

Dividing with numbers in standard form

Year 8 About 60 minutes No calculator 48 marks



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

Date _____

A Do Now

Quick questions to start.

A1 Needed today [1 mark]
 Write $10^9 \div 10^3$ as a single power of 10.

Answer

A2 Last lesson [1 mark]
 Work out $(2 \times 10^4) \times (4 \times 10^{-7})$.
 Give your answer in standard form.

Answer

A3 From chapter 8 [1 mark]
 Expand $3x(2x - 5)$.

Answer

A4 Year 7 [1 mark]
 Work out $2.4 \div 0.6$.

Answer

B Example, then your turn

Year 8

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

EXAMPLE 1

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

(a) $(8 \times 10^7) \div (2 \times 10^3)$

(b) $(9 \times 10^{-3}) \div (3 \times 10^5)$

Hint Divide the front numbers. Then divide the powers of 10 by subtracting the indices.

B1 Work out each answer. Give your answers in standard form. [2 marks]

(a) $(6.4 \times 10^9) \div (2 \times 10^4)$

(b) $(7.5 \times 10^{-2}) \div (2.5 \times 10^{-6})$

Answer (a) (b)

EXAMPLE 2

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

(a) $(3 \times 10^8) \div (5 \times 10^2)$

(b) $(1.4 \times 10^{-4}) \div (7 \times 10^3)$

Hint $3 \div 5 = 0.6$, which is less than 1. Write 0.6 as 6×10^{-1} .

B2 Work out each answer. Give your answers in standard form. [2 marks]

(a) $(2 \times 10^9) \div (8 \times 10^4)$

(b) $(3.6 \times 10^{-2}) \div (9 \times 10^{-6})$

Answer (a) (b)

EXAMPLE 3

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

(a) $\sqrt{1.6 \times 10^7}$

(b) $\sqrt{4.9 \times 10^{-5}}$

Hint Make the power of 10 even first:

$1.6 \times 10^7 = 16 \times 10^6$. Then take the square root of each part.

B3 Work out each answer. Give your answers in standard form. [2 marks]

(a) $\sqrt{3.6 \times 10^9}$

(b) $\sqrt{8.1 \times 10^{-7}}$

Answer (a) (b)

EXAMPLE 4

A virus is 4×10^{-5} m wide. How many of these viruses would fit side by side across a gap 2 cm wide? Give your answer in standard form.

Hint Change 2 cm into metres first: $2 \text{ cm} = 0.02 \text{ m}$
 $= 2 \times 10^{-2} \text{ m}$.

B4 A cell is 5×10^{-6} m wide. How many of these cells would fit side by side across a line 3 mm long? Give your answer in standard form. [3 marks]

Answer

EXAMPLE 5

A country uses 4.8×10^{10} litres of water a day. It has 6×10^7 people. Work out the litres for each person, in standard form.

Hint Divide the total by the number of people.

B5 A city's 1.2×10^7 homes use 3.6×10^9 kWh of electricity in a year. Work out the mean kWh for one home, in standard form. [3 marks]

Answer

c Practice

Year 8

C1 Write down the missing number. [2 marks]
 Give it in standard form.

$$\square \div (4 \times 10^3) = 2 \times 10^5$$

Answer

C2 Work out each answer. Give your answers in standard form, correct to 2 significant figures. [2 marks]

(a) $(7 \times 10^5) \div (3 \times 10^2)$

(b) $(2 \times 10^{-3}) \div (6 \times 10^4)$

Answer (a) (b)

C3 Radio signals travel 3×10^8 m each second. A satellite is 3.6×10^7 m above the Earth. How many seconds does a signal take to reach it? Give your answer in standard form. [2 marks]

Answer

C4 Work out $\frac{(6 \times 10^5) \times (4 \times 10^3)}{8 \times 10^2}$. [2 marks]
Give your answer in standard form.

Answer

C5 Which is larger, P or Q? Show your working. [2 marks]

$$P = (8 \times 10^6) \div (4 \times 10^{-2})$$

$$Q = (9 \times 10^5) \div (3 \times 10^{-3})$$

Answer

D Exam-style questions

GCSE Foundation

D1 Work out each answer. Give your answers in standard form.

(a) $(8 \times 10^6) \div (4 \times 10^2)$ [1 mark]

Answer

(b) $(6 \times 10^{-3}) \div (2 \times 10^{-7})$ [1 mark]

Answer

(c) $(4 \times 10^3) \div (5 \times 10^7)$ [1 mark]

Answer

Total for D1: 3 marks

D2 Ana says, " $(6 \times 10^8) \div (3 \times 10^{-2}) = 2 \times 10^6$, because $8 - 2 = 6$." [2 marks]

Explain what Ana has done wrong. Write the correct answer in standard form.

D3 A spacecraft travels 3.6×10^8 km in 4.8×10^2 hours.

- (a) Work out its mean speed in kilometres per hour. Give your answer in standard form. [2 marks]

Answer

- (b) Work out its mean speed in kilometres per minute. Give your answer in standard form. [2 marks]

Answer

Total for D3: 4 marks

D4 The table shows the number of people and the area of two countries.

- (a) Work out the number of people for each km^2 in country P. Give your answer in standard form. [2 marks]

Country	Number of people	Area (km^2)
P	6.4×10^7	2.5×10^5
Q	4.5×10^6	9×10^4

Answer

- (b) Work out the number of people for each km^2 in country Q. Give your answer in standard form. [2 marks]

Answer

- (c) How many times as many people for each km^2 does country P have as country Q? [1 mark]

Answer

Total for D4: 5 marks

D5 A plastic card is 7.5×10^{-4} m thick. A stack of these cards is 9 cm high. Work out the number of cards in the stack. Give your answer in standard form. [4 marks]

Answer

E Extension

Stretch

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

E1 A cube has a volume of 2.7×10^{-5} m³. Work out its surface area, in m². Give your answer in standard form. [4 marks]

Answer

Extension hints

Cover these with paper. Uncover one at a time.

- E1** **Hint 1** The volume is the side length cubed. First find the side length.
- Hint 2** $2.7 \times 10^{-5} = 27 \times 10^{-6}$, and the cube root of 27 is 3.
- Hint 3** The side is 3×10^{-2} m. A cube has 6 square faces.

How did it go?

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

- I can divide numbers in standard form by dividing the front numbers and subtracting the powers.
- I can put an answer such as 0.6×10^6 back into standard form.
- I can use dividing to find how many fit, or an amount for each one.