MS REY

GCSE Mathematics

Practice Tests: Set 8

Paper 3F (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 the number 72.163 correct to 1 decimal place.

Rounding

6 rounds up
= 72.2

..............................72.2..............................

(Total for Question 1 is 1 mark)

2   Write down two multiples of 18.

Types of Number

18,36,54,72 etc.

..............18.............. and ....36..............

(Total for Question 2 is 1 mark)

3   Write 0.7 as a percentage.

FDP Conversions

$$= \frac{7}{10} = \frac{70}{100}$$

..............................70..............................%

(Total for Question 3 is 1 mark)

4   Write brackets in this calculation so that the answer is correct.

BODMAS

$$25 + 3 \times (7 - 2) = 40$$

= 25 + 3 × 5
= 25 + 15   = 40 ✓

(Total for Question 4 is 1 mark)

Types of Number
Ordering Integers

5   Here is a list of numbers.
odd

       (9235)   9842   6386   *odd* (8607)   *odd* (9417)

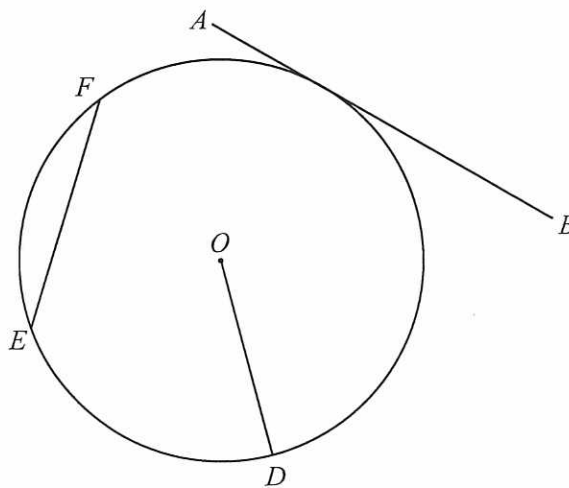Write down the smallest odd number in the list.

                                          8607

(Total for Question 5 is 1 mark)

6   *Circle Properties*

The diagram shows a circle, centre O.
D, E and F are points on the circle.
The line AB touches the circle.

Write down the mathematical name for the line

(i) AB

                                    Tangent

(ii) OD

                                    Radius

(iii) EF

                                    Chord

(Total for Question 6 is 3 marks)

7 Maria asks the students in her class how many brothers they each have.
Here are her results.

2   1   3   4   1   0   0   2   3   1

2   2   3   1   1   0   2   4   1   1

(a) Complete the frequency table for her results.

Number of brothers	Tally	Frequency
0	I I I	3
1	~~IIII~~ I I	7
2	~~IIII~~	5
3	I I I	3
4	I I	2

(2)

(b) Write down the modal number of brothers.

most frequent

.... 7

(1)

(c) Write down the fraction of these students who have no brothers.

"3 out of 20" = $\frac{3}{20}$

.... $\frac{3}{20}$

(1)

(Total for Question 7 is 4 marks)

8 The table shows the lowest temperature on one day in December for each of six cities.

City	Temperature in °C
Athens	9
Barcelona	6
Bucharest	−3
Kazan	−12
Kiev	−5
Moscow	−9

(*a*) Which of these cities had the lowest temperature?

........................*Kazan*........................

(1)

(*b*) Work out the difference between the lowest temperature in Barcelona and the lowest temperature in Moscow.

$6 - -9 = 15$
↑ (+) ↑
Barcelona *Moscow*

........................*15*........................°C

(1)

In Podgorica, the lowest temperature was 14 °C higher than the lowest temperature in Bucharest.

(*c*) Work out the lowest temperature in Podgorica.

$-3 + 14 = 11$
↑
Bucharest

........................*11*........................°C

(1)

(Total for Question 8 is 3 marks)

9 Ahmed buys a rake and some packets of seeds.

The rake costs £19.50.
Each packet of seeds costs £1.99.

Ahmed pays with two £20 notes and receives £8.56 change.

Work out the number of packets of seeds Ahmed buys.

Total spent | £20 × 2 − £8.56 = £31.44

Total spent − Rake = seeds | £31.44 − £19.50 = £11.94

How many seed packets | £11.94 ÷ £1.99 = **6**

6

....

