern number 1 | Pattern number 2 | Pattern number 3 | Pattern number 4 |

(a) Draw Pattern number 4 in the space above.

(1)

(b) Complete the table.

Pattern number	1	2	3	4	5
Number of dots	4	8	12	16	20

+4 +4 +4 +4

(1)

(c) Work out the number of dots in Pattern number 13.

Pattern	5	6	7	8	9	10	11	12	13
Dots	20	24	28	32	36	40	44	48	52

....................52....................

(2)

(d) Find an expression, in terms of n, for the number of dots in Pattern number n.

⓪ ⇐ 4 8 12 16 20
-4   +4 +4 +4 +4

$4n + 0 = 4n$

....
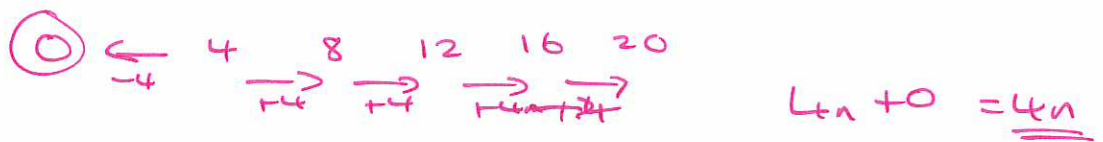
(1)

There are fewer than 90 dots in Pattern number k.

Forming and Solving Inequalities

(e) What is the largest possible value of k?

Sequence < 90

(÷4)

$4n < 90$

$n < 22.5$

$\therefore n = 22 \ (max)$

....................22....................

(2)

(Total for Question 12 is 7 marks)

13 The table shows information about the weights, in kg, of 40 parcels.

Weight of parcel (p kg)	Frequency	midpoint	f×m
$0 < p \leqslant 1$	19	0.5	9.5
$1 < p \leqslant 2$	12	1.5	18
$2 < p \leqslant 3$	5	2.5	12.5
$3 < p \leqslant 4$	2	3.5	7
$4 < p \leqslant 5$	2	4.5	9
TOTALS	40		56

(*a*) Write down the modal class.

most frequent : $0 < p \leqslant 1$

........................$0 < p \leqslant 1$........................
(**1**)

(*b*) Work out an estimate for the mean weight of the parcels.

$$mean = \frac{Total\,(f×m)}{Total\,(f)} = \frac{56}{40} = 1.4$$

1.4

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

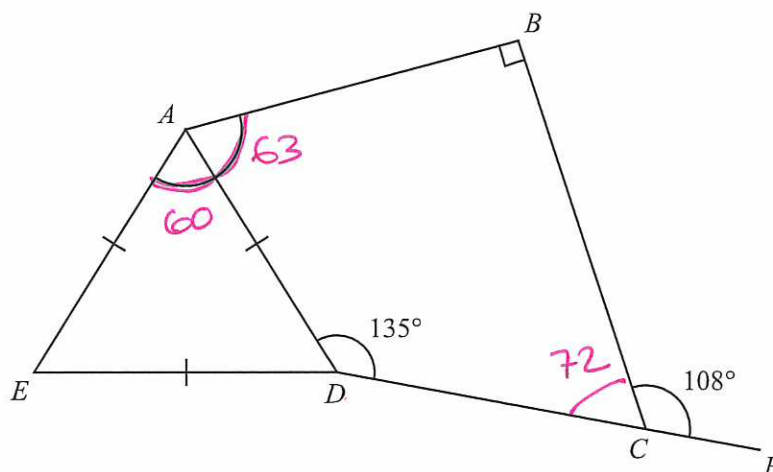(**Total for Question 13 is 5 marks**)

14

Diagram **NOT**
accurately drawn

ABCD is a quadrilateral.
ADE is an equilateral triangle.
DCF is a straight line.

Work out the size of angle *EAB*.
Give a reason for each stage of your working.

$D\hat{C}B = 180° - 108° = 72°$ Angles on a straight line = 180°

$D\hat{A}B = 360° - 135° - 72° - 90°$ Angles in a quadrilateral = 360°
$\qquad = 63°$
$D\hat{A}E = 60°$ Equilateral triangle

$B\hat{A}E = 60° + 63° = 123°$

123 °

(Total for Question 14 is 5 marks)

OR Probability

15 Last Thursday, 135 students each bought one item of fruit.
The table shows information about the 135 items of fruit they bought.

