

E1.14 Using a calculator

Name: _____ Class: _____ Date: _____

Total: 12 marks

KEY WORDS brackets 括号 • standard form 标准形式 • significant figure 有效数字
 • decimal place 小数位 • display 显示屏

Objective

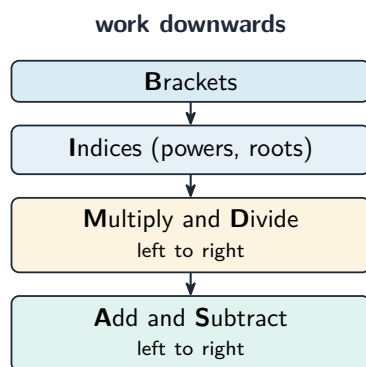
Build the skills to answer Extended exam questions on **using a calculator** 计算器的使用 — entering a calculation with the right **brackets** 括号, reading the **display** 显示屏 including **standard form** 标准形式, and giving an answer to a sensible **degree of accuracy** 精确度.

You must be able to:

- enter a fraction whose numerator or denominator is itself a calculation
- interpret a calculator display, including a standard-form display such as $3.6\text{E}-5$
- round the displayed answer to a given number of significant figures or decimal places

1 Worked examples

■ The calculator obeys the order of operations — so you must add the brackets



$$\begin{array}{l}
 -6 \times -3 + 7 \times 2 \\
 \downarrow \text{multiply first: } -6 \times -3 = 18, 7 \times 2 = 14 \\
 18 + 14 \\
 \downarrow \text{then add} \\
 32
 \end{array}$$

Typing left to right and pressing = gives the wrong answer

Standard form: $A \times 10^n$, **with** $1 \leq A < 10$

$$\boxed{6\,500\,000} \longrightarrow \boxed{6.5 \times 10^6}$$

point moves 6 places

$$\boxed{0.00042} \longrightarrow \boxed{4.2 \times 10^{-4}}$$

point moves 4 places

standard form: $a \times 10^n$ with $1 \leq a < 10$

A display of 3.6E-5 means 3.6×10^{-5}

- **Brackets round a whole line:** $\frac{4.2 + 7.8}{3.5 - 1.1}$ must be entered as $(4.2 + 7.8) \div (3.5 - 1.1)$, giving 5. Without brackets the calculator returns $4.2 + 2.23 \dots - 1.1$.
- **Roots and powers:** $\sqrt{6.4^2 + 4.8^2} = \sqrt{64} = 8$ — the whole sum must be inside the root.
- **Standard form:** a display of 3.6E-5 is $3.6 \times 10^{-5} = 0.000\,036$. Never write E in your answer.
- **Accuracy:** unless the question says otherwise, give a non-exact answer to 3 significant figures, and keep the full value in the calculator until the last step.

Answer shapes (marked by **method marks** — M1 for a correct method, A1 for the correct answer): show the substituted expression before the answer; a lone number from a calculator earns nothing if it is wrong.

2 Practice

2.1 Use your calculator to find the exact value of $\frac{4.2 + 7.8}{3.5 - 1.1}$. [2]

2.2 Work out $\sqrt{6.4^2 + 4.8^2}$. [2]

2.3 Work out $(2.5 \times 10^4) \times (4 \times 10^{-7})$, giving your answer in standard form. [2]

3 Exam-style questions

3.1 (a) Use your calculator to find $\frac{17.4 - 3.9}{2.7 \times 1.25}$, giving your answer correct to 3 significant figures. [2]

(b) Write your answer to part (a) correct to 1 decimal place. [1]

3.2 Work out $\sqrt[3]{1728} + \sqrt{2.25}$. [2]

3.3 A calculator display shows 3.6E-5. Write this number in ordinary form. [1]

Solutions

Marking: **M1** a correct method, **A1** the correct answer.

Each answer shows the steps, then the **result**.

2.1

- enter as $(4.2 + 7.8) \div (3.5 - 1.1) = 12 \div 2.4$

$$= \mathbf{5}$$

2.2

- $6.4^2 + 4.8^2 = 40.96 + 23.04 = 64$

$$\sqrt{64} = \mathbf{8}$$

2.3

- multiply the numbers and add the powers: $2.5 \times 4 = 10$ and $10^4 \times 10^{-7} = 10^{-3}$
- 10×10^{-3} is not in standard form, so adjust

$$= \mathbf{1 \times 10^{-2}}$$

3.1

(a)

- $\frac{13.5}{3.375}$

$$= \mathbf{4.00}$$

(b)

- 4.00 to 1 decimal place

$$= \mathbf{4.0}$$

3.2

- $\sqrt[3]{1728} = 12$ and $\sqrt{2.25} = 1.5$

$$12 + 1.5 = \mathbf{13.5}$$

3.3

- E-5 means $\times 10^{-5}$, so move the point 5 places left

$$= \mathbf{0.000\,036}$$