AQA

MODEL SOLUTIONS

Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

GCSE MATHEMATICS

F

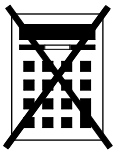
Foundation Tier Paper 1 Non-Calculator

Tuesday 6 November 2018 Morning Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:
- mathematical instruments

You must **not** use a calculator.



Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- You may ask for graph paper, tracing paper and more answer paper. These must be tagged securely to this answer book.

Advice

In all calculations, show clearly how you work out your answer.

For Examiner's Use	
Pages	Mark
2–3	
4–5	
6–7	
8–9	
10–11	
12–13	
14–15	
16–17	
18–19	
20–21	
22	
TOTAL	

N 0 V 1 8 8 3 0 0 1 F 0 1

IB/M/Nov18/E5

8300/1F

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Answer **all** questions in the spaces provided

1 Work out (–3) + (–8)

Circle your answer.

+ and – cancel to a –

–3 – 8 = –11

[1 mark]

–5 5 –11 11

2 What does the longest bar in a bar chart represent?

Circle your answer.

most = mode

[1 mark]

mean median mode range

3 Work out 1.1 – 0.15

Circle your answer.

[1 mark]

0.95 1.05 0.85 1.085

0 1 . 1 0
– 0 . 1 5
0 . 9 5

Do not write outside the box

4 On a circle, which of these is **always** longer than the diameter?

Circle your answer.

[1 mark]

chord (can be shorter) arc radius (half) circumference

5 Work out 83 × 26

[3 marks]

$$\begin{array}{r} 83 \\ \times\ 26 \\ \hline 498 \\ 1,660 \\ \hline 2158 \end{array} \quad \begin{array}{l} \\ \\ 83\times6 \\ 83\times20 \\ \\ \end{array}$$

Answer 2158

7

Do not write outside the box

6 The cost of 3 calendars is £18

Work out the cost of 5 calendars.

[2 marks]

÷3 (3 : £18) ÷3
1 : £6
×5 (5 :) ×5

Answer £ 30

7 A helicopter blade does 3206 full turns in 7 minutes.

Work out the number of full turns per minute.

[2 marks]

3206 ÷ 7 = turns in 1 minute.

0458
7 | 3206

Answer 458

Do not write outside the box

8 At a cinema, films are shown on Screen 1 and Screen 2

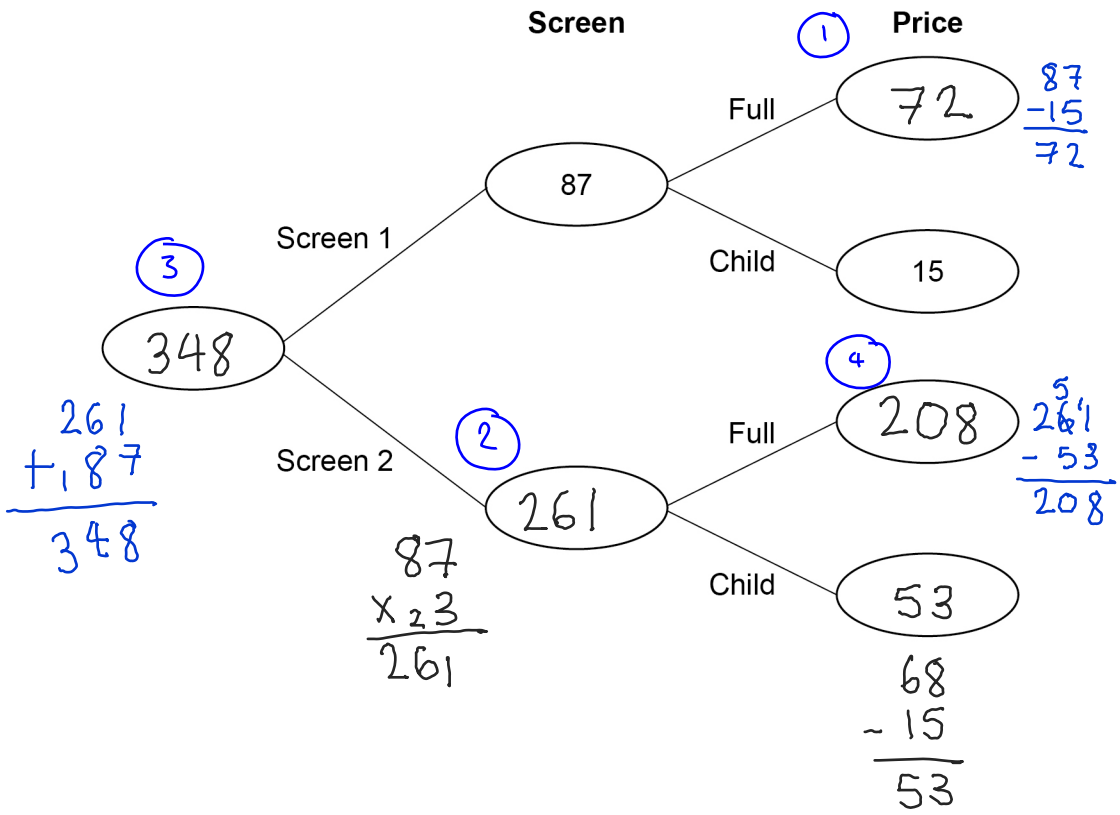
Customers pay full price or child price.