Fruit	apple	pear	orange	banana	peach
Number of students	36	15	27	33	24

One of the 135 students is chosen at random.

(*a*) Find the probability that this student bought an apple or a banana.

$$P(\text{apple or banana}) = P(\text{apple}) + P(\text{banana})$$
$$= \frac{36}{135} + \frac{33}{135} = \frac{69}{135}$$

(2)

A pie chart is drawn for the information in the table.

Pie Charts

(*b*) Work out the size of the angle in the pie chart for oranges.

Oranges = 27 frequency   (÷135)

135 frequency = 360°
1 frequency = 2.6̇°
(×27)   27 frequency = 72°

72°

(2)

(Total for Question 15 is 4 marks)

Substitution

16 (*a*) Find the value of $25 - 4g$ when $g = -3$

USE YOUR CALCULATOR | $25 - 4(-3) = 37$

.... 37
(2)

(*b*) Expand and simplify $x(2x + 1) + 3(x - 2) + 7$

Exponding and simplifying

Expand | $2x^2 + 2x + 3x - 6 + 7$

collect | $2x^2 + 4x + 1$

.... $2x^2 + 4x + 1$
(3)

(Total for Question 16 is 5 marks)

Volume Problem

17
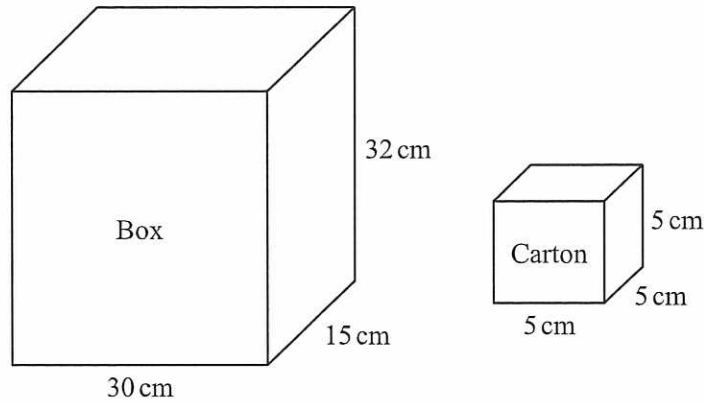
Diagram **NOT** accurately drawn

A wooden box measures 30 cm by 15 cm by 32 cm.
The box has a lid.

A carton measures 5 cm by 5 cm by 5 cm.

James has 110 cartons.
He wants to put all these cartons in the box and be able to shut the lid.

Can James put all 110 cartons in the box and shut the lid?
Show your working clearly.

Box Volume! $30cm \times 15cm \times 32cm = 14400 cm^2$

No! simply look at how many boxes will fit per dimension!

Box Width = 30cm

Box Length = 32cm

Box Depth = 15cm

Total cartons

Conclusion

Carton box width = 5cm : $30 \div 5 = 6$ widthways

Carton box length = 5cm : $32 \div 5 = 6.4 \therefore$ <u>fit 6</u> lengthways

Carton box depth = 5cm : $15 \div 5 = 3$ deepways

$6 \times 6 \times 3 = 108$ cartons

No. can only fit 108 cartons.

(Total for Question 17 is 3 marks)

Sharing Ratio

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1. Work out the difference between the largest share and the smallest share when 3450 yen *Calculator Paper!* is divided in the ratios 2 : 6 : 7

$2 : 6 : 7$ $2 + 6 + 7 = 15$ parts

               $3450y = 15$ parts

$(\div 15)$ $230y = 1$ part

$2 : 6 : 7$ $460 : 1380 : 1610$
$(\times 230)$

Difference $1610 - 460 = 1150y$

$$\begin{array}{r} 0230 \\ 15\overline{)3450} \end{array}$$

$$\begin{array}{r} 230 \\ \times\; 6 \\ \hline 1380 \end{array} \qquad \begin{array}{r} 230 \\ \times\; 7 \\ \hline 1610 \end{array}$$

.... 1150 .... yen

(Total for Question 1 is 3 marks)

2. Gopal is paid £20 000 each month.   *Percentage Increase*
   Jamuna is paid £19 200 each month.

   Gopal and Jamuna are both given an increase in their monthly pay.
   After the increase, they are both paid the same amount each month.

