



## Rounding and estimation

- Rounding numbers to a given degree of accuracy
- Using rounding to make estimates

Keywords

You should know

explanation 1a

explanation 1b

**1** Round each of these numbers to the nearest 10.

- |                 |               |                 |
|-----------------|---------------|-----------------|
| <b>a</b> 18     | <b>b</b> 85   | <b>c</b> 24     |
| <b>d</b> 97     | <b>e</b> 5    | <b>f</b> 360    |
| <b>g</b> 742    | <b>h</b> 8738 | <b>i</b> 5682   |
| <b>j</b> 15 697 | <b>k</b> 3069 | <b>l</b> 10 099 |

**2** Round each of these numbers to the nearest 100.

- |                 |                 |                 |
|-----------------|-----------------|-----------------|
| <b>a</b> 730    | <b>b</b> 840    | <b>c</b> 625    |
| <b>d</b> 148    | <b>e</b> 2700   | <b>f</b> 3530   |
| <b>g</b> 1740   | <b>h</b> 9950   | <b>i</b> 12 860 |
| <b>j</b> 19 972 | <b>k</b> 10 956 | <b>l</b> 40     |

**3** Round each of these numbers to the degree of accuracy given.

- |                               |                               |                                 |
|-------------------------------|-------------------------------|---------------------------------|
| <b>a</b> 774 (nearest 100)    | <b>b</b> 86 (nearest 10)      | <b>c</b> 5940 (nearest 1000)    |
| <b>d</b> 71 (nearest 10)      | <b>e</b> 50 (nearest 100)     | <b>f</b> 80 999 (nearest 1000)  |
| <b>g</b> 41 967 (nearest 100) | <b>h</b> 96 084 (nearest 100) | <b>i</b> 569 972 (nearest 1000) |

**4** Each of these numbers has been rounded to the nearest 10.  
Write down the range of the original number.

- |              |               |               |
|--------------|---------------|---------------|
| <b>a</b> 560 | <b>b</b> 1240 | <b>c</b> 3090 |
| <b>d</b> 500 | <b>e</b> 4000 | <b>f</b> 2100 |

- 5** The following table shows the size of the audience for a television show on five different days.

Copy and complete the table. Always work from the number in the first column (size of audience).

Size of audience	Rounded to nearest 10	Rounded to nearest 100	Rounded to nearest 1000
1 963 756			
2 004 842			
1 875 074			
2 115 499			
2 047 908			

- 6** The London Marathon is 46 275 yards long. The numbers below show this length in yards rounded to different degrees of accuracy.

State the degree of accuracy which was used, for example to the nearest 100 yards.

- a** 46 000                      **b** 46 300                      **c** 50 000                      **d** 46 280

- 7** Bea read in the newspaper that, to the nearest thousand pounds, the local skateboard park upgrade cost £18 000. It cost a whole number of pounds.



- a** What is the smallest amount of money this could have cost?  
**b** What is the largest amount of money this could have cost?  
**c** Bea's dad told her that it had cost £18 400 to the nearest hundred pounds. What are the smallest and largest amounts now?

- 8** Jenni has some money saved in her bank account. It is a whole number of pounds.

She wrote down that she had £3500 to the nearest hundred pounds.

She told her mother she had £4000 to the nearest thousand pounds.

Write down the range of the amounts that Jenni could have in her bank account.

### explanation 2

- 9** Write each of these numbers correct to 1 decimal place.

**a** 32.61

**b** 2.75

**c** 95.17

**d** 101.02

**e** 17.785

**f** 892.063

**g** 726.24

**h** 1000.95

**i** 0.386

**j** 0.5296

**k** 3.032

**l** 5.063

**m** 5.983

**n** 6.954

**o** 54.902

- 10** Write each of these numbers correct to 2 decimal places.

**a** 94.875

**b** 10.0202

**c** 674.289

**d** 8541.087

**e** 12.006

**f** 29.0036

**g** 6.7582

**h** 1001.0074

**i** 0.386

**j** 0.6384

**k** 5.6073

**l** 59.0057

**m** 65.894

**n** 0.996

**o** 9.998

- 11** Use a calculator to work these out.

Give your answer to the number of decimal places (d.p.) specified.

**a**  $4 \div 17$  (2 d.p.)

**b**  $18 \div 7$  (1 d.p.)

**c**  $29 \div 3$  (2 d.p.)

**d**  $781 \div 52$  (2 d.p.)

**e**  $915 \div 12$  (1 d.p.)

**f**  $18 \div 199$  (2 d.p.)

- 12** For a physics experiment, Joshua used his calculator to work out the mean height of a pendulum swing and got 7.298 756 434 cm.

He was asked to write his answer to 1 d.p. What should Joshua write down?

- 13** Reki worked out the area of a circle on her calculator and got  $4.569877509\text{ cm}^2$ . Round her answer to 2 d.p.
- 14** The value of the number pi ( $\pi$ ) to 10 d.p. is 3.141 592 653 6. Round this number to the number of decimal places specified.
- a** 1 d.p.      **b** 2 d.p.      **c** 3 d.p.      **d** 4 d.p.      **e** 5 d.p.
- 15** Jess rounded the number 847.45 to the nearest whole number and got 848. What mistake do you think Jess made? What is the correct value?
- 16** State whether each of these statements is true or false.
- a** 367.25 correct to 1 d.p. is 367.3.
- b** 1050.51 rounded to the nearest whole number is 1050.
- c** 45.1648 correct to 2 d.p. is 45.16.

### explanation 3

- 17** Estimate the answer to each calculation. Do not use a calculator. Show your method clearly.
- a**  $12.3 \times 82$       **b**  $35.9 \times 67$       **c**  $947 \div 76$
- d**  $3021 \div 48.2$       **e**  $\frac{473}{63}$       **f**  $46.74 \times 31.8$
- g**  $\frac{553.9}{82.7}$       **h**  $307.6 \div 52.9$       **i**  $7.987 \times 36.4$
- j**  $\frac{4.897}{8.087}$       **k**  $0.983 \times 3.9$       **l**  $0.052 \times 81.9$
- 18** Estimate the answer to each calculation. Do not use a calculator. Show your method clearly.
- a**  $43 \times (35 + 78)$       **b**  $86.4 \div (42.3 \times 0.45)$
- c**  $(17 \times 9.8) \div 6.3$       **d**  $(15.6 \div 3.7) + 45$

- 19** Estimate the total time spent travelling by 32 pupils going to school if the average journey time is 17 minutes. Give your answer in hours.



- 20** There are 9 people working in an office.  
Each of them buys lunch. The costs are as follows:  
£1.50, £3.65, £5.23, £0.99, £2.75, £4.50, £2.99, £3.40, £4.05
- Without using a calculator, estimate the total amount spent on lunch by the people in that office.
  - The mean amount spent is found by finding the total spent and dividing it by the number of people. Estimate the mean amount spent on lunch.
- 21** The height of Mount Everest is 8848 m and the height of Ben Nevis (the tallest mountain in the UK) is 1344 m.  
Estimate how many times higher Mount Everest is than Ben Nevis.
- 22** At the census in 2001, the population of England and Wales was 52 042 000 (to the nearest thousand) and the population of London was 7 172 000.  
Estimate the percentage of the population living in London at the time of the census.
- 23** Which of these answers is an appropriate estimate?  
(The symbol  $\approx$  means 'is approximately equal to'.)
- $19.6 \times 72.1 \approx 1400$
  - $2864 \div 94 \approx 30$
  - $96.2 \times (33 \div 17) \approx 50$
  - $1750 \div (83 \times 2.4) \approx 1$