1. Safety rules on a campsite require Sarah to set up her barbecue at least 4 m from her tent.
She decides to measure this distance using her stride length.
Sarah knows that her stride length is 0.8 m, rounded to the nearest 0.1 m.

Find the minimum number of strides Sarah will need to take to **guarantee** that her barbecue is asafe distance from her tent.

_____ **[3]**

2. A sack of coffee weighs 25 kg, correct to the nearest kg.
The coffee is used to fill bags that hold 500 g, correct to the nearest 10 g.

Work out the largest number of bags that could be filled from the sack of coffee.

_____ **[4]**

3. A lift can safely take a total weight of 600 kg, correct to the nearest 10 kg.

Can you be certain that eight people, each of weight 75 kg correct to the nearest kg, can safely travel in the lift?

Show how you decide.

[3]

4. The distance from the Earth to the Moon varies as they move in their orbits.
The largest distance is 406 700 km correct to the nearest 100 km.
The smallest distance is 356 400 km correct to the nearest 100 km.

Calculate the largest possible difference between these two measurements.

_____ km **[3]**

5(a). A town has a population of 120 000, correct to the nearest ten thousand, and an area of 54 km^2, correct to the nearest whole number.

Write down the upper bound of the population.

_____ **[1]**

(b). Calculate the upper bound of the population density.

_____ people / km^2 **[3]**

6. The mass of a sack of rice is 20 kg, correct to the nearest kilogram.
Salma uses this rice to fill small bags with 500 g of rice, correct to the nearest 10 grams.

Write down the maximum possible mass of rice in a small bag.

_____ g **[1]**

7. The length, L, of a steel rod is 8.3 m, correct to 1 decimal place.

Complete the error interval for length L.

_____ $\leq L <$ _____ **[2]**

8. Sunil makes 7.5 litres of soup, correct to the nearest 0.5 litre.
He serves the soup in 300 ml portions, correct to the nearest 10 ml.
24 people order this soup.

Does Sunil definitely have enough soup to serve the 24 people?
Show how you decide.

[4]

9. A log is 18 m long, correct to the nearest metre.
It is to be cut into fence posts which must be 80 cm long, correct to the nearest 10 centimetres.

What is the largest number of fence posts that can possibly be cut from this log?

---------- **[4]**

END OF QUESTION PAPER

Question			Answer/Indicative content	Marks	Part marks and guidance	
1			6	3	**B1** for 0.75 m **M1** for $\frac{4}{\textit{their}\ '0.75'}$ Or 5 × 0.75 = 3.75	
			Total	3		
2			51	4	**B3** for 51.5151… rot OR **B1** for use of 25.5 (kg) or 25500 (g) **B1** for use of 0.495 (kg) or 495 (g) **M1** for $\frac{\textit{their}\ 25500}{\textit{their}\ 495}$ **Examiner's Comments** Candidates found this question difficult. Though the majority knew to divide the sack weight by the bag weight, invariably they chose an incorrect bound for one or both values. It was disappointing to see 25.5 kg so often written as 2550 g. Where candidates were unsure which bounds to use, the answer space was often filled with multiple attempts. Even when the correct bounds were used, candidates sometimes failed to round their answer down.	Leading to their answer Leading to their answer For **M** mark allow any $\frac{\text{sack weight}}{\text{bag weight}}$ eg $\frac{2500}{500}$
			Total	4		

Question			Answer/Indicative content	Marks	Part marks and guidance	
3			No with correct supporting work	3	**M2** for 604 compared with 595 or for 604 compared with 600 **Or M1** for 8 × 75.5 soi by 604 OR **M2** for 595 compared with 8 × 75 **Or M1** for 595 used **Examiner's Comments** Not well done. Even if the correct ideas were shown, the working and answers were often not expressed clearly. As expected, many candidates used 'Upper bound of weight of people (604) is greater than lower bound of weight lift can take (595), so No'. There were numerous other comparisons which were equally valid arguments. More often a random scattering of values filled the answer space with no indication of which had been chosen to support the decision. Incorrectly, some decided that by finding just one condition for which it was safe to use the lift they had shown that it would be safe in every event. Though most had some idea of upper and lower bounds it was clear that knowledge was limited. 75.4 as the upper bound for one person and, even worse, 610 and 590 as the upper and lower bound for the lift were common wrong values used.	Condone use of 75.49[9..] soi by 603.92 OR **M2** for $\frac{595 \text{ to } 605}{74.5 \text{ to } 75.5}$ AND answer less than 8 **Or M1**for $\frac{595 \text{ to } 605}{74.5 \text{ to } 75.5}$ For M1, NOT **both** 600 & 75
			Total	3		

