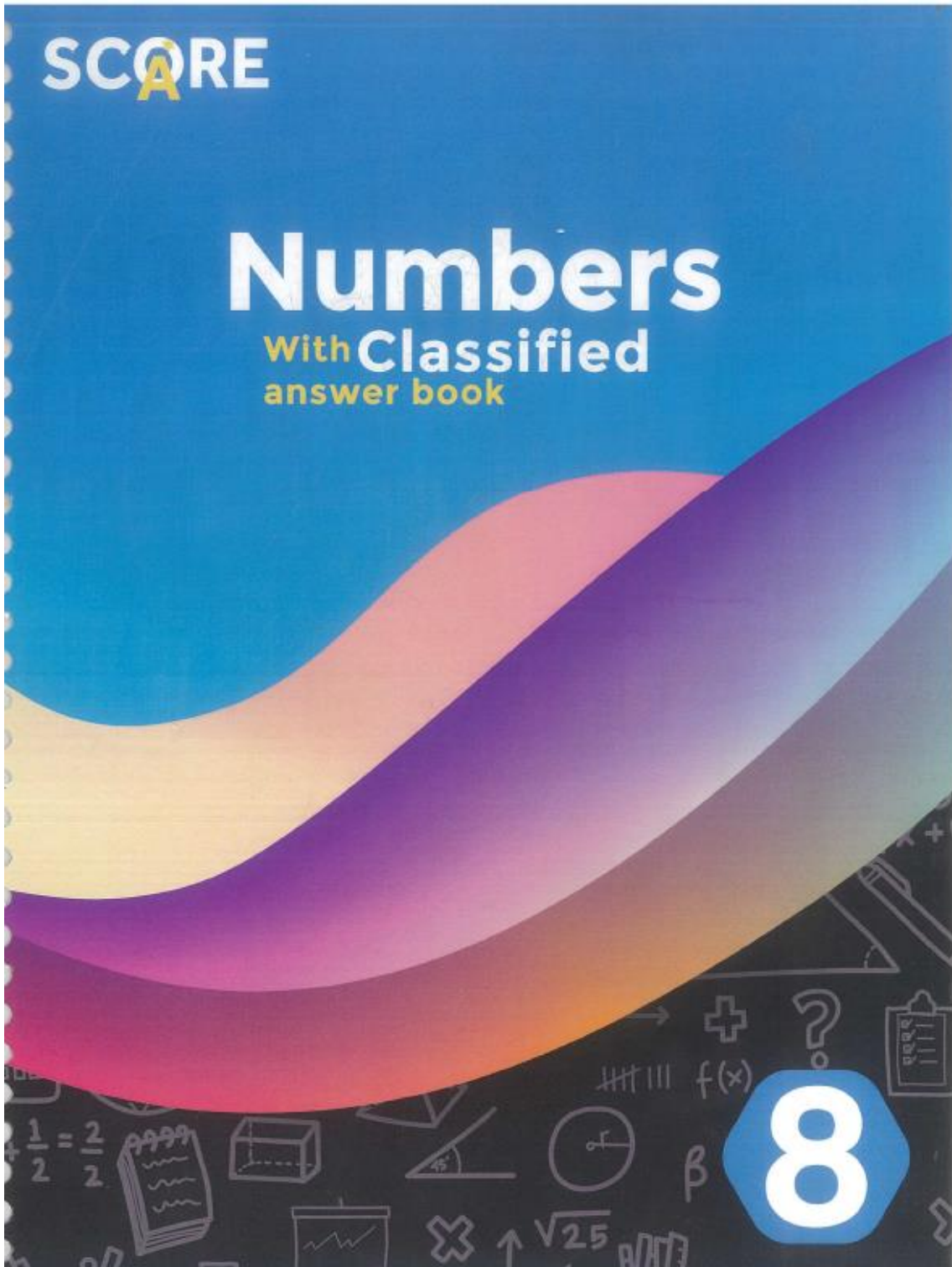


Classified - Understanding upper and lower bounds

p. 24 to p. 31



6- Understanding Upper and Lower Bounds

1. A whole number is rounded to the nearest 10. The answer is 80.
 - a List the integer values the number could be.
 - b What is the
 - i lower bound
 - ii upper bound?

2. A number with one decimal place is rounded to the nearest whole number. The answer is 12. Complete these sentences.
 - a The lower bound is

 - b The upper bound is

3. A number n , rounded to two significant figures is 3800. Write down the error interval for n .

4. How would the error interval change if n had been rounded to:
 - three significant figures?

 - four significant figures?

5. Jess rounds a number, x , to one decimal place.

The result is 9.8.

Write down the error interval for x .

6. A number, n , is rounded to 2 decimal places.

The result is 4.76.

Using inequalities, write down the error interval for n .

7. Eva and Annie each think of a number.

When I
round my integer to
the nearest 10, I get
the answer 40

Eva

My number is
not an integer, but
mine also rounds to 40
to the nearest 10

Annie

a) What is the smallest number Eva could be thinking of?

b) What is the greatest number Eva could be thinking of?

c) Complete the sentence.

