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
1. \[0.03 \quad 0.030 \quad 0.031 \quad 0.04\] B1 Total 1

2. \[5 \times 6 + 8 = 30 + 8 = 38\] B1 Total 1

3. \[\frac{3}{4} \text{ m} = 0.75 \text{ m} = 75 \text{ cm} = 750 \text{ mm}\] B1 Total 1

4. \[p^2 + p^2 = 2p^2\] B1 Total 1

5. (a) 10% of 220 = \(220 \div 10 = £22\) B1
    70% of 220 = \(7 \times 22 = £154\)

(b) \(\frac{1}{3}\) of £4.20 = £4.20 \(\div 3 = £1.40\) M1
    £4.20 + £1.40 = £5.60 A1

(c) Decrease = 400 – 310 = £90 M1
    \(%\) decrease = \(\frac{90}{400} \times 100\%\) A1
    = \(\frac{90}{4} \% = \frac{45}{2} \% = 22.5\%\) A1 Total 5

6. (a) \((3, 2)\) B1

(b) B1

(c) \((6, -2)\) M1 A1

(d) \((2, 0)\) B1 Total 5
7. (a) $30 \times 2.54 = 76.2$ cm  

(b) e.g.  

[Graph showing conversion of inches to centimeters]  

(c) $\approx 23$ inches  

[Calculation gives 22.8346... so e.g. 22.83 is B0]  

Total 5

8. (a) $\frac{3}{12} \quad [= \frac{1}{4}]$  

(b) $\frac{6}{12} \quad [= \frac{1}{2}]$  

(c) $\frac{4}{12} \quad [= \frac{1}{3}]$  

(d) $\frac{9}{12} \quad [= \frac{3}{4}]$  

Total 4

9. (a) $\frac{142}{2} = £71$  

\[71 \div 5 = £14.20\]  

(b) 1.25 litres = 1250 ml  

1250 – 400 = 850 ml poured out  

\[850 \div 3 = 283.33\ldots\]  

283 ml (3sf) was poured into each glass  

Total 6
10  (a) \[ \approx 300 - 260 = 40 \]  

(b) \[ \approx 12 \text{ teachers (from line of best fit, nearest whole number)} \]

\[ \begin{array}{c|c|c|c|c} 
\text{Number of Pupils} & 0 & 50 & 100 & 150 \\
\hline 
\text{Number of Teachers} & 0 & 5 & 10 & 15 \\
\end{array} \]

11  (a) \[ 180 - 2 \times 31 = 180 - 62 = 118^\circ \]  
\[ a = 360 - 118 = 242^\circ \]  

(b) External angle of regular octagon = \[ \frac{360}{8} = 45^\circ \]  
External angle of regular hexagon = \[ \frac{360}{6} = 60^\circ \]  
\[ b = 45 + 60 = 105^\circ \]

12  (a) Ratio = \[ 4 : 8 = 1 : 2 \]

(b) \[ 3 + 4 + 8 = 15 \]  
\[ 300 \div 15 = £20 \]  
\[ 3 \times £20 = £60 \]

13  11 am to 4.30 pm = \[ 1 + 4.5 = 5.5 \text{ hours} \]  
\[ 5 \times 5.5 = 27.5 \text{ hours} \]
\[ 27.5 \times £11.60 = £319 \text{ for Monday to Friday} \]  
\[ 379.90 - 319 = £60.90 \text{ for Saturday} \]
\[ 1.5 \times £11.60 = £17.40 \text{ per hour on Saturday} \]  
\[ 60.90 + 17.40 = 3.5 \text{ hours on Saturday} \]  
\[ 10 \text{ am to 12 noon} = 2 \text{ hours} \]  
\[ \text{Younis finished at 1.30 pm on Saturday} \]  

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14 e.g. 20% off is $\frac{1}{5}$ off

Buy 2 get 1 half price means he would pay $2\frac{1}{2}$ times the usual price for 3 packets

The fraction of full price he pays is $\frac{2\frac{1}{2}}{3} = \frac{5}{6}$

The discount is $\frac{1}{6}$

$\frac{1}{5}$ is larger than $\frac{1}{6}$ so 20% off is better value

[Can get full marks with an assumed price and suitable words] Total 3

15 e.g. If the number is 18, × by 2 will increase it by 18 which is too much
Likewise any number bigger than 18 will increase by more than 18
when it is multiplied by 2

So, the number is 17 or less

If the number is 15, ÷ by 3 gives 5 so it has decreased by 10
Any number less than 15 will decrease by less than 10

If the number is 16, ÷ by 3 gives $5\frac{1}{3}$ so it has decreased by $10\frac{2}{3}$

If the number is 17, ÷ by 3 gives $5\frac{2}{3}$ so it has decreased by $11\frac{1}{3}$

So the number is 17 or more

Putting them together, the number is 17

[Setting up inequalities is obviously fine!] Total 4

16 (a) The mean

e.g. There is no prize of 50p so that cannot be the mode.