(Total for Question 9 is 4 marks)

10 A box contains 3 red bricks, 2 yellow bricks and 7 orange bricks. Total = 12
There are no other bricks in the box.

$$\begin{array}{c} \frac{1}{2} \\ 0 \qquad\qquad\qquad\qquad\qquad\qquad 1 \end{array}$$

A B C D E F
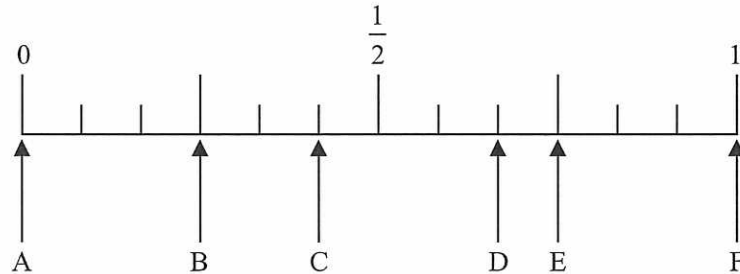
Edward is going to take at random a brick from the box.

Write down the letter of the arrow that points to the probability that he takes

(i) a red brick,

$P(Red) = $ "3 out of 12" $= \frac{1}{4} = \underline{\underline{B}}$

.... **B**

(ii) a yellow brick or an orange brick,

$P(\text{yellow or orange}) = P(\text{yellow}) + P(\text{orange})$
$= \frac{2}{12} + \frac{7}{12} = \frac{9}{12} = \frac{3}{4} = \underline{\underline{E}}$ .... **E**

(iii) a brick that is **not** blue, ←

$P(A) = 1 - P(\cancel{A})$ | $P(NOT\ blue) = 1 - P(blue)$ No this isn't a typo.
Blue = Impossible ∴ P(blue) = 0
$= 1 - 0$
$= \underline{\underline{F}}$ .... **F** .... ∴ P(NOT BLUE) = 1

(iv) a green brick.

Impossible! P(Green) = 0.

.... **A**

(Total for Question 10 is 4 marks)

THIS QUESTION IS IMPOSSIBLE WITHOUT MORE INFO!

11 Tim caught a plane to New York from Boston.
The plane left at 6 55 pm.

(*a*) Work out how many minutes it was from the time when Tim arrived at the airport to
the time when the plane left.

....minutes

(1)

The plane left Boston at 6 55 pm.
The plane took 1 hour 24 minutes to reach New York.

Time Calculations

(*b*) What was the time in Boston when the plane reached New York?

1 hour   6:55 + 1 hour = 7:55 pm

5 mins   7:55 + 5 mins = 8:00 pm

19 mins   8:00 + 19 mins = 8:19 pm

....8:19 pm

(1)

(Total for Question 11 is 2 marks)

12 Pauline throws a biased dice 240 times.
The table gives information about her results.

Score	Frequency
1	90
2	30
3	18
4	48
5	16
6	38

240 frequency = 360°
(÷240) 1 frequency = 1.5°
(×38) 38 frequency = 57°

Pauline is going to draw a pie chart for her results.

(*a*) Work out the angle in the pie chart for a score of 6.

6 score = 38 frequency

.... 57 °

(2)

Donna spins a biased 5-sided spinner a number of times.
He draws a pie chart for his results.

The table gives the angle in the pie chart for each number the spinner lands on.

Number on spinner	Angle in pie chart
1	60°
2	80°
3	100°
4	70°
5	50°

The spinner lands on 3 a total of 250 times.

(*b*) Work out the total number of times Donna spins the spinner.

(÷100) | 250 frequency = 100°
2.5 frequency = 1°
(×360) | 900 frequency = 360°

.... 900

(2)

(Total for Question 12 is 4 marks)

Simplifying Algebraic Expressions

13 (a) Simplify $t + t + t$

1 lot + 1 lot + 1 lot = 3 lots
= 3t

.... 3t ....
(1)

(b) Simplify $3p \times 5q$

$= 3 \times p \times 5 \times q$
$= 15 \times p \times q$
$= 15pq$

.... 15pq ....
(1)

(c) Expand $4(y - 5)$

Expanding Brackets

$4 \times y = 4y$
$4 \times -5 = -20$

$4y - 20$

.... 4y − 20 ....
(1)

(d) Solve $\dfrac{8x}{5} = 9.2$

Linear Equations

$\dfrac{8x}{5} = 9.2$

$(\times 5) \quad 8x = 46$

$(\div 8) \quad x = \dfrac{46}{8} = 5.75$

$x =$ .... 5.75 ....
(2)

(Total for Question 13 is 5 marks)

14 Here is a trapezium.

Area of Trapezium

22 cm a

Diagram **NOT**
accurately drawn

12 cm h

25 cm b
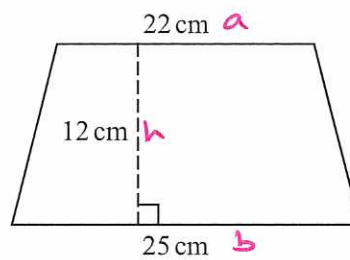
Work out the area of the trapezium.