There are three times as many customers in Screen 2 as Screen 1

68 customers paid child price.

Complete the frequency tree.

[5 marks]



261 + 187 = 348

87 × 3 = 261

87 − 15 = 72

261 − 53 = 208

68 − 15 = 53

9

Turn over ►

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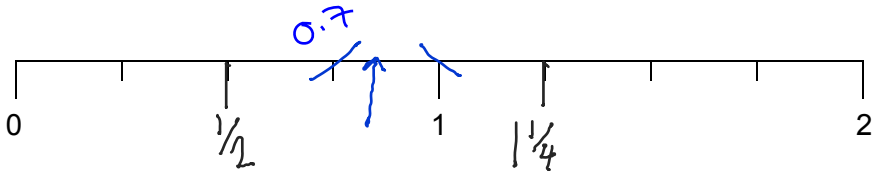
9 Work out the fraction that is halfway between $\frac{1}{2}$ and $1\frac{1}{4}$



[3 marks]

Half way between 0·75 and 1

$= 0·75 + 0·125$

Answer 0.875 or $\frac{7}{8}$

10 x is a positive integer.

$35 \div x$ is a positive integer.

Work out the **four** possible values of x.

[2 marks]

4 factors of 35: $1 \times 35 = 35$

$5 \times 7 = 35$

Answer 1 5 7 35

Do not write outside the box

11 A fair dice has six sides, numbered 1 to 6

After it is rolled, five of the numbers can be seen.

11 (a) Write down the probability that one of these five numbers is 2

[1 mark]

out of 6, 5

Answer 5/6

11 (b) Work out the **greatest** possible sum of the five numbers.

[2 marks]

Add the 5 biggest numbers:

2 + 3 + 4 + 5 + 6

5 9 14 20

Answer 20

Turn over for the next question

8

Do not write outside the box

12 Work out $\frac{2}{7} + \frac{6}{7}$ $= \frac{8}{7} = 1\frac{1}{7}$

Circle your answer.

[1 mark]

$1\frac{1}{7}$ $\frac{8}{14}$ $\frac{8}{49}$ $1\frac{5}{7}$

13 Work out $4 + (3 \times 5) - 1$

$= 4 + 15 - 1$
$= 19 - 1$

Circle your answer.

[1 mark]

16 18 28 34

14 The nth term of a sequence is $5n - 2$

Work out the 3rd term. $n = 3$

$5(3) - 2 = 15 - 2 = 13$

Circle your answer.

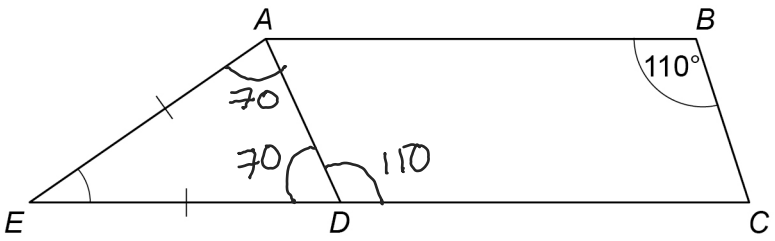
[1 mark]

