



Standard form

About 45 minutes No calculator 37 marks

Date _____

A Do Now

The first question is what today's lesson needs. The others bring back earlier topics.

- A1** Needed today [2 marks] **A2** From chapter 4 [2 marks]
Simplify $\frac{4x^2 \times 8x^4}{16x}$.

Answer

- A3** From chapter 9 [2 marks] **A4** From chapter 12 [2 marks]
A prism is 7 cm long. Its cross-section is a right-angled triangle with shorter sides 12 cm and 5 cm. Find its total surface area.

Answer

Answer

B Example, then your turn

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

EXAMPLE 1

Write 0.000 93 in standard form.

Hint Move the point until the number is between 1 and 10. Count the places: a small number has a negative power.

- B1** Write 0.000 061 7 in standard form. [2 marks]

Answer

EXAMPLE 2

Work out $(3.5 \times 10^4) \times (2 \times 10^6)$. Give your answer in standard form.

Hint Multiply the front numbers. Add the powers of 10.

B2 Work out [2 marks]

$(4 \times 10^{-3}) \times (6 \times 10^8)$. Give your answer in standard form.

Answer

c Practice

C1 Write 5.08×10^6 as an ordinary number. [1 mark]

Answer

C2 Work out [2 marks]
 $(6.3 \times 10^9) \div (1.4 \times 10^2)$. Give your answer in standard form.

Answer

C3 Work out $6.3 \times 10^5 + 4.9 \times 10^4$. [2 marks]
 Give your answer in standard form.

Answer

C4 Write these numbers in order of size. Start with the smallest: [2 marks]
 4.6×10^{-3} , 0.0047, 4.07×10^{-4} , 4.6×10^{-2}

Answer

C5 Write 4 260 000 000 in standard form. [1 mark]

Answer

C6 0.25×10^{-3} is not in standard form. Write it in standard form. [1 mark]

Answer

C7 Work out $8.2 \times 10^6 - 5 \times 10^5$. [2 marks]
 Give your answer in standard form.

Answer

C8 Work out $\sqrt{3.6 \times 10^9}$. Give your answer in standard form. [2 marks]

Answer

D Exam-style questions

D1 Ben says, " $0.000\ 74 = 7.4 \times 10^4$, because the point moves 4 places." [2 marks]

Explain why Ben is wrong, and write 0.000 74 correctly in standard form.

Answer

D2 A red blood cell is 8×10^{-6} m wide. A human body holds about 2.5×10^{13} red blood cells.

- (a) All the cells are laid side by side in a straight line. Work out the length of the line, in metres. Give your answer in standard form. [2 marks]

Answer

- (b) The distance round the Earth is about 4×10^7 m. How many times round the Earth would the line go? [2 marks]

Answer

- (c) The body makes 2×10^6 new red blood cells every second. Work out the number of seconds it takes to make 2.5×10^{13} cells. Give your answer in standard form. [2 marks]

Answer

Total for D2: 6 marks

E Extension

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

- E1** n is a whole number. Write $\frac{(3 \times 10^n)^2}{6 \times 10^{n-3}}$ in standard form. Give your answer in terms of n . [4 marks]

Answer

Extension hints

Cover these with paper. Uncover one at a time.

- E1** **Hint 1** Square the bracket first: square the 3 and double the power.
Hint 2 $(3 \times 10^n)^2 = 9 \times 10^{2n}$.
Hint 3 $9 \div 6 = 1.5$ and $10^{2n} \div 10^{n-3} = 10^{n+3}$, so $1.5 \times 10^{n+3}$.

How did it go?

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

- I can write large and small numbers in standard form, and back again. ☐ ☐ ☐
- I can multiply, divide, add, subtract and compare numbers in standard form. ☐ ☐ ☐
- I can use standard form in a real problem and find a square root. ☐ ☐ ☐