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 1D Marking Guide – AQA Foundation Tier

1. $-14 - 4.5 = 4.5 - 14$  
   \[ 1 \]  
   \[ \text{B1 Total 1} \]

2. $6 \times 3 = 3x \times 6x$  
   \[ 2 \]  
   \[ \text{B1 Total 1} \]

3. $= 4 + 18 = 22$  
   $6 \times 10 = 22 \times 26$  
   \[ 3 \]  
   \[ \text{B1 Total 1} \]

4. $\text{A B C D}$  
   \[ 4 \]  
   \[ \text{B1 Total 1} \]

5. (a) $= 4 \times 4 = 16$  
   \[ 5 \]  
   \[ \text{B1} \]

   (b) Wednesday = 8  
   Friday = $16 + 1 = 17$  
   Fri – Wed = $17 - 8 = 9$  
   \[ 5 \]  
   \[ \text{B1} \]

   (c) Tuesday = 10  
   Thursday = $65 - (16 + 10 + 8 + 17)$  
   $= 65 - 51 = 14$  
   \[ 5 \]  
   \[ \text{M1 A1 Total 4} \]

6. 10% of £150 = $150 \div 10 = £15$  
   20% of £150 = $2 \times 15 = £30$  
   Number of weeks = $450 \div 30 = 15$ weeks  
   \[ 6 \]  
   \[ \text{M1 A1 Total 2} \]

7. (a) 1 km = 1000 m  
   \[ 7 \]  
   \[ \text{M1 A1 Total 4} \]

   (b) $9 \times 250 = 1000 + 1000 + 250 = 2250$ m  
   $2250$ m = 2.25 km  
   \[ 7 \]  
   \[ \text{M1 A1 Total 4} \]
8 (a) \((-2, 4)\) 
(b) \(y = x - 2\) \([M1 \text{ for line drawn or gradient}]\) 
(c) \(y = x - 2\) 

9 (a) 
(b) There are 10 numbers and 1 is in the intersection 
\[P (T \cap F) = \frac{1}{10}\] 
(c) \(6\) and \(12\), \(6\) and \(18\), \(12\) and \(18\)
10  (a) \[13 \times 31 = 403\]
\[0.13 \times 31 = 4.03\]
\[0.13 \times 3.1 = 0.403\]  
\[\text{B1}\]

(b) \[403 \div 13 = 31\]
\[806 \div 13 = 62\]
\[8060 \div 13 = 620\]
\[8060 \div 1.3 = 6200\]  
\[\text{M1} \quad \text{A1}\]

(c) \[52 = 4 \times 13 = 2^2 \times 13\]
\[4030 = 10 \times 403 = 2 \times 5 \times 13 \times 31\]  
\[\text{M1} \quad \text{A1} \quad \text{Total 5}\]

11  \[6^2 = 36\]
\[\begin{array}{ccc}
6 & 12 & 36 \\
216 & & \\
\end{array}\]  
\[\text{B1} \quad \text{Total 1}\]

12  \[6 + 7 + 11 = 24\]
At the start, Fiona has \(\frac{7}{24}\) of all the marbles  
\[5 + 4 = 9\] so at the end, Fiona has \(\frac{5}{9}\) of \(\frac{1}{2}\) the marbles
\[\frac{5}{9} \times \frac{1}{2} = \frac{5}{18}\] of all the marbles  
\[\frac{7}{24} \times \frac{24}{3} = \frac{21}{72}\]
\[\frac{5}{18} \times \frac{18}{4} = \frac{20}{72}\]  
\[\frac{20}{72} \text{ is less than } \frac{21}{72} \text{ so Fiona has less marbles} \]
\[\text{A1} \quad \text{Total 4}\]

13  (a) e.g. Total = \(9 \times 10.99 + 3 \times 7.95 + 4 \times 3.85\)
\[\approx 90 + 24 + 16\]
\[\approx £139\]
\[5 + 3 + 2 = 10\]
\[139 + 10 = £13.90\]
Penny pays \(3 \times £13.90\)
\[\approx 3 \times 14\]
\[\approx £42\]  
\[\text{M1} \quad \text{A1}\]

(b) e.g. An overestimate because I rounded some numbers up  
\[\text{B1} \quad \text{Total 6}\]

14  \[5\% = 14\]
\[2.5\% = 7\]
\[27.5\% = 28 + 28 + 14 + 7 = 77\]
\[\begin{array}{ccc}
49 & 63 & 77 \\
91 & & \\
\end{array}\]  
\[\text{B1} \quad \text{Total 1}\]
15 P (£1 or £5) = 1 – 0.48 = 0.52
P (£5) = 0.52 ÷ 4 = 0.13
P (£1) = 3 × 0.13 = 0.39

16 As AC = CD, triangle ACD is isosceles so angle CAD = angle ADC
So, angle ADC = \(\frac{1}{2} (180 - 90) = \frac{1}{2} \times 90 = 45^\circ\)

As AB = AC = BC, triangle ABC is equilateral so angle ACB = 60°
Hence, angle BCD = 90 + 60 = 150°

As BC = CD, triangle BCD is isosceles so angle BDC = angle CBD
So, angle BDC = \(\frac{1}{2} (180 - 150) = \frac{1}{2} \times 30 = 15^\circ\)