$A = \dfrac{h(a+b)}{2}$

$A = \dfrac{12(22+25)}{2}$

$A = 282 \text{ cm}^2$

.... 282 ....cm²

(Total for Question 14 is 2 marks)

15 Jiang left her home at 1 pm to cycle to a bicycle shop.
Here is the travel graph for Jiang's journey to the bicycle shop.
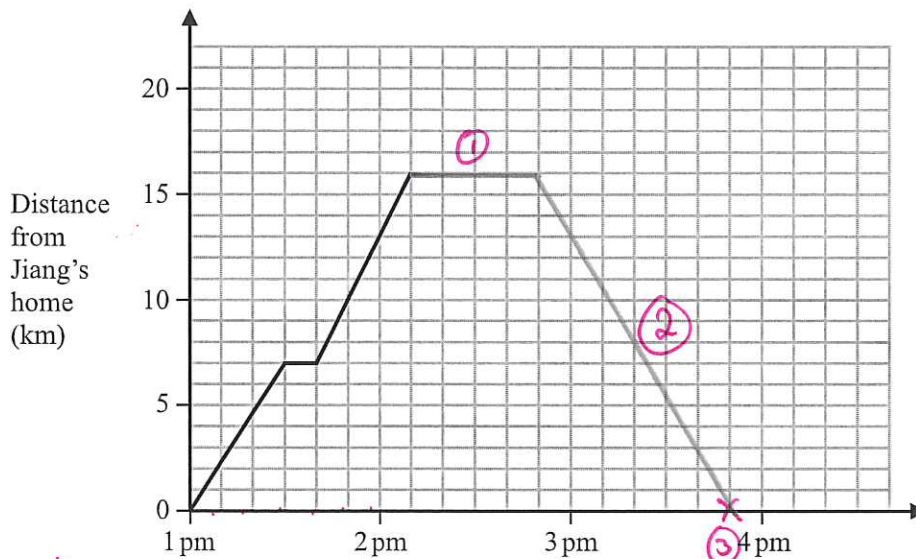
6 boxes = 1 hour = 60 mins Time
(÷6) *1 box = 10 mins*

Jiang stopped on the way to the bicycle shop for a rest.

(a) For how long did she stop for a rest?

↓
O distance

1 box = 10 mins ....minutes

(1)

(b) Work out Jiang's average speed, in kilometres per hour, for that part of her journey
from her home to when she stopped for a rest.

first part of journey...

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

$S = ?$ $D = 7km$ $T = \frac{1}{2}$ hour

$S = \frac{7km}{\frac{1}{2} hour} = 14 km/h$

....kilometres per hour

(2)

Jiang spent 40 minutes at the bicycle shop. → *4 boxes, 0 distance added* ①
She then cycled home at a constant speed. → *Straight line, same gradient* ②
She got to her home at 3 50 p.m. → *Stops at 3:50 pm* ③

(c) Show all this information on the graph.

(2)

(Total for Question 15 is 5 marks)

16

1 euro = 1.25 Japanese Yen
1 Canadian dollar = 0.72 euros

Natsuko has 360 Japanese Yen.
Zoe has 425 Canadian dollars.

Natsuko and Zoe each change their money into euros.

Zoe gets more euros than Natsuko.
How many more?

Both to €

Swap Names! oops!

Zoe

Natsuko

$€1 = 1.25 Y$

×288 ↓   ↓ ×288 $(360 ÷ 1.25 = 288)$

$= €288 = 360 Y$

$\$1 = €0.72$

↓ ×425

$\$425 = €306$

Difference $= €306 - €288$

$= €18$

....18...........euros

(Total for Question 16 is 3 marks)

17 Aaron is going to buy a laptop.

The laptop costs 39 000 rupees.

Aaron already has $\frac{1}{3}$ of the cost of the laptop.

He needs to save for the rest of the cost.

Aaron has a Saturday job.
Each Saturday his pay is 5300 rupees.
He is going to save 55% of his pay.

Work out the number of Saturdays Aaron must work until he has saved the rest of the cost of the laptop.

Has : $\frac{1}{3}$ off $39000 \times \frac{1}{3} = 13000$

Must Save : $39000 - 13000 = 26000$ Rupees left to save.

