Mathematics
Paper 1 (Non-Calculator)
Foundation Tier

Method marks (M) are awarded for a correct method which could lead to a correct answer.
Accuracy marks (A) are awarded for a correct answer, having used a correct method, although this can be implied.
(B) marks are awarded independent of method.
Churchill Paper 1E Marking Guide – AQA Foundation Tier

1  4  5  8  16  B1  Total 1

2  -14.4  -7.2  -1.6  1.6  B1  Total 1

3  $\frac{12}{60} = \frac{2}{10} = \frac{1}{5}$

3  \(\frac{3}{25} \quad \frac{1}{6} \quad \frac{1}{5} \quad \frac{1}{4}\)  B1  Total 1

4  $10 + 12 + 12 + 18 + 18 = 70$
$70 + 5 = 14$

12  13  13.5  14  B1  Total 1

5  (a)  \(= 18 + 3 = 6\)  B1
(b)  10% of 60 = 60 ÷ 10 = 6
5% of 60 = 6 ÷ 2 = 3  M1 A1
(c)  \(\frac{1}{5}\) of 7.5 = 7.5 ÷ 5  e.g. 5 ÷ 5 = 1
\(2.5 ÷ 5 = 0.5\)
\(7.5 ÷ 5 = 1.5\)  M1
\(\frac{3}{5}\) of 7.5 = 3 × 1.5 = 4.5  A1  Total 5

6  360 ÷ 40 = 9  M1
So 9° represents 1 person
Frequencies:  19  3  12  6
Angles:  171°  27°  108°  54°  M1

M1 A1  Total 4
7  
(a) 11  
(b) 5  
(c) \(100^3 = 100 \times 100 \times 100 = 1000000 = \text{one million}\)  

[Allow 1 million]  

Total 4  

8  
3 \times 1.2 = 3.6  
1.6 \div 2 = 0.8  
3.6 + 0.8 = 4.4  

4.4  
4.2  
3.8  
2.6  

Total 1  

9  
(a) \(0.3 + 7x + 2x + 5x = 1\)  
\(14x = 0.7\)  
\(x = 0.7 + 14\)  
\(x = 0.05\)  

(b) e.g. \(P(\text{Yellow}) = 5 \times 0.05 = 0.25\)  
A probability of 0.3 equates to 12 counters  
A probability of 0.1 equates to \(12 \div 3 = 4\) counters  
A probability of 0.25 equates to \(4 + 4 + 2 = 10\) counters  

Total 6  

10  
e.g. Titan could have 3 home wins and 3 losses  
\((3 \times 7) + (3 \times 0) = 21 + 0 = 21\)  
Need to find if Epsilon could have won less than 3 times  
2 home wins = \(2 \times 7 = 14\) points  
2 away wins = \(2 \times 8 = 16\) points  
1 home win and 1 away win = \(7 + 8 = 15\) points  
Epsilon could have 1 home win, 1 away win, 3 draws and 1 loss  
So Titan could have 3 wins and Epsilon 2 wins  
Yes, Unaza could be correct  

Total 4  

11  
(a)  

(b)  

22  
15  
17  
10  
5  
7  
3  
6  
1  
47  
33  
14  
21  
12  
11  
10  
3  
8  

Total 4
(c) \[ \begin{array}{c}
5x + 12 \\
4x + 6 \\
3x + 2 \\
2x \\
x
\end{array} \] \[ \begin{array}{c}
x + 6 \\
x + 4 \\
x + 2 \\
x \\
x
\end{array} \] M1

5x + 12 \quad A1 \quad \text{Total 6}

12 \quad \text{e.g.} \quad C \quad S \quad V
5 : 4 \quad 5 : 4 = 15 : 12
3 : 2 \quad 3 : 2 = 12 : 8 \quad \text{M1}

\text{Giving}
C \quad S \quad V
15 : 12 : 8 \quad \text{Choc to Vanilla} = 15 : 8 \quad \text{M1 A1 \quad Total 3}

13 \quad (a) \quad \text{Trapezium} \quad \text{B1}
(b) \quad \text{e.g.} \quad \text{M1 A1}

\text{Total 3}
14 \[ \frac{3}{5} - \frac{2}{9} - \frac{27}{45} - \frac{10}{45} = \frac{17}{45} \]

\[ \frac{1}{4} - \frac{1}{45} + \frac{6}{45} = \frac{17}{45} \]

\[ B1 \quad \text{Total 1} \]

15 Fraction of beads in bag that are green = \[ \frac{5}{8} \times \frac{2}{5} \]
\[ = \frac{10}{40} = \frac{1}{4} \]

Fraction of beads in bag that are yellow = \[ 1 - \left( \frac{2}{5} + \frac{1}{4} \right) \]
\[ = 1 - \left( \frac{8}{20} + \frac{5}{20} \right) \]
\[ = 1 - \frac{13}{20} = \frac{7}{20} \]