51 5 123 13

Do not write outside the box

15 Trapezium *ABCE* is made from parallelogram *ABCD* and isosceles triangle *ADE*.

AE = *DE*



Not drawn accurately

Work out the size of angle *AED*. **[3 marks]**

$\angle ADC = 110°$ opposite angles in a parallelogram are equal

$\angle ADE = 180 - 110 = 70°$ a straight line is 180°

$\angle DAE = 70°$ pair of angles in an isosceles triangle are equal

$\angle AED = 180 - 70 - 70 = 40°$ sum of angles in a triangle is 180°

Answer 40 degrees

16 $a : b = 1 : 6$ ×3

$a : c = 3 : 1$

How many times bigger is b than c? **[2 marks]**

common factor

$a : b = 3 : 18$ $(1:6) \times 3$

$a : c = 3 : 1$

$a : b : c = 3 : 18 : 1$ $18 \div 1 = 18$

Answer 18

8

Do not write outside the box

17 (a) Laura wants to work out 3% of 1700

Her method is 1700×0.3

Is her method correct?

Tick a box.

☐ Yes ☑ No

Give a reason for your answer.

[1 mark]

3% = 0.03 not 0.3

3 ÷ 100 = 0.03

It should be $\times 0.03$

17 (b) Laura also wants to work out $\frac{30}{29}$ of 60

Her answer is 58

Is her answer correct?

Tick a box.

☐ Yes ☑ No

Give a reason for your answer.

[1 mark]

$\frac{30}{29}$ is bigger than 1 so her answer would need to be more than 60.

OR 60 is not divisible by 29 so the answer would be a decimal.

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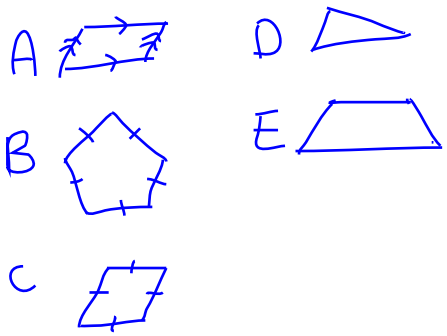
18 Here are five shapes, A to E.



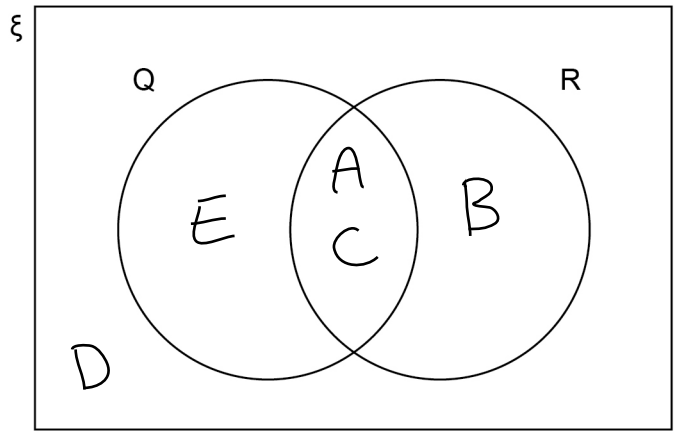
A	Parallelogram
B	Regular pentagon
C	Rhombus
D	Scalene triangle
E	Trapezium

In the Venn diagram,

ξ is the set of all shapes

Q is the set of quadrilaterals A, C, E have 4 sides

R is the set of shapes which **always** have rotational symmetry. A, C, B same when turned around a point



Complete the Venn diagram with the letters A to E.

[3 marks]

5

Turn over ►

Do not write outside the box

19 $a = 7$ and $b = 2$

Work out the value of $\frac{a}{b} - a^b$

[3 marks]

$\frac{7}{2} - 7^2$ Substitute values

$= 3.5 - 49$

$49^8.0$
$- 3.5$
45.5

Answer -45.5 or $-\frac{91}{2}$

20 Solve $3x - 8 = 19$

[2 marks]

$3x = 27$

$+8$

$\div 3$ $x = 9$ $\div 3$

$x =$ 9

Do not write outside the box

21 Here are five number cards.

17	12	23	15	16

Two of the five cards are picked at random.

Work out the probability that the total of the two numbers is **more than** 30

[3 marks]

	17	12	23	15	16
17	✓	29	40	32	33
12	29	✓	35	27	28
23	40	35	✓	38	39
15	32	27	38	✓	31
16	33	28	39	31	✓

Out of 20 possibilities, 14 are more than 30.

