

Multiplying 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-multiplying-with-numbers-in-standard-form/

Date _____

A Do Now

Quick questions to start.

A1 Needed today [1 mark]
Write $10^4 \times 10^3$ as a single power of 10.

Answer

A2 Last lesson [1 mark]
Write 0.00058 in standard form.

Answer

A3 From chapter 8 [1 mark]
Factorise $6x + 15$.

Answer

A4 Year 7 [1 mark]
Work out 3.5×0.6 .

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) $(2 \times 10^4) \times (3 \times 10^5)$

(b) $(1.2 \times 10^{-3}) \times (4 \times 10^7)$

Hint Multiply the front numbers. Then multiply the powers of 10 by adding the indices.

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

(a) $(4 \times 10^3) \times (2 \times 10^6)$

(b) $(3.1 \times 10^{-5}) \times (3 \times 10^2)$

Answer (a) (b)

EXAMPLE 2

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

(a) $(5 \times 10^3) \times (8 \times 10^4)$

(b) $(6 \times 10^{-2}) \times (7 \times 10^5)$

Hint The front numbers make 40 and 42, which are not between 1 and 10. Write 40 as 4×10^1 .

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

(a) $(9 \times 10^6) \times (4 \times 10^2)$

(b) $(2.5 \times 10^4) \times (8 \times 10^{-7})$

Answer (a) (b)

EXAMPLE 3

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

(a) $(3 \times 10^{-4}) \times (2 \times 10^{-3})$

(b) $(4.5 \times 10^{-2}) \times (6 \times 10^{-5})$

Hint Adding two negative indices gives a more negative index: $-4 + -3 = -7$.

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

(a) $(2 \times 10^{-6}) \times (4 \times 10^{-2})$

(b) $(7.5 \times 10^{-3}) \times (4 \times 10^{-4})$

Answer (a) (b)

EXAMPLE 4

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

(a) $(3 \times 10^4)^2$

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

Hint $(3 \times 10^4)^2$ means $(3 \times 10^4) \times (3 \times 10^4)$. Square the front number and double the index.

B4 Work out each answer. Give your answers in standard form. [2 marks]

(a) $(6 \times 10^5)^2$

(b) $(5 \times 10^{-2})^3$

Answer (a) (b)

EXAMPLE 5

A grain of salt has a mass of 6×10^{-5} grams. A packet holds 2.5×10^7 grains. Work out the mass of salt in the packet, in grams. Give your answer in standard form.

Hint Multiply the mass of one grain by the number of grains.

B5 A bacterium is 2.5×10^{-6} m long. 4×10^7 of these bacteria are laid end to end in a line. Work out the length of the line, in metres. Give your answer in standard form. [3 marks]

Answer

c Practice

Year 8

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

$(3 \times 10^4) \times \square = 1.2 \times 10^9$

Answer

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

(a) $(2.4 \times 10^3) \times (3.7 \times 10^5)$

(b) $(1.9 \times 10^{-2}) \times (4.3 \times 10^{-3})$

Answer (a) (b)

C3 Work out $2.5 \times 10^{-3} \times 60\,000$. [2 marks]
Give your answer in standard form.

Answer

C4 A field is a rectangle 4×10^3 m [2 marks]
long and 2.5×10^2 m wide. Work
out its area, in m^2 . Give your
answer in standard form.

Answer

C5 Which is larger, P or Q? By how [2 marks]
much is it larger?

$$P = (6 \times 10^4) \times (5 \times 10^{-3})$$

$$Q = (7 \times 10^{-2}) \times (4 \times 10^3)$$

Answer

D Exam-style questions

GCSE Foundation

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

(a) $(2 \times 10^5) \times (4 \times 10^3)$ [1 mark]

Answer

(b) $(5 \times 10^{-3}) \times (3 \times 10^{-2})$ [1 mark]

Answer

(c) $(7 \times 10^4)^2$ [1 mark]

Answer

Total for D1: 3 marks

D2 Leo works out $(4 \times 10^5) \times (3 \times 10^2)$. He writes 12×10^{10} . [3 marks]

Leo has made two mistakes. Explain each one. Write the correct answer in standard form.

- D3** Radio signals travel at 3×10^8 metres per second. A signal from a space probe takes 4×10^3 seconds to reach the Earth.
- (a) Work out the distance from the probe to the Earth, in metres. Give your answer [2 marks] in standard form.

Answer

- (b) Write this distance in kilometres. Give your answer in standard form. [2 marks]

Answer

Total for D3: 4 marks

- D4** A factory packs bolts and washers in boxes. The table shows how many are in each box and the mass of one.
- (a) Work out the mass [2 marks] of the bolts in a box, in kg. Give your answer in standard form.

Item	Number in a box	Mass of one (kg)
Bolt	6×10^3	2.5×10^{-2}
Washer	4×10^4	3×10^{-3}

Answer

- (b) Work out the mass of the washers in a box, in kg. Give your answer in standard form. [2 marks]

Answer

- (c) Which box is heavier, and by how many kilograms? [1 mark]

Answer

Total for D4: 5 marks

- D5** A square floor tile has sides of length 6×10^{-2} m. A hall floor is covered with 5×10^4 of these tiles. Work out the area of the floor, in m^2 . 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** $(4 \times 10^n) \times (5 \times 10^3) = 2 \times 10^{-5}$ [4 marks]
Work out the value of n .

Answer

Extension hints

Cover these with paper. Uncover one at a time.

- E1** **Hint 1** Multiply the front numbers first. What do 4 and 5 make?
Hint 2 $4 \times 5 = 20 = 2 \times 10^1$, so the left side is $2 \times 10^{1+n+3}$.
Hint 3 The powers must match: $1 + n + 3 = -5$.

How did it go?

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

I can multiply numbers in standard form by multiplying the front numbers and adding the powers. ☐ ☐ ☒

I can put an answer such as 42×10^3 back into standard form. ☐ ☐ ☒

I can square a number in standard form and use multiplying in a problem. ☐ ☐ ☒