Angle ADB = angle ADC – angle BDC = 45 – 15 = 30°

17 (a) 7
(b) N – 1
(c) e.g. Each pattern has 3 triangles on the bottom row
Each pattern has 4 triangles on the other rows
The number of rows above the bottom row is the same as the number of circles
With 16 circles the number of triangles = 16 × 4 + 3
= 64 + 3
= 67

[Or, for example, no. of triangles = 3, 7, 11, 15 so 4N – 1;
16 circles means N = 17; no. of triangles = 4 × 17 – 1 = 67]

18 (a) \(\frac{16}{5} ÷ \frac{6}{5} = \frac{16}{5} \times \frac{5}{6} = \frac{16}{1} \times \frac{1}{6} = \frac{8}{3} = 2\frac{2}{3}\)
(b) e.g. \[
\begin{array}{c}
5 & 3 \\
\times & 2 & 4 \\
\hline
2 & 1 & 2 \\
1 & 0 & 6 & 0 \\
1 & 2 & 7 & 2 \\
\hline
\end{array}
\]
So, 24 × 53 = 1272
0.24 × 5.3 = 1.272
19 (a) Width: \( x + x + 1 = 7 \)  
(of diagram) \( 2x = 6 \)  
\( x = 3 \)  
Height: \( x + y + 2 = 4y + 2 \)  
(of diagram) \( 3 + y + 2 = 4y + 2 \)  
\( 3 = 3y \)  
\( y = 1 \)  
M1  
A1

(b) e.g. \( 4y + 2 = 4 + 2 = 6 \)  
Area of “whole” rectangle = \( 7 \times 6 = 42 \text{ m}^2 \)  
Small rectangle removed measures \( x \) by \( x + 1 = 3 \) by 4  
Area of “removed” rectangle = \( 3 \times 4 = 12 \text{ m}^2 \)  
Floor area = \( 42 - 12 = 30 \text{ m}^2 \)  
M1  
A1  
Total 5

20 (a) Using Pythagoras’, with \( c \) as the hypotenuse we have  
\[ a^2 + b^2 = c^2 \]  
So \( 6^2 + 8^2 = c^2 \)  
\( 36 + 64 = c^2 \)  
\( 100 = c^2 \)  
\( c = \sqrt{100} \)  
\( c = 10 \text{ cm} \)  
M1  
A1

(b) Area of rectangular sides = \( 5 \times 6 + 5 \times 8 + 5 \times 10 \)  
\( = 30 + 40 + 50 \)  
\( = 120 \text{ cm}^2 \)  
Area of triangle = \( \frac{1}{2} \times 6 \times 8 \)  
\( = 24 \text{ cm}^2 \)  
Surface area = \( 2 \times 24 + 120 \)  
\( = 48 + 120 \)  
\( = 168 \text{ cm}^2 \)  
M1  
A1  
Total 5

21 (a) \( 0.4 \text{ mm/s} = \frac{3600 \times 0.4 \text{ mm/h}}{1000} \)  
\( = 1440 \text{ mm/h} \)  
\( = 144 \text{ cm/h} \)  
\( = 1.44 \text{ m/h} \)  
M1  
A1

(b) \( x \text{ km/h} = \frac{1000x \text{ m/h}}{1000} \)  
\( = \frac{1000x}{3600} \)  
\( = \frac{x}{3.6} \)  
\( = \frac{5}{18} \times x \text{ m/s} \)  
M1  
A1  
Total 4

22 Volume = \( 4^3 = 64 \text{ cm}^3 \)  
Density = \( \frac{\text{mass}}{\text{volume}} \)  
\( = \frac{80}{64} = \frac{20}{16} = \frac{5}{4} = 1.25 \text{ g/cm}^3 \)  
B1  
Total 1
23  Let Cornpops cost £\(C\) and Wheatrings cost £\(W\)

\[
\begin{align*}
\text{Hayfa:} & \quad 3C + W = 8 \quad (1) \\
\text{Jim:} & \quad 2C + 4W = 14 \quad (2) \\
4 \times (1) & \quad 12C + 4W = 32 \quad (3)
\end{align*}
\]

\[
(3) - (2) \quad 10C = 18 \\
C = 1.8 \\
\begin{align*}
\text{Sub (1)} & \quad 5.4 + W = 8 \\
W & = 2.6
\end{align*}
\]

Cornpops cost £1.80, Wheatrings cost £2.60, difference = 80p  

A1  Total 4

24  

(a) \(1 \times 10^9\)  

B1  

(b) \(6000^3 = 6^3 \times 1000^3\)  
\[
\begin{align*}
&= 216 \times 1000000000 \\
&= 216000000000 \\
&= 2.16 \times 1000000000000 \\
&= 2.16 \times 10^{11}
\end{align*}
\]

M1  A1

(c) Volume = \(\frac{4}{3} \times \pi \times 6371^3\)  
\[
\begin{align*}
&\approx \frac{4}{3} \times 3 \times 6000^3 \\
&\approx 4 \times 2.16 \times 10^{11} \\
&\approx 4 \times 2 \times 10^{11} \\
&\approx 8 \times 10^{11} \text{ km}^3
\end{align*}
\]

M1  A1

[Accept \(8 \times 10^{11}\) to \(1.2 \times 10^{12}\), standard form is not required]  

Total 5

TOTAL FOR PAPER: 80 MARKS