$\frac{14}{20} \overset{\times 5}{=} \frac{70}{100}$

Answer 70% or $\frac{7}{10}$ or 0.7

8

Do not write outside the box

22 (a) Complete the table of values for $y = x^2$

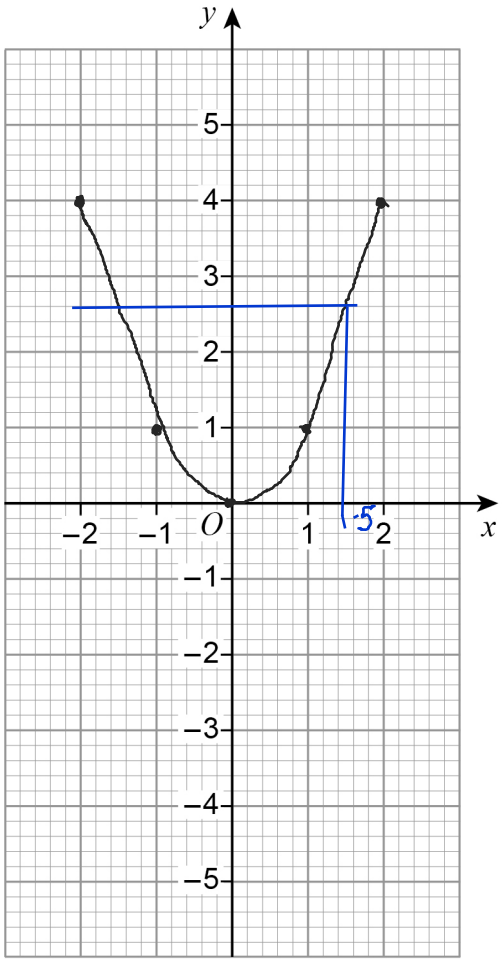
[1 mark]

x	–2	–1	0	1	2
y	4	1	0	1	4

-2^2 -1^2 0^2 1^2 2^2

22 (b) Draw the graph of $y = x^2$ for values of x from –2 to 2

[2 marks]



22 (c) Use your graph to estimate the value of $\sqrt{2.6}$

± 1.5 $y = 2.6$

[2 marks]

Answer 1.5 or −1.5

Do not write outside the box

23 Two consecutive whole numbers are n and $n + 1$

23 (a) Simplify $n - (n + 1)$

[1 mark]

$n - n - 1$

$= -1$

Answer -1

23 (b) Multiply out $n(n + 1)$

$n \times n = n^2$

$n \times 1 = n$

[1 mark]

Answer $n^2 + n$

23 (c) The two numbers are added.

Show that the answer must be an odd number.

[2 marks]

$n + n + 1 = 2n + 1$

$2n =$ even $\quad 1 =$ odd

even + odd = odd

9

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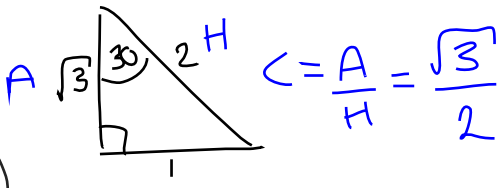
24 Circle the value of cos 30° **[1 mark]**



$\frac{1}{2}$ $\frac{\sqrt{3}}{2}$

25 Work out $8\frac{1}{2} \div 2\frac{2}{3}$

Give your answer as a mixed number.

[4 marks]

