Working with large numbers (7)

Contents

1 Multiplication

When multiplying large numbers, multiply the key digits first (these are called the *significant figures*) and then add the amount of zeros. E.g.

$$50,000 \times 3,000 \ldots \text{First do } 3 \times 5 = 15$$
$$\ldots \text{Second, notice the 7 zeros in total}$$
$$\ldots \text{Putting this together gives} \ldots$$
$$= 150,000,000$$

$$(40,000)^2 = 40,000 \times 40,000$$
$$= 1600,000,000$$

2 Division

When dividing large numbers, write as a fraction and "cancel out" zeros to make the calculation easier. Mathematically, we are cancelling a "multiply by 10" with a "divide by 10".

$$20,000 \div 4,000 = \frac{20,000}{4,000}$$
$$= \frac{20}{4}$$
$$= 5$$

This can be extended to square roots. E.g. $\sqrt{250,000} = 500$ since

$$\frac{250,000}{500} = \frac{2,500}{5} = 500$$

(Check: $500 \times 500 = 250,000$)

3   Key words

$$1{,}000 = 1 \text{ thousand}$$
$$10{,}000 = 10 \text{ thousand}$$
$$100{,}000 = 100 \text{ thousand}$$
$$1{,}000{,}000 = 1 \text{ million}$$
$$1 \text{ billion} = 1{,}000 \text{ million i.e. } 1{,}000{,}000{,}000$$

In Britain, a billion used to be 1 million million, but it has since come into line with other countries.

4   Entering large numbers into the calculator

3,000,000,000 may be too large to enter in manually (or it takes too long). Since it is the equivalent of 3 multiplied by 10 a total of 9 times, we enter $3\,\boxed{\text{EXP}}\,9$ or $3\,\boxed{\text{EE}}\,9$ or $3\,\boxed{\times 10^x}\,9$ and it appears as 3^9 or 3×10^9, depending on your calculator.

N.B.   Remember 3^9 on the screen is not

$$3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3$$

but

$$3 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10.$$