Multiply and divide numbers in standard form

1 **a)** Circle the correct answer to $3 \times (2 \times 10^6)$

$\boxed{6 \times 10^6}$ 6×10^{12} 32×10^6 32×10^{12}

b) Circle the correct answer to $(9 \times 10^5) \times 10$

9×10^5 $\boxed{9 \times 10^6}$ 9×10^{50} 90×10^{50}

c) Circle the correct answer to $(8 \times 10^6) \div 2$

4×10^3 $\boxed{4 \times 10^6}$ 6×10^6 8×10^3

d) Circle the correct answer to $(5 \times 10^7) \div 10$

0.5×10^{-3} 5×10^{-3} 0.5×10^6 $\boxed{5 \times 10^6}$

2 Here is how Dani and Tom work out $(3 \times 10^4) \times (2 \times 10^5)$.

Dani's method

$(3 \times 10^4) \times (2 \times 10^5)$
$= 3 \times 2 \times 10^4 \times 10^5$
$= 6 \times 10^9$

Tom's method

$(3 \times 10^4) \times (2 \times 10^5)$
$= 30{,}000 \times 200{,}000$
$= 6{,}000{,}000{,}000$
$= 6 \times 10^9$

Whose method do you prefer? _Various answers_

Explain your answer.

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_____

3 Work out the multiplications. Give your answers in standard form.

a) $(2 \times 10^6) \times (4 \times 10^5) = $ _8×10^{11}_   **c)** $(3 \times 10^5) \times (3 \times 10^{-2}) = $ _9×10^3_

b) $(3 \times 10^5) \times (2 \times 10^7) = $ _6×10^{12}_   **d)** $(4.1 \times 10^{-3}) \times (2 \times 10^6) = $ _8.2×10^3_

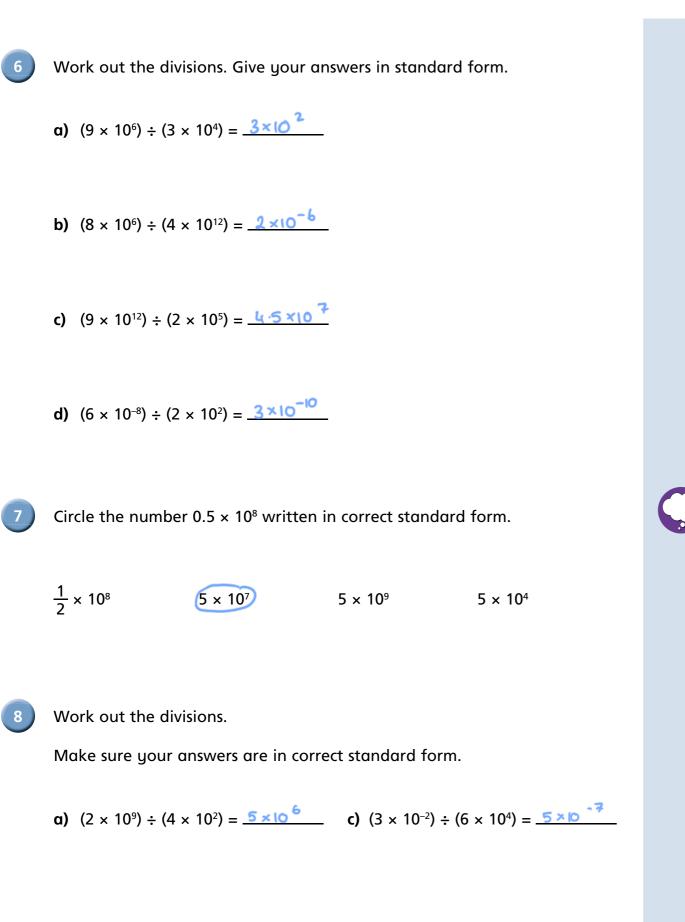**4** Work out the multiplications. Make sure your answers are in correct standard form.

a) $(5 \times 10^4) \times (3 \times 10^5) = $ _1.5×10^{10}_

b) $(8 \times 10^4) \times (6 \times 10^7) = $ _4.8×10^{12}_

c) $(6.2 \times 10^6) \times (2 \times 10^5) = $ _1.24×10^{12}_

d) $(8 \times 10^5) \times (4 \times 10^{-2}) = $ _3.2×10^4_

5 Dani and Tom are now working out $(8 \times 10^6) \div (2 \times 10^4)$.

Dani's method

$(8 \times 10^6) \div (2 \times 10^4)$
$= (8 \div 2) \times (10^6 \div 10^4)$
$= 4 \times 10^2$

Tom's method

$(8 \times 10^6) \div (2 \times 10^4)$
$= \dfrac{8{,}000{,}000}{20{,}000}$
$= \dfrac{800}{2}$
$= 400$
$= 4 \times 10^2$

Whose method do you prefer this time? _Various answers_

Explain your answer.

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6 Work out the divisions. Give your answers in standard form.

a) $(9 \times 10^6) \div (3 \times 10^4) = $ _3×10^2_

b) $(8 \times 10^6) \div (4 \times 10^{12}) = $ _2×10^{-6}_

c) $(9 \times 10^{12}) \div (2 \times 10^5) = $ _4.5×10^7_

d) $(6 \times 10^{-8}) \div (2 \times 10^2) = $ _3×10^{-10}_

7 Circle the number 0.5×10^8 written in correct standard form.

$\frac{1}{2} \times 10^8$ (5 × 10⁷) 5×10^9 5×10^4

8 Work out the divisions.

Make sure your answers are in correct standard form.

a) $(2 \times 10^9) \div (4 \times 10^2) = $ _5×10^6_   **c)** $(3 \times 10^{-2}) \div (6 \times 10^4) = $ _5×10^{-7}_

b) $(2 \times 10^{12}) \div (8 \times 10^4) = $ _2.5×10^7_   **d)** $(3 \times 10^{-3}) \div (4 \times 10^5) = $ _7.5×10^{-9}_

9 Work out the calculations and write >, < or = to make the statements correct.

a) $(8 \times 10^4) \times (6 \times 10^5)$ (>) $(8 \times 10^{12}) \div (2 \times 10^3)$

b) $(5 \times 10^4) \times (6 \times 10^{-2})$ (<) $(9 \times 10^9) \div (3 \times 10^3)$

c) $(6 \times 10^2) \div (4 \times 10^5)$ (<) $(3 \times 10^{-8}) \times (5 \times 10^7)$

10 1 trillion = 1,000 billion

There are about 40 trillion cells in the human body.

Each cell consists of about 100 trillion atoms.

About how many atoms are there in the human body altogether?

Give your answer in standard form.

4×10^{27}