   Gopal was given an increase of 8%

   Work out the percentage increase that Jamuna was given.

Gopal end   £20000 × 1·08 = £21600

Start × multiplier^t = End   £19200 × multiplier = £21600

$(\div 19200)$ multiplier $= \dfrac{21600}{19200}$

            $1 + x\% = 1·125$

multiplier $= 1 + x\%$ $x\% = 0·125$

(-1) .... 12·5 .... %

$(\times 100)$ $x = 12·5$

(Total for Question 2 is 4 marks)

3 There are some people in a cinema.

$\frac{3}{5}$ of the people in the cinema are children.

For the children in the cinema,

    number of girls : number of boys = 2 : 7

There are 170 girls in the cinema.

Work out the number of adults in the cinema.

Cinema G : B   2 : 7

170 : ?

$170 \div 2 = 85$

Boys in cinema $7 \times 85 = 595$

Kids
in cinema $170 + 595 = 765$

$\frac{3}{5}$ in cinema $\frac{3}{5}$ of total $= 765$

$(\div 3)$ $\frac{1}{5}$ of total $= 255$

Adults in cinema
$= \frac{2}{5}$ of total $\frac{2}{5}$ of total $= 510$

510

(Total for Question 3 is 5 marks)

4   The diagram shows two cylinders, **A** and **B**.
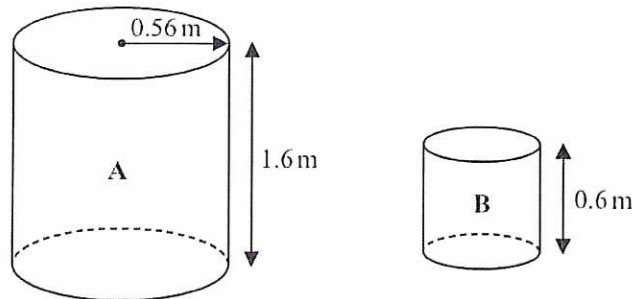

0.56 m

A

1.6 m

B   0.6 m

Diagram **NOT**
accurately drawn

Cylinder **A** has height 1.6 m and radius 0.56 m.

(*a*) Work out the curved surface area of cylinder **A**.
Give your answer in m² correct to 3 significant figures.

curved area $= 2\pi rh$

$= 2\pi (0.56)(1.6)$

$= 5.63$ m² (3 s.f)

.... m²
5.63

(2)

Cylinder **B** is mathematically similar to cylinder **A**.
The height of cylinder **B** is 0.6 m.

LSF   ASF   VSF
(similar shapes)

(*b*) Work out the radius of cylinder **B**.

Length Scale factor
(Big to Small)

$1.6 \div 0.6 = \frac{8}{3}$ bigger

$0.56 \div \frac{8}{3} = 0.21$ m

.... m
0.21

(2)

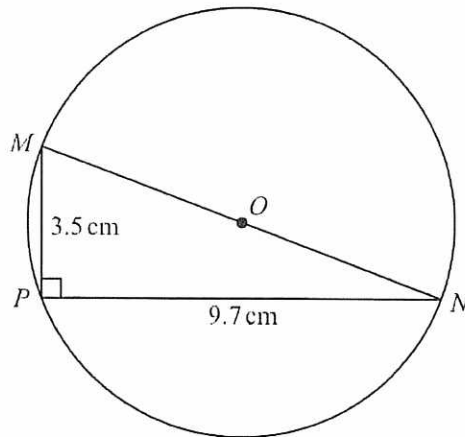**(Total for Question 4 is 4 marks)**

5

Diagram **NOT** accurately drawn

M, *N* and *P* are points on a circle, centre *O*.
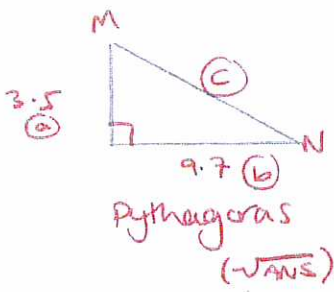*MON* is a diameter of the circle.