Amount saved per Saturday 55% of $5300 = 0.55 \times 5300 = 2915$

Saturdays needed $\frac{26000}{2915} = 8.919...$

Conclusion $\therefore$ Must work **9** saturdays!

9
....

(Total for Question 17 is 5 marks)

Averages and Range

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1   Three numbers have

   a mean of 17
   a median of 20
   a range of 27.

   Suppose the numbers are $x \quad y \quad z$

   Find the three numbers.

   mean = 17 $\quad \dfrac{x + y + z}{3} = 17 \qquad \therefore x + y + z = 51$

   medium = 20 $\qquad y = 20 \implies \therefore x + 20 + z = 51$

   $\qquad\qquad\qquad\qquad\qquad\qquad x + z \quad = 31$

   range = 27 $\qquad \therefore x = 2, \ z = 29$

   ....2........ , ...20........ , ...29........
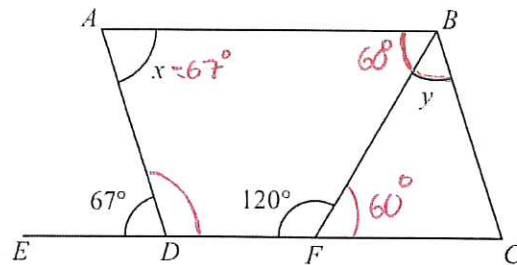
   (Total for Question 1 is 3 marks)

2

Diagram **NOT** accurately drawn

ABCD is a parallelogram.
EDFC is a straight line.

(*a*) (i) Write down the size of angle *x*.

.... 67 ...°

(ii) Give a reason for your answer.

.... Alternate angles on parallel lines equal. ....

(2)

(*b*) Work out the size of angle *y*.

ABCD is a
Parallelogram

Alternate angles

$A\hat{B}C + B\hat{A}D = 180°$ (co-interior)

$C\hat{F}B = 180° - 120° = 60° = A\hat{B}F$

$67° + 60° + y° = 180°$

$127 + y° = 180°$

$y° = 53°$

.... 53 ...°

(2)

(Total for Question 2 is 4 marks)

3 The table gives information about the number of trees in each of 20 gardens.

Number of trees	C.F	Frequency		Total Trees
0	2	2		0
1	9	7		7
2	12	3		6
3	16	4		12
4	19	3		12
5	20	1		5

(a) Work out the total number of trees in these gardens.   TOTAL!   42

.... 42

(2)

(b) Find the median number of trees in these gardens.

median = 10th term

.... 2

(1)

0 0 1 1 1 1 1 1 1 2 2 2

median = 2

(Total for Question 3 is 3 marks)

4 Charlotte earns £8.50 per hour.
She gets a pay rise of 6%

Percentage Increase

Work out how much Charlotte earns per hour after her pay rise.

$$100\% = £8.50$$
$$(\div 100) \quad 1\% = £0.085$$
$$(\times 6) \quad 6\% = £0.51$$
$$£8.50 + £0.51 = £9.01$$

£...

(Total for Question 4 is 3 marks)

Transformations: Enlargements

$\binom{2}{1}$ SF 3 $3\binom{2}{1} = \binom{6}{3}$

5
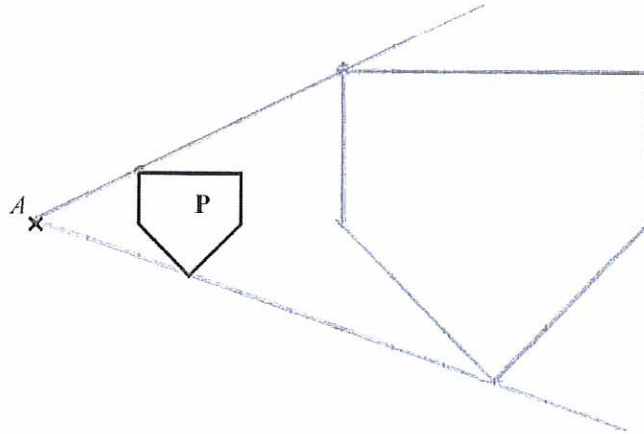
(a) On the grid, enlarge shape **P** with scale factor 3 and centre *A*.