With 5 values, the median will be the 3rd value (in order) and as there is no prize of 50p the median cannot be 50p.

(b) e.g. He has assumed the ball is equally likely to go through each of the gates.

(c) e.g. To go through the outer gates the ball has to move quite a bit to the side. Hence the ball is less likely to go through the outer gates and his assumption is not reasonable.
The outer gates win the bigger prizes so the true mean prize will be considerably less (and almost certainly less than the 40p it costs for a roll!)

17 (a) $x^2 - x - 5x + 5$

$= x^2 - 6x + 5$

$= x^2 - 6x - 5 \quad x^2 - 4x + 5 \quad x^2 - 5x + 6$

(b) $(x - 1)(x + 10) \quad (x + 2)(x - 5)$

$(x - 2)(x - 5) \quad (x - 2)(x + 5)$

B1 Total 2
18 e.g.

\[
\begin{array}{ccc}
2 & \times & 3 \\
\text{Prime number} & \text{Prime number} & \text{Even number} \\
\end{array}
\]

\[
\begin{array}{ccc}
20 & \div & 4 \\
\text{Multiple of 4} & \text{Even number} & \text{Prime number} \\
\end{array}
\]

\[
\begin{array}{ccc}
5 & + & 11 \\
\text{Prime number} & \text{Prime number} & \text{Square number} \\
\end{array}
\]

\[
\begin{array}{ccc}
23 & - & 9 \\
\text{Odd number} & \text{Square number} & \text{Multiple of 7} \\
\end{array}
\]

[There are lots of correct answers for each one] Total 4

19 (a)

(b) Rotation by 90° clockwise about the point (0, 0) M2 A1 Total 5
20 A kite has two pairs of equal sides
Here: \[2p + 2 = 3p - 3\] \[2p + 5 = 3p\]
\[5 = p\] M1
So, \[2p + 2 = 2 \times 5 + 2 = 12\]
Each half of kite is a right-angled triangle
Base = \[2p + 2 = 12 \text{ cm}\] and perpendicular height = \[p = 5 \text{ cm}\]
Area of half of kite = \[\frac{1}{2} \times 5 \times 12 = 30 \text{ cm}^2\] M1
Area of kite = \[2 \times 30 = 60 \text{ cm}^2\] A1 Total 4

21 (a) Pythagoras' with \(c = \text{hypotenuse}\)
\[a^2 + b^2 = c^2\]
\[a^2 + 8.6^2 = 9.7^2\]
\[a^2 + 73.96 = 94.09\]
\[a^2 = 94.09 - 73.96 = 20.13\] M1
\[a = \sqrt{20.13} = 4.4866...\] M1
\[= 4.49 \text{ cm (3sf)}\] A1

(b) \[\sin \theta = \frac{\text{opp}}{\text{hyp}}\]
\[\sin b = \frac{6.7}{8.1} = 0.82716...\] M1
\[b = \sin^{-1} 0.82716... = 55.808...\] M1
\[= 55.8^\circ \text{ (3sf)}\] A1 Total 4

22
\[x + y = 1.5 \quad (1)\]
\[4x - 3y = 13 \quad (2)\]
\[3 \times (1) \quad 3x + 3y = 4.5 \quad (3)\] M1
\[(2) + (3) \quad 7x = 17.5 \quad \text{M1}\]
\[x = 17.5 \div 7 = 2.5\]
Sub (1)
\[2.5 + y = 1.5 \quad \text{M1}\]
\[y = 1.5 - 2.5 = -1 \quad \text{A1}\]
So \(x = 2.5, \ y = -1\) Total 4

23 (a) \(y \propto \frac{1}{x}\)
\[y = \frac{k}{x}\]
When \(x = 240, \ y = 2\) so \[2 = \frac{k}{240}\]
\[k = 240 \times 2 = 480\] M1
Hence, \(y = \frac{480}{x}\) A1

(b) \(y = \frac{480}{30}\) M1
\[y = \frac{48}{3} = 16 \text{ as required}\] A1 Total 4

TOTAL FOR PAPER: 80 MARKS