MP = 3.5 cm
PN = 9.7 cm

Angle *MPN* = 90°

Work out the circumference of the circle.
Give your answer correct to 3 significant figures.

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

$3.5^2 + 9.7^2 = MN^2$

$106.34 = MN^2$

$10.312... = MN = diameter = d$

Pythagoras
$(\sqrt{ANS})$

$C = \pi d$

$C = \pi (10.312...)$

$C = 32.4 cm \ (3S.f)$

...................**32.4**.......... cm

(Total for Question 5 is 4 marks)

6

Diagram **NOT** accurately drawn

52°

x cm   H

12.6 cm
A

O
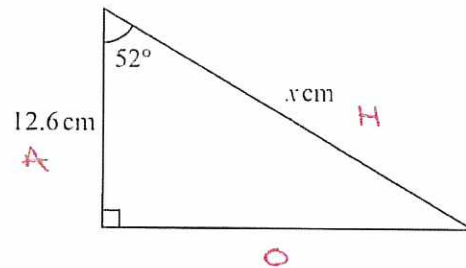
Work out the value of x.
Give your answer correct to 3 significant figures.

SOHCAHTOA

$$\cos \theta = \frac{A}{H}$$

$$\cos 52 = \frac{12.6}{x}$$

$(\times x)$ $x \cos(52) = 12.6$

$(\div (\cos(52)))$ $x \quad = \dfrac{12.6}{\cos(52)}$

$x \quad = 20.5 \,(3 s.f)$

$x =$..

(Total for Question 6 is 3 marks)

7   Solve the simultaneous equations

$$x + y = 15 \quad ①$$
$$7x - 5y = 3 \quad ②$$

Show clear algebraic working.

① × 7 : $7x + 7y = 105$ ③   ⊖   Same Take Opposite Plus

$7x - 5y = 3$ ②

$12y = 102$

(÷12) $y = \frac{17}{2}$

$y = \frac{17}{2}$ in ① $x + y = 15$

$x + \frac{17}{2} = 15$

$\left(-\frac{17}{2}\right)$ $x \qquad = \frac{13}{2}$

$x =$ .... $17/2$ ....

$y =$ .... $13/2$ ....

$\left(\frac{13}{2}, \frac{17}{2}\right)$

(Total for Question 7 is 3 marks)

25 Tenzin walks in the mountains.
She has a rule to estimate the temperature at different heights on a mountain.

> Temperature decreases by 2 °C for every increase of 300 metres in height.

The temperature at a height of 800 metres on a mountain is 6 °C.

(*a*) Use Tenzin's rule to work out an estimate of the temperature at a height of
2000 metres on the mountain.

Height gained | 2000m - 800 m = 1200m

Degrees dropped | 1200 ÷ 300m = 4 sets of 2°C = 8°C fall

New temperature | 6°C - 8°C = -2°C

.... **-2** °C

(3)

Tenzin also has a rule to estimate the time it will take her to complete a walk in the
mountains.

She uses

    an average speed of 5 km / h for the distance she will walk

and then

    adds on 1 minute for every increase of 10 metres in height.

Speed Distance Time

$\frac{D}{S \mid T}$

Tenzin plans to walk 12 km in the mountains with an increase of 800 metres in height.

(*b*) Use Tenzin's rule to work out an estimate for the time it will take her to complete
this walk.
Give your answer in hours and minutes.

Distance = 12km

Speed = 5km/h

Time = ?

$T = \frac{D}{S} = \frac{12km}{5km/h}$

= 2.4 hours

1 minute per 10m height | 1min : 10m height   (÷80)

(×80) ↓ 80min : 800m height

.... hours .... minutes

(3)

(Total for Question 25 is 6 marks)

Total Time | 2.4 hours + 80mins   **TOTAL FOR PAPER IS 80 MARKS**

0.4 hours = 0.4×60=24 min | = 2hours 24mins + 1hour 20mins

80mins = 1hour 20 | = 3hours 44mins