Yellow beads as fraction of red beads = \[ \frac{\frac{7}{20}}{\frac{5}{2}} = \frac{7}{20} \times \frac{5}{2} = \frac{35}{40} \]
\[ = \frac{7}{8} \]

\[ A1 \]

[Can get full marks with assumed number of beads in bag]

\[ \text{Total 4} \]

16 Volume of cube = \( l^3 = 64 \)

Side of cube = \( \sqrt[3]{64} = 4 \) cm

Length of rod = \( 9 \times 4 = 36 \) cm

Side of XS of rod = \( 4 + 3 = 1 \frac{1}{3} \) cm

Dimensions of rod are \( 1 \frac{1}{3} \) by \( 1 \frac{1}{3} \) by 36 cm
\[ \text{[or 1.33 cm (3sf)]} \]

\[ A1 \quad \text{Total 4} \]

17 (a) \[ 60 - 22 = 38 \]
\[ 53 - 38 = 15 \]
\[ 22 + 38 + 15 = 75 \]
\[ 80 - 75 = 5 \]

\[ \text{[Shown on diagram]} \]

\[ M1 \]

(b) \[ \frac{15}{20} = \frac{3}{4} \]

\[ B1 \quad \text{Total 4} \]

18 (a) e.g. 8 is the last digit of one number being multiplied and 3 is the last digit of the other number.

As \( 8 \times 3 = 24 \), 4 must be the last digit of the answer.

The last digit of the given answer is 1 so it must be wrong.

\[ B1 \]

(b) \[ 4 \times 6 = 24, \quad 13804 \text{ ends in a 4 so could be correct} \]
\[ 7 \times 8 = 56, \quad 18632 \text{ ends in a 2 so can't be correct} \]
\[ 9 \times 5 = 45, \quad 49375 \text{ ends in a 5 so could be correct} \]
\[ 47 \times 388 = 18632 \text{ must be wrong} \]

\[ A1 \quad \text{Total 4} \]
19 (a) In the 5th week he will have added 10 minutes on four times
1 hour + 4 × 10 minutes = 1 hour 40 minutes
M1
A1
(b) 2 hours has been added on to the original time
2 hours = 120 minutes = 12 × 10 minutes
M1
He spends 3 hours in the 13th week of the year
A1
(c) In 52nd week he'd spend 1 hour + 51 × 10 minutes
51 × 10 minutes = 510 minutes
510 minutes = 510 ÷ 60 hours = 8.5 hours
M1
In 52nd week he'd spend 1 + 8.5 = 9.5 hours on the treadmill
There are 24 × 7 = 168 hours in a week
M1
Naz is wrong, 9.5 hours is less than a tenth of the hours in a week
A1
19 Total 7

20 \[1 - \frac{3}{8} = \frac{5}{8}\] of income not on rent
\[1 - \frac{6}{11} = \frac{5}{11}\] of rest of income is saved
M1
Fraction saved = \[\frac{5}{11} \times \frac{5}{8} = \frac{25}{88}\]
M1 A1 Total 3

21 (a) \[\frac{1}{2}x + 9 > 3x - 6\]
\[\frac{1}{2}x + 15 > 3x\]
\[x + 30 > 6x\]
\[30 > 5x\]
\[x < 6\]
A1
(b) \[< \]
Total 3

22 (a) e.g. Base = 9 cm²
Sides of 1st layer = 12 cm²
Top of 1st layer = 8 cm²
Sides of 2nd layer = 4 cm²
Top of 2nd layer = 1 cm²
Total = 9 + 12 + 8 + 4 + 1 = 34 cm²
A1
(b) e.g. Pressure = \[\frac{\text{force}}{\text{area}}\]
The weight of the shape is the same so the force is the same
The area of contact was 9 cm² but is now 1 cm²
M1
The force on 1 cm² is 9 times what it was before
The pressure will be 9 times as large
Pressure = 9 × 800 = 7200 N/m²
A1 Total 4
23 (a) 

(b) 

\[ \begin{array}{|c|c|c|c|c|c|c|} 
\hline
x & -3 & -2 & -1 & 0 & 1 & 2 & 3 \\
\hline
x^3 - 4x & -15 & 0 & 3 & 0 & -3 & 0 & 15 \\
\hline
\end{array} \]

(c) 

24 (a) 4 hours = 4 \times 60 \text{ minutes} = 6 \times 40 \text{ minutes} 
Doubling 6 times = \times 2^6 = \times 64 
\[ 64 \times \frac{3}{4} \text{ million} = 48 \text{ million} \]
\[ 12 \text{ million} \quad 24 \text{ million} \quad 48 \text{ million} \quad 96 \text{ million} \]

(b) Each year the previous year’s value is multiplied by 0.63 
So new value = 63\% of previous value 
Annual \% decrease = 100 – 63 = 37\% 
\[ 0.63\% \quad 37\% \quad 50.4\% \quad 63\% \]

TOTAL FOR PAPER: 80 MARKS