(2)
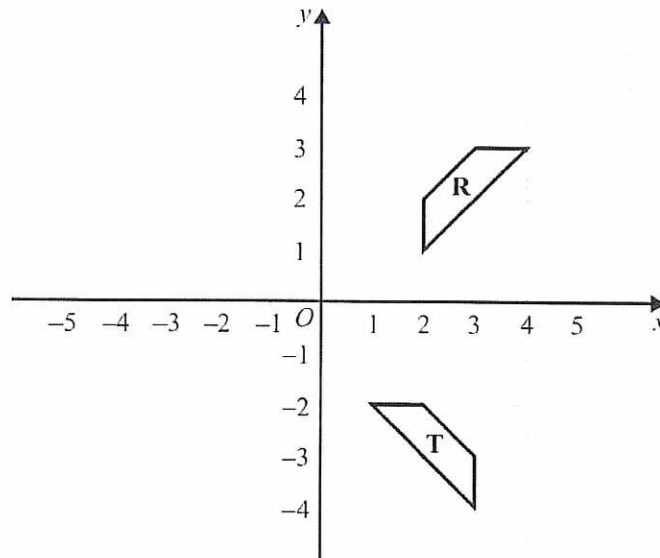
(b) Describe fully the single transformation that maps shape **R** onto shape **T**.

Rotation 90° clockwise   centre (0, 0)

....

(3)

(Total for Question 5 is 5 marks)

8   A, B and C are three cities.

North   North

43 km

A ⌐   C
   θ

70 km

                      B
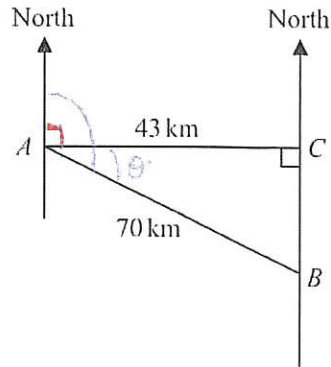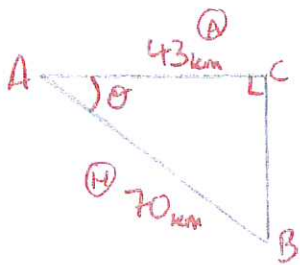
Diagram **NOT**
accurately drawn

City C is due east of city A and due north of city B.
City A is 43 km from city C and 70 km from city B.

Work out the bearing of city B from city A.
Give your answer correct to the nearest degree.

43km
A   )θ   C

70km

B

"shift cos"

Bearing of B from A

SOHCAHTOA

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

$\cos\theta = \frac{43}{70}$

$\theta = 52.0996...$

$\theta = 52$ (nearest degree)

$= 90 + \theta = 142°$

.... 142 °

(Total for Question 8 is 4 marks)

24 (a) Simplify $m^7 \times m^4$

$$a^m \times a^n = a^{m+n} \quad | \quad m^7 \times m^4 = \underline{\underline{m^{11}}}$$

.... M^{11}
(1)

(b) Simplify $(3a^2b^4)^3$

$$(3a^2b^4)^3 = 3a^2b^4 \times 3a^2b^4 \times 3a^2b^4$$
$$= 27a^6b^{12}$$

$27a^6b^{12}$
....
(2)

Expanding and Simplifying

(c) Expand and simplify $4(g - 2h) + 5(2g - 3h)$

Expand $\quad | \quad 4g - 8h + 10g - 15h$

Collect $\quad | \quad 14g - 23h$

$14g - 23h$
....
(2)

(d) Expand and simplify $(y - 7)(y + 5)$

Expanding Double Brackets

Expand $\quad | \quad = y^2 + 5y - 7y - 35$

Collect $\quad | \quad = y^2 - 2y - 35$

$y^2 - 2y - 35$
....
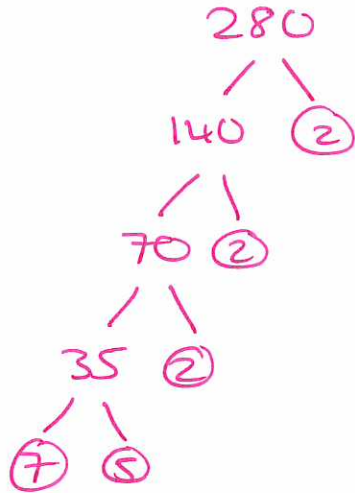**(2)**

(Total for Question 24 is 7 marks)

Product of Primes

25 Write 280 as a product of its prime factors.
Show your working clearly.

$$280$$

140   ②

70   ②

35   ②

⑦   ⑤

$$280 = 2 \times 2 \times 2 \times 5 \times 7$$

$$= 2^3 \times 5 \times 7$$

(Total for Question 25 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS