

# 1.1.4 Estimation

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Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

**KEY WORDS** significant figure

&lt;!-- Session 2 native-skill companion --&gt;

## Objective

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Practise estimation within the labelled native lessons. Public original tasks; locally authored answer guidance.

## 1 Key knowledge and worked examples

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### ■ Estimation, rounding and simple error intervals · Foundation

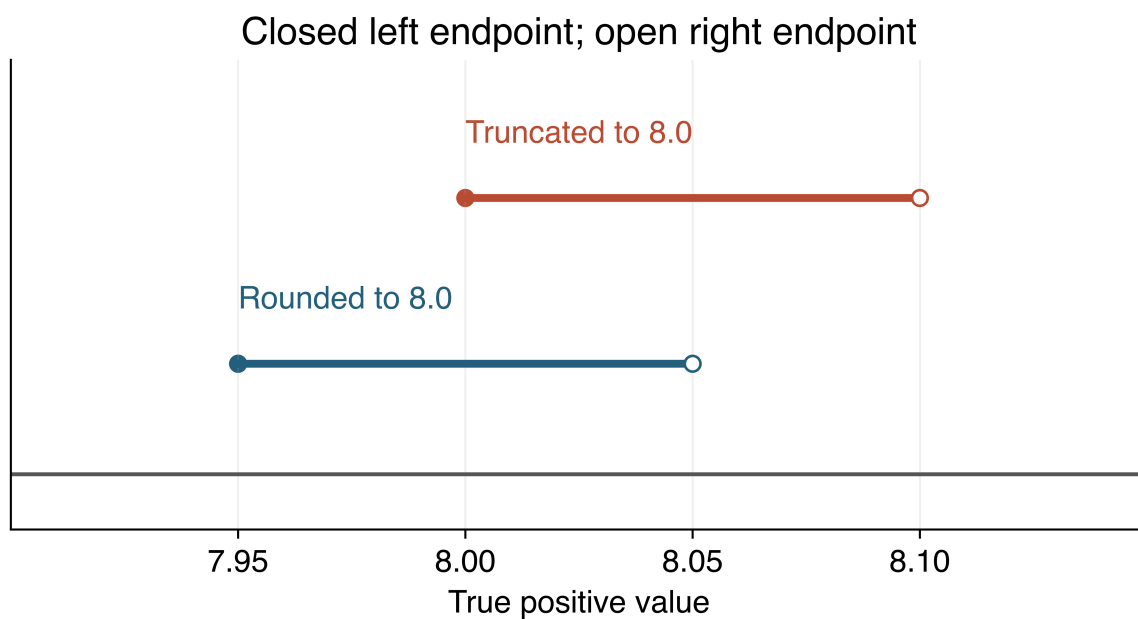
For a rough check use easy nearby numbers:  $50 \times 20 \div 10 = 100$ . Decimal places count digits after the point; significant figures start at the first nonzero digit. Round only the final result. Nearest-unit rounding has an interval extending half a unit either way; positive truncation keeps values from the stated value up to the next unit.

$$7.95 \leq L < 8.05$$

The calculation is about 96.18, consistent with the estimate 100. The number 0.004786 rounds to 0.0048 at 2 significant figures, but to 0.005 at 3 decimal places. If length  $L$  rounds to 8.0 cm at 1 decimal place,  $7.95 \leq L < 8.05$ . If a positive value is truncated to 8.0 at 1 decimal place,  $8.0 \leq L < 8.1$  instead. Reported precision must fit the question. Seventeen items packed six per box need three whole boxes, since two boxes hold only twelve items. Rounding  $17/6$  to two boxes would fail the physical requirement. For a nearest-0.1 reading of 8.0, each possible value differs from the report by at most 0.05; a claim of 8.08 lies outside the interval. Carry full calculator precision until a final money, length or accuracy requirement is applied.

Zeros before the first nonzero digit do not count as significant figures. Rounding and truncation give different intervals. Do not turn an approximate check into an exact answer, or round every intermediate result.

AQA N14–N16 require accuracy interpretation at both tiers. Foundation uses simple intervals and limits of accuracy. Higher combines upper and lower bounds for calculated quantities in the separate bounds lesson.



*Original native-lesson illustration; labels belong to its worked example.*

## 2 Practice

**2.1** (Foundation) Find the rough estimate  $50 \times 20 \div 10$ .

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**2.2** (Foundation) Round 0.004786 to 2 significant figures.

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**2.3** (Foundation) Find the upper endpoint of the nearest-0.1 interval for 8.0.

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### 3 Exam-style questions

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**3.1** Decide whether this claim is true. Justify with a concrete calculation or counterexample: Rounding a positive value and truncating it to the same decimal place always give the same error interval.

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## Solutions

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**2.1**  $50 \times 20 / 10 = 100$ .

**2.2** Start at digit 4; the next digit after 7 is 8, so round to 0.0048.

**2.3** Half of 0.1 is 0.05;  $8.0 + 0.05 = 8.05$ .

**3.1** False. Rounding to 3.6 at one decimal gives  $3.55 \leq x < 3.65$  under the usual rounding convention. Truncating a positive value to 3.6 gives  $3.6 \leq x < 3.7$ .

Local review guidance: show the chosen method; give the checked result; explain the condition or failed shortcut. This is authored classroom guidance.