

1. Factual recall

Simplify:

a) $10^5 \div 10^2$

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

c) $10^{-3} \div 10^{-6}$

Write in standard form:

a) 25×10^6

b) 0.73×10^4

2. Carry out a routine procedure

Calculate:

a) $(9 \times 10^6) \div (3 \times 10^3)$

b) $(2 \times 10^5) \div (5 \times 10^2)$

c) $\frac{3 \times 10^{-3}}{4 \times 10^{-2}}$

3. Classify some mathematical object

Which calculation gives the greatest answer?

a)

$(9.3 \times 10^8) \div (3.1 \times 10^3)$

or

$(8 \times 10^2) \times (4 \times 10^2)$

b)

$(6 \times 10^{-2}) \div (8 \times 10^{-7})$

or

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

4. Interpret a situation or answer

Proxima Centauri is the closest star other than the sun to the earth. It is estimated to be $4.02 \times 10^{13} \text{ Km}$ away from the earth.

If light travels at a speed of $3 \times 10^6 \text{ Km/s}$.

How long does it take the light of Proxima Centauri to reach the earth. Give your units in years.

Standard Form: Division

5. Prove, show, justify

The diameter of the **Moon** is $1.4 \times 10^3 \text{ km}$.

The diameter of the **Sun** is $3.5 \times 10^6 \text{ km}$.

The ratio of the diameters of the Moon to the Sun can be written in the ratio 1:n.

Show that n is a multiple of 20.

6. Extend a concept

$20 = 2 \times 10^1$ in standard form

$20 = 1.0100 \times 2^4$ in base 2 standard form.

Given that $20 = 10100$,
 $10 = 1010$, $5 = 101$ in base 2.

Calculate

a) $(1.0100 \times 2^4) \div (1.01 \times 2^2)$

b) $(1.0100 \times 2^4) \div (1.010 \times 2^3)$

c) $(1.010 \times 2^3) \div (1.01 \times 2^2)$

Try leaving your answers in base 2 standard form

7. Construct an instance

Write 2 standard form divisions that give the same answers.

8. Criticise a fallacy

A student answers the following question, identify and amend all mistakes.

$$\begin{aligned}
 &(4 \times 10^5) \div (8 \times 10^7) \\
 &= (8 \div 4) \times (10^5 \div 10^7) \\
 &= 2 \times 10^2
 \end{aligned}$$