# OCR 04 Approximation and Estimation (Foundation)

1. Round 6 967 527 to the nearest thousand.
2. Round 4.3826 to 2 decimal places.
3. Round 7392 to 2 significant figures.
4. Round 25.9815 to 3 significant figures.
5. The length of a garden (*l*) is 32 m correct to the nearest metre.

Write down the error interval.

1. Estimate the answer to .
2. A value, *v*, is given as 25.74 truncated to 2 decimal places.

Write down the error interval for *v*.

1. The crowd at a rugby match was estimated to be 14 750 to the nearest 50 people.

What are the smallest and largest numbers of people that could have attended the match?

1. Estimate the answer to .
2. A garden that is open to the public had 1789 visitors one Saturday. Each person paid £5.75 to visit the garden. Estimate the total amount of money that was taken that day.
3. A river is 2850 km to the nearest 10 km and 2800 km to the nearest 100 km.

Write down the error interval for the length (*l*) of the river.

1. Selma says that  is approximately 8.2.

Use estimation to show that Selma is correct.

1. Mr Khan had solar panels fitted to his house. The solar panels cost £5845 to install. He saves £316 pounds on his fuel bill each year after he has the solar panels fitted. Show by estimation that it will take him 20 years to recover the cost through savings on his fuel bills.
2. Clyde measures the four walls in a field. The lengths of the sides are 78 m, 56 m, 99 m and

92 m, all correct to the nearest metre. Clyde says the perimeter of the field is 325 m, correct to the nearest metre. Explain why he may be wrong.

1. Marcus thinks that the total of 59.6, 57.9, 78.6 and 65.7 is 283.8.

Use estimation to show that Marcus is incorrect.

1. The average daily water consumption of a person in Britain is 163 litres. Estimate the number of litres of water that a person uses in one year, and explain whether your answer is an overestimate, underestimate or about right.
2. An average adult inhales 0.5 litres of air per breath at a rate of 18 breaths per minute. Use estimation to show that an average adult inhales approximately 5 million litres of air per year.
3. A bicycle wheel has a diameter of 68.5 cm. Estimate how many times the wheel will turn when the bicycle travels a distance of 5 km. Give your answer to the nearest whole number.
4. A camera is on sale in France for 58.68 euros. The same camera is on sale in Sweden for 1119.32 Swedish kroner. Show that the camera costs approximately twice as much in Sweden.  euros and  Swedish kroner.
5. The distance from London to San Francisco is 8590.4 km. One particular aircraft completes this journey at an average speed of 804 km/h. If a different aircraft completes this journey at an average speed of 715 km/h, estimate how much longer this aircraft will take.

### Answers

1. 6 968 000
2. 4.38
3. 7400
4. 26.0
5. 
6. 
7. 
8. Smallest number 14 725; largest number 14 774
9. 
10. 
11. 
12.  so  is between 8 and 9, so 8.2 is a sensible estimate.
13. years
14. Actual measurements would be in the ranges:



So the perimeter would be metres.

1. Using estimation (rounding up), the total cannot be bigger than .
2. litres. Overestimation, since both figures were rounded up in the approximation.
3.  million litres
4. Circumference of wheel cm m.

5 km 5000 m so the wheel turns approximately times.

1. 58.68 euros  60 euros. .

1119.32 Swedish kroner  1100 Swedish kroner. .

, so the camera costs approximately twice as much in Sweden.

1. 

804 km/h: time 

715 km/h: time 

So the journey will take approximately 2 hours longer.

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| **Assessment Objective** | **Qu.** | **Topic** | **R** | **A** | **G** |  | **Assessment Objective** | **Qu.** | **Topic** | **R** | **A** | **G** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| AO1 | 1 | Round to the nearest thousand |  |  |  |  | AO1 | 1 | Round to the nearest thousand |  |  |  |
| AO1 | 2 | Round to 2 decimal places |  |  |  |  | AO1 | 2 | Round to 2 decimal places |  |  |  |
| AO1 | 3 | Round a large number to 2 significant figures |  |  |  |  | AO1 | 3 | Round a large number to 2 significant figures |  |  |  |
| AO1 | 4 | Round to 3 significant figures when the third digit is 9 |  |  |  |  | AO1 | 4 | Round to 3 significant figures when the third digit is 9 |  |  |  |
| AO1 | 5 | Write an error interval for continuous data |  |  |  |  | AO1 | 5 | Write an error interval for continuous data |  |  |  |
| AO1 | 6 | Estimate an answer |  |  |  |  | AO1 | 6 | Estimate an answer |  |  |  |
| AO1 | 7 | Write an error interval for a truncated answer |  |  |  |  | AO1 | 7 | Write an error interval for a truncated answer |  |  |  |
| AO1 | 8 | Write an error interval for discrete data |  |  |  |  | AO1 | 8 | Write an error interval for discrete data |  |  |  |
| AO1 | 9 | Estimate the answer to a calculation involving division by a decimal |  |  |  |  | AO1 | 9 | Estimate the answer to a calculation involving division by a decimal |  |  |  |
| AO1 | 10 | Estimate the answer to a product |  |  |  |  | AO1 | 10 | Estimate the answer to a product |  |  |  |
| AO2 | 11 | Interpret approximate values |  |  |  |  | AO2 | 11 | Interpret approximate values |  |  |  |
| AO2 | 12 | Estimate a square root |  |  |  |  | AO2 | 12 | Estimate a square root |  |  |  |
| AO2 | 13 | Use estimation |  |  |  |  | AO2 | 13 | Use estimation |  |  |  |
| AO2 | 14 | Interpret estimation |  |  |  |  | AO2 | 14 | Interpret estimation |  |  |  |
| AO2 | 15 | Use estimation to check whether an answer is feasible |  |  |  |  | AO2 | 15 | Use estimation to check whether an answer is feasible |  |  |  |
| AO3 | 16 | Estimate and evaluate |  |  |  |  | AO3 | 16 | Estimate and evaluate |  |  |  |
| AO3 | 17 | Estimate a value in context |  |  |  |  | AO3 | 17 | Estimate a value in context |  |  |  |
| AO3 | 18 | Use a formula and estimate in context |  |  |  |  | AO3 | 18 | Use a formula and estimate in context |  |  |  |
| AO3 | 19 | Solve a real-life problem by estimation |  |  |  |  | AO3 | 19 | Solve a real-life problem by estimation |  |  |  |
| AO3 | 20 | Estimate times given distance and speed |  |  |  |  | AO3 | 20 | Estimate times given distance and speed |  |  |  |