Eva's number is between

and

Are the answers the same for Annie's number?

8. The table shows how eggs are categorised by mass.

Egg size	Mass (g)
very large	$m > 73$
large	$63 < m \leq 73$
medium	$53 < m \leq 63$
small	$m \leq 53$

- What is the size of an egg that weighs 72 g?
- What is the size of an egg that weighs 63 g?
- What is the maximum mass of a small egg?

9. Write these intervals in words.

The first one has been done for you.

$1 < x \leq 5$ x is greater than 1 but less than or equal to 5

$1 \leq x < 5$ _____

$1 < x < 5$ _____

$3.5 < x \leq 4.5$ _____

10. In a school, there are 200 students in Year 7 and 300 students in Year 8

Both numbers are correct to 1 significant figure.

Work out the greatest and smallest possible total number of students in Years 7 and 8

greatest possible number =

smallest possible number =

11. Tick the interval that matches each statement.

a) $x = 8$ to the nearest integer

$7.5 < x < 8.5$

$7.5 < x \leq 8.5$

$7.5 \leq x \leq 8.5$

$7.5 \leq x < 8.5$

$x = 8.0$ to 1 decimal place

$7.5 < x < 8.5$

$7.5 < x \leq 8.5$

$7.95 \leq x < 8.05$

$7.5 \leq x \leq 8.05$

b) the length of the book, l , is 20 cm to the nearest centimetre

$19.5 \leq l < 20.5$

$19.5 < l \leq 20.5$

$19 < l < 21$

$19.5 \leq l \leq 20.5$

the length of the book, l , is 20 cm to the nearest 10 cm

$10 \leq l < 30$

$15 < l \leq 25$

$10 < l < 25$

$15 \leq l < 25$

c) $p = 3$ to 1 significant figure

$2 < p < 4$

$2.5 \leq p < 3.5$

$2.5 < p \leq 3.5$

$2.5 \leq p \leq 3.5$

$p = 30$ to 1 significant figure

$25 < p < 35$

$29.5 < p \leq 30.5$

$25 \leq p < 35$

$29.5 \leq p < 30.5$

12. Complete the error intervals for each statement.

$a = 16$ to the nearest whole number

$\leq a <$

$b = 10$ to the nearest whole number

$\leq b <$

$c = 600$ to the nearest 100

$\leq c <$

$d = 6,000$ to the nearest 1,000

$\leq d <$

$e = 6,000$ to the nearest 100

$\leq e <$

$f = 6,000$ to the nearest 10

$\leq f <$

$g = 6,000$ to the nearest integer

$\leq g <$

13. Brett and Tom have given these error intervals for the number m .

Brett

$$23.5 \leq m < 24.5$$

Tom

$$24.5 > m \geq 23.5$$

Brett thinks their answers are the same.

Do you agree with Brett?

Explain your answer.

14. Write a possible statement to match each error interval.

The first one has been done for you.

- a) $3.75 \leq h < 3.85$ $h = 3.8$ to 1 decimal place
- b) $11.5 \leq p < 12.5$ _____
- c) $105 \leq q < 115$ _____
- d) $7,950 \leq m < 8,050$ _____
- e) $0.005 \leq t < 0.015$ _____

15. Vihaan works out the area of this pond to be 19 m^2 , correct to the nearest metre. Write
- the lower bound of the area
 - the upper bound of the area
 - an inequality to show the range of values the area could be.
16. Saarya works out the mean number of points her netball team scores each match to be 60 points, correct to the nearest 10 points.
- the lower bound of the mean number of points
 - the upper bound of the mean number of points
 - Write an inequality to show the range of values the mean number of points could be. Explain how you worked out your answers.
17. A shop sells pieces of wood that measure 150 cm to the nearest 10 cm. For the length of one piece of wood, write
- the lower bound
 - the upper bound
 - an inequality to show the range of values.

18. a is an integer.
For each of the following, write down the possible values of a .

$$9 \leq a \leq 12$$

$$9 < a \leq 12$$

$$9 < a < 12$$

$$9 \leq a < 12$$

19. $x = 4$ to the nearest integer.

x could be any number from 3.5 to 4.4

Annie is incorrect. Explain why.

20. Which of these inequalities represents the possible values of x ?

$$3.5 < x \leq 4.5$$

$$3.5 \leq x \leq 4.5$$

$$3.5 \leq x < 4.5$$

21. A bottle has a capacity of 1.2 litres correct to the nearest 0.1 litres.

- a For the capacity of one bottle, write
- i the lower bound
 - ii the upper bound
 - iii an inequality to show the range of values.
- b For the capacity of five bottles, write
- i the lower bound
 - ii the upper bound
 - iii an inequality to show the range of values.

22. The length of a book is 25 cm to the nearest centimetre.

Complete these statements about the length of the book.

The lower limit for the length of the book iscm.

The upper limit for the length of the book iscm.