$8\frac{1}{2} = \frac{17}{2}$

$2\frac{2}{3} = \frac{8}{3}$

$\frac{17}{2} \div \frac{8}{3}$

$= \frac{17}{2} \times \frac{3}{8} = \frac{51}{16} = 3\frac{3}{16}$

Answer $3\frac{3}{16}$

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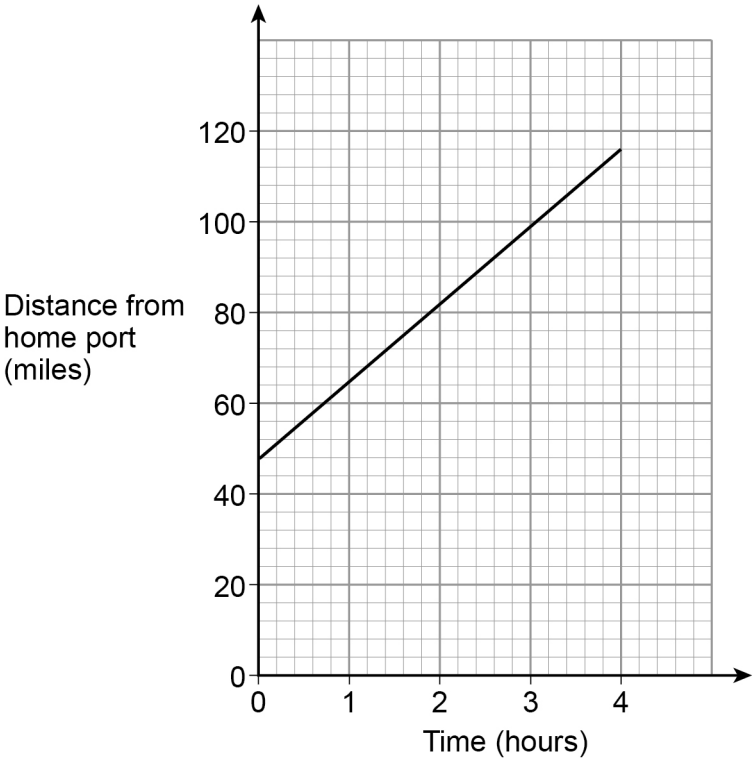
26 A ship is sailing in a straight line from its home port.

The distance-time graph shows 4 hours of the journey.



Work out the speed of the ship during these 4 hours.

[3 marks]

speed = $\frac{\text{dist}}{\text{time}}$

Dist = 116 − 48 = 68

speed = $\frac{68}{4}$ = 17

Answer 17 mph

8

Turn over ►

Do not write outside the box

27 Kim works at an airport in the UK.

She records the number of planes landing between 10 am and 2 pm each day.

The table shows the data for the first 10 days in January.

Day	1	2	3	4	5	6	7	8	9	10
Number of planes	148	151	147	155	153	147	155	102	151	154

27 (a) The airport was affected by fog on one of the days.

Which day do you think it was?

Give a reason for your answer.

[1 mark]

Day 8

Reason Lowest value, it's an anomaly

27 (b) Kim uses the data to predict how many planes will land at the airport in a year.

In her method, she

uses an estimate of 150 planes in each 4-hour period throughout the day

assumes the same number of planes each day.

Work out her prediction.

[3 marks]

6 4hour period

150 x 6 = 900

900 x 365 = 328,500

4
365
x 5 9
3285

Answer 328,500

Do not write outside the box

27 (c) In fact,

fewer planes land in winter than in summer

fewer planes land at night than during the day.

What does this tell you about Kim's prediction?

Tick **one** box.

- ☐ Her prediction is too low
- ☐ Her prediction is too high
- ☑ Her prediction could be too low or too high

Give a reason for your answer.

[2 marks]

- few landings at night would make it too high
- fewer landings in winter would make it too low

Turn over for the next question

6

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28 The sum of the angles in any quadrilateral is 360°

For example, in a rectangle $4 \times 90° = 360°$

Zak writes,

$5 \times 90° = 450°$ so the sum of the angles in any pentagon must be 450°

Is he correct?

Tick a box.

☐ Yes ☑ No

Show working to support your answer.

[2 marks]

$180(n-2)$ is the sum of angle for n sides.

pentagon: $180(5-2)$

$= 180 \times 3 = 540$

$540 > 450$, so it cannot be all right angles

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29 $\sqrt{6^2 + 8^2} = \sqrt[3]{125a^3}$

Work out the value of a.

36+64

[4 marks]

$6^2 + 8^2 = 100$

$\sqrt{100} = 10$

$\sqrt[3]{125a^3} = 5a$

$5a = 10$

$a = 2$

Answer 2

30 Work out the percentage increase from 80 to 280

[3 marks]

% increase = $\frac{\text{Change}}{\text{original}} \times 100$

$= \frac{280 - 80}{80} \times 100$

$= \frac{200}{80} \times 100 \quad = 2.5 \times 100$

$= 250$

Answer 250 %

Turn over for the next question

9

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31 Solve $x^2 - x - 12 = 0$

[3 marks]

Factorise x to -12, + to -1
(-4 and 3)

$(x - 4)(x + 3) = 0$

$x = 4$

Answer $x = -3$

END OF QUESTIONS

3

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