Question			Answer/Indicative content	Marks	Part marks and guidance	
4			50400 nfww	3	**M2** for using 406750 and 356350 Or **B1** for 406750 or 356350 Examiner's Comments Most candidates realised that the answer came from subtracting the lower bound of the smallest distance from the upper bound of the largest distance. Some incorrectly gave the upper bound of the largest distance as 406 749. A number misunderstood the implication of the given accuracy and used incorrect upper and/or lower bounds or simply subtracted the two given values.	For M2 or B1 condone use of 406749[.9..]
			Total	3		
5	a		125 000	1	Examiner's Comments Many candidates struggled on this question. A number to an inappropriate accuracy was given, such as 120 005 or 120 000.5 or similar.	condone 124 999[.9...]
	b		2336[.448...] or 2340 or 2336.45 or 2337	3	**B1** for 53.5 **M1** for *their* '125 000' ÷ *their* '53.5' Examiner's Comments It was common to use the wrong bound for both numbers, but the correct division of population divided by area was usually attempted.	**isw** after correct answer seen *their* '53.5' can be in range 52 to 55
			Total	4		

Question			Answer/Indicative content	Marks	Part marks and guidance	
6			505 or 504.9	1	Examiner's Comments Some candidates identified the upper bound correctly as 505. Common incorrect answers included 510, 550, 504, 504.9 and 500.5.	
			Total	1		
7			8.25 8.35	2	B1 for either one correct or for both correct but reversed Examiner's Comments Most candidates appreciated the level of accuracy needed. The lower limit was usually correctly given, although the upper limit was sometimes in error. Some candidates, in an attempt to exclude 8.35, offered answers such as 8.349… or 8.34.	
			Total	2		

Question			Answer/Indicative content	Marks	Part marks and guidance		
8			No, with correct calculation leading to 23.77 to 23.8 identified or with 7.32 compared with 7.25 oe or 302 compared with 305 oe	4 1 AO1.3b 2 AO3.1d 1 AO3.3	**B1** for 7250 or 7.25 seen **B1** for 305 or 0.305 seen **M1** for *their* 7.25 ÷ *their* 0.305 with consistent units and at least one attempted bound or for *their* 0.305 × 24 oe or *their* 7250 ÷ 24 oe	Ignore upper bound Ignore lower bound *Their* 7.25 in range 7 to 8, *their* 0.305 in range 0.29 to 0.31 or equivs. Ignore other divisions or products **M0** for 7500 ÷ 300 or 7.5 ÷ 0.3	

Examiner's Comment

Most candidates recognised this as a bounds question, but only a minority went on to earn all four marks. Many had problems deciding the bounds for the soup and values such as 7.45 and 7.55 were frequently seen. There was more success with the portion size, largely because it was an integer and only to the nearest 10, although 290 and 310 were common errors. Those that attempted a division of the bounds usually earned the M1 for a calculation involving at least one bound.

If they had the correct bounds they were more likely to earn all four marks. Those that multiplied 24 with the upper bound of the portion size did not fare as well, as they often omitted the required comparison.

Question			Answer/Indicative content	Marks	Part marks and guidance	
					In general most candidates had a weak understanding of the topic, including some of those with four marks; rather than hone in on the one calculation that was needed, many simply attempted all four combinations and chose the answer that best suited the question.	
			Total	4		
9			24	4	**B3** for 24.7 or 24.6[6…] OR **B1** for 18.5 or 1850 **B1** for 0.75 or 75 **M1** for *their*1850 ÷ *their*75 oe soi by 24.7 or 24.6[6…]	condone 18.49 or 1849 in this question $1750 \leq$ *their*1850 ≤ 1850 and $70 \leq$ *their*75 ≤ 90 allow work in metres e.g. use of 1.75,1.85, .7, .9 <u>Examiner's Comments</u> Both correct boundaries were not often given by candidates. Sometimes all four boundaries were given and not always the correct values were chosen for the calculation. Most responses did use the correct division for the calculation but the numbers chosen were not the most appropriate for the problem.
			Total	4		