

Standard form calculations with a calculator

Starter

1. **(Review of last lesson)** Without using a calculator, find the value of:

- (a) $(7 \times 10^6) \times (8 \times 10^{-9})$ (b) $(1.2 \times 10^{-5}) \div (9.6 \times 10^3)$
 (c) $(7.1 \times 10^9) - (4.2 \times 10^8)$ (d) $(8.9 \times 10^{-5}) + (2.1 \times 10^{-6})$

Give your answers in standard form.

Working: (a) $(7 \times 10^6) \times (8 \times 10^{-9}) = (7 \times 8) \times 10^{6-9}$
 $= 56 \times 10^{-3}$
 $= 5.6 \times 10 \times 10^{-3}$
 $= 5.6 \times 10^{1-3}$ *remember 10 = 10¹*
 $= 5.6 \times 10^{-2}$

(b) $(1.2 \times 10^{-5}) \div (9.6 \times 10^3) = (1.2 \div 9.6) \times 10^{-5-3} = 0.125 \times 10^{-8}$
 But 0.125×10^{-8} is not in standard form.
 $0.125 \times 10^{-8} = (1.25 \div 10) \times 10^{-8}$
 $= 1.25 \times 10^{-1} \times 10^{-8}$
 $= 1.25 \times 10^{-1-8}$
 $= 1.25 \times 10^{-9}$

(c) $(7.1 \times 10^9) - (4.2 \times 10^8) = (7.1 \times 10^9) - (0.42 \times 10^9)$
 $= (7.1 - 0.42) \times 10^9$
 $= 6.68 \times 10^9$

(d) $(8.9 \times 10^{-5}) + (2.1 \times 10^{-6}) = (8.9 \times 10^{-5}) + (0.21 \times 10^{-5})$
 $= (8.9 + 0.21) \times 10^{-5}$
 $= 9.11 \times 10^{-5}$

E.g. 1 Check your answers to the starter questions by entering the calculations on your calculator.

- (a) $(7 \times 10^6) \times (8 \times 10^{-9})$ (b) $(1.2 \times 10^{-5}) \div (9.6 \times 10^3)$
 (c) $(7.1 \times 10^9) - (4.2 \times 10^8)$ (d) $(8.9 \times 10^{-5}) + (2.1 \times 10^{-6})$

Answers: (a) 5.6×10^{-2} (b) 1.25×10^{-9}
 (c) 6.68×10^9 (d) 9.11×10^{-5}

Use your calculator to answer these questions, giving your answers in standard form.

E.g. 2 A country has a population of 8.32×10^7 people. There are 5.2×10^4 branches of the supermarket Spendalot in the country. How many people are there per Spendalot store?

Working: People per store = $8.32 \times 10^7 \div 5.2 \times 10^4 = 1600 = 1.6 \times 10^3$

E.g. 3 A film cost $\pounds 3.45 \times 10^8$ to make. It made $\pounds 8.9 \times 10^7$ at the box office. What was the loss made by the film?

Working: Loss = $\pounds 3.45 \times 10^8 - \pounds 8.9 \times 10^7 = \pounds 2.56 \times 10^8$

Exercise

9-1 class textbook:	p133 M5.5 Qu 1-10
A*-G class textbook:	p125 M5.5 Qu 1-9
9-1 homework book:	p47 M5.5 Qu 1-10
A*-G homework book:	p34 M5.5 Qu 1-10

