

Standard Form.

Why use standard form?

Standard form is used to make very large or very small numbers easier to read. It is difficult to put large or small numbers in order of size because of this. Standard form makes this easier.

Standard form shows the magnitude (size) of the number as powers of ten.

e.g. 1.234×10^4 1.234×10^{-4}

This means $1.234 \times (10 \times 10 \times 10 \times 10)$ $1.234 \times (1 \div 10 \div 10 \div 10 \div 10)$

Which is 12340 0.0001234

To put a list of large numbers in order is difficult because it takes time to count the number of digits and hence determine the magnitude of the number.

1. Put these numbers in order of size,

5239824 , 25634897 , 5682147 , 86351473 , 1258964755
142586479 , 648523154

It is easier to order large numbers when they are written in standard form.

2. Put these numbers in order of size,

5.239×10^6 , 2.563×10^7 , 5.682×10^6 , 8.635×10^7 , 1.258×10^9
 1.425×10^8 , 6.485×10^8

You can see that it is easier to work with large numbers written in standard form. To do this we must be able to convert from one form into the other.

3. Convert these numbers into normal form.

a) $5.239 \times 10^3 = 5.239 \times (10 \times 10 \times 10)$
b) 4.543×10^4 c) 9.382×10^2 d) 6.665×10^6
e) 1.951×10^2 f) 1.905×10^5 g) 6.005×10^3

4. Convert these numbers into standard form.

a) 65345 (how many times do you multiply 6.5345 by 10 to get 65345 ?)
b) 28748 c) 548454 d) 486856
e) 70241 f) 65865758 g) 765

Standard form can also be used to write small numbers

e.g. $0.00056 = 5.6 \times 10^{-4}$

5. Convert these numbers into normal form.

a) 8.34×10^{-3} b) 2.541×10^{-8} c) 1.01×10^{-5}
d) 8.88×10^{-1} e) 9×10^{-2} f) 5.05×10^{-9}

6. Convert these numbers to standard form.

a) 0.000567 b) 0.987 c) 0.0052
d) 0.0000605 e) 0.008 f) 0.0040302

7. Calculate, giving answers in standard form,

a) $(3.45 \times 10^{-5} + 9.5 \times 10^{-6}) \div 0.0024$

b) $2.31 \times 10^5 \times 3.98 \times 10^{-3} + 0.0013$