

Standard form

Year 8 About 60 minutes No calculator 48 marks



Hints online, answers free with an account:
mathswariz.uk/worksheets/ks3-year-8-standard-form/

Date _____

A Do Now

Quick questions to start.

- A1** Needed today [1 mark] Write 5.06×10^4 as an ordinary number.
- A2** Last lesson [1 mark] Work out 0.06×10^{-2} .

Answer

Answer

- A3** From chapter 8 [1 mark] Expand and simplify $(x + 4)(x - 6)$.
- A4** Year 7 [1 mark] Round 0.04637 to 2 significant figures.

Answer

Answer

B Example, then your turn

Year 8

Your teacher works through each example with you. Then try the one beside it.

EXAMPLE 1

Write each number in standard form.

(a) 0.0072

(b) 0.000305

Hint Move the digits until the first non-zero digit is in the units column. The number of places is the power; moving the digits to the left gives a negative power.

- B1** Write each number in standard form [2 marks]

(a) 0.064

(b) 0.0000091

Answer (a) (b)

EXAMPLE 2

Write each number as an ordinary number.

(a) 3.8×10^{-4} (b) 6.05×10^5

Hint A negative power makes the number smaller: there are 4 zeros in front of the 3, counting the one before the decimal point.

- B2** Write each number as an ordinary number. [2 marks]

(a) 9.17×10^{-3} (b) 2.4×10^7

Answer (a) (b)

EXAMPLE 3

These numbers are not in standard form. Write each one in standard form.

(a) 27×10^3

(b) 0.63×10^{-2}

Hint Write the first number in standard form, then put the two powers of 10 together.

B3 These numbers are not in standard form. Write each one in standard form. [2 marks]

(a) 840×10^{-6}

(b) 0.059×10^5

Answer (a) (b)

EXAMPLE 4

Work out each answer. Give your answers in standard form.

(a) $3.2 \times 10^4 + 6.5 \times 10^3$

(b) $4.1 \times 10^{-3} - 7 \times 10^{-4}$

Hint The powers are different, so you cannot just add the front numbers. Write both as ordinary numbers first.

B4 Work out each answer. Give your answers in standard form. [4 marks]

(a) $5.7 \times 10^5 + 8.4 \times 10^4$

(b) $2.3 \times 10^{-2} - 6 \times 10^{-3}$

Answer (a) (b)

EXAMPLE 5

One speck of dust has a mass of 7×10^{-10} grams. Work out the mass of 3 000 000 specks of dust. Give your answer in standard form.

Hint Write 3 000 000 as 3×10^6 . Multiply the front numbers, then the powers of 10.

B5 One sheet of gold leaf is 1.2×10^{-4} mm thick. A pile has 5000 sheets. Work out the height of the pile, in mm. Give your answer in standard form. [3 marks]

Answer

c Practice

Year 8

C1 Work out each answer. Give your answers in standard form. [2 marks]

(a) 0.003^2

(b) 0.012^2

Answer (a) (b)

C2 Write these numbers in order of size. Start with the smallest. [2 marks]

4.5×10^{-3} , 3.9×10^{-2} ,
 6×10^{-4} , 0.0052

Answer

C3 Which of these numbers are written in standard form? [2 marks]

P: 3.7×10^{-5} Q: 37×10^{-6}

R: 0.37×10^{-4} S: 1×10^8

C4 How many times bigger is 6×10^{-2} than 3×10^{-5} ? [2 marks]

Answer

Answer

C5 Write each number in standard form. [2 marks]

(a) 25 million

(b) three thousandths

Answer (a) (b)

D Exam-style questions

GCSE Foundation

D1 Answer each part.

(a) Write 6.3×10^{-4} as an ordinary number. [1 mark]

Answer

(b) Write 0.0000802 in standard form. [1 mark]

Answer

(c) Write 58 million in standard form. [1 mark]

Answer

Total for D1: 3 marks

D2 Mia says, " 34×10^{-3} is in standard form, because it is a number times a power of 10." [2 marks]

Explain why Mia is wrong. Write 34×10^{-3} in standard form.

D3 A red blood cell is 0.000008 m wide. A human hair is 7.2×10^{-5} m wide.

(a) Write 0.000008 in standard form.

[1 mark]

Answer

(b) How many times wider is the hair than the red blood cell?

[2 marks]

Answer

(c) Work out the difference between the two widths. Give your answer in standard form. [2 marks]

Answer

Total for D3: 5 marks

D4 The table shows the masses of four grains of sand.

(a) Write the grains in order of mass. Start with the lightest. [2 marks]

Answer

(b) Work out the total mass of grains A and B. Give your answer in standard form. [2 marks]

Grain	Mass (grams)
A	3.6×10^{-4}
B	8.1×10^{-5}
C	2×10^{-3}
D	9.5×10^{-5}

Answer

Total for D4: 4 marks

D5 A dust mite has a mass of 4×10^{-6} grams. Work out how many dust mites have a total mass of 1 gram. Give your answer in standard form. [3 marks]

Answer

No route is given. The hints are at the end of the sheet. Use one at a time.

- E1** Two numbers add up to 6.1×10^{-3} . One of the numbers is 4 times the other. [4 marks]
Work out the two numbers. Give your answers in standard form.

Answer and

Extension hints

Cover these with paper. Uncover one at a time.

- E1** **Hint 1** Call the smaller number n . Then the other is $4n$, and together they make $5n$.
Hint 2 $5n = 0.0061$, so $n = 0.0061 \div 5$.
Hint 3 $n = 0.00122$. Now work out $4n$, then write both numbers in standard form.

How did it go?

Colour one circle on each line: not yet, nearly, yes.

- I can write small and large numbers in standard form and change them back. ☐ ☐ ☐
- I can put a number such as 27×10^3 into standard form. ☐ ☐ ☐
- I can add, subtract and compare numbers in standard form. ☐ ☐ ☐