Standard Form

Standard form is used to represent numbers which are very small or very large.

Examples

The mass of the Earth $= 5.972 \times 10^{24}$ kg

The mass of an electron $= 9.109 \times 10^{-31}$ kg

In standard form a number is expressed as a number between 1 and 10 multiplied by a power of 10.

Further examples

1) $362 = 3.62 \times 10^{2}$

2) $67{,}581 = 6.7581 \times 10^{4}$

3) $4{,}250{,}000 = 4.25 \times 10^{6}$

4) $0.00723 = 7.23 \times 10^{-3}$

5) $0.0125 = 1.25 \times 10^{-2}$

6) $0.00000000841 = 8.41 \times 10^{-9}$

7) $6.4 = \quad = 6.4 \times 10^0$

Write in standard form

1) $88{,}800 = 8.88 \times 10^4$

2) $4{,}300{,}000 = 4.3 \times 10^6$

3) $1638 = 1.638 \times 10^3$

4) $513{,}000 = 5.13 \times 10^5$

5) $65 = 6.5 \times 10^1$

6) $0.089 = 8.9 \times 10^{-2}$

7) $0.000062 = 6.2 \times 10^{-5}$

8) $0.000000456 = 4.56 \times 10^{-7}$

9) $0.27 = 2.7 \times 10^{-1}$

10) $0.0003185 = 3.185 \times 10^{-4}$

Write as ordinary numbers

1) $2.3 \times 10^7 = 23{,}000{,}000$

2) $4.61 \times 10^5 = 461{,}000$

3) $3.7 \times 10^{-4} = 0.00037$

4) $5.16 \times 10^{-7} = 0.000000516$

6 Write these numbers out in full.

a 2.5×10^2
b 3.45×10
c 4.67×10^{-3}
d 3.46×10
e 2.0789×10^{-2}
f 5.678×10^3
g 2.46×10^2
h 7.6×10^3
i 8.97×10^5
j 8.65×10^{-3}
k 6×10^7
l 5.67×10^{-4}

7 Write these numbers in standard form.

a 250
b 0.345
c 46 700
d 3 400 000 000
e 20 780 000 000
f 0.000 5678
g 2460
h 0.076
i 0.000 76
j 0.999
k 234.56
l 98.7654
m 0.0006
n 0.005 67
o 56.0045

6a) $2.5 \times 10^2 = 250$

6b) $3.45 \times 10 = 34.5$

6c) $4.67 \times 10^{-3} = 0.00467$

6d) $3.46 \times 10 = 34.6$

6e) $2.0789 \times 10^{-2} = 0.020789$

6f) $5.678 \times 10^3 = 5678$

6g) $2.46 \times 10^2 = 246$

6h) $7.6 \times 10^3 = 7600$

6i) $8.97 \times 10^5 = 897{,}000$

6j) $8.65 \times 10^{-3} = 0.00865$

6k) $6 \times 10^7 = 60{,}000{,}000$

6l) $5.67 \times 10^{-4} = 0.000567$

7a) $250 = 2.5 \times 10^{2}$

7b) $0.345 = 3.45 \times 10^{-1}$

7c) $46{,}700 = 4.67 \times 10^{4}$

7d) $3{,}400{,}000{,}000 = 3.4 \times 10^{9}$

7e) $20{,}780{,}000{,}000 = 2.078 \times 10^{10}$

7f) $0.0005678 = 5.678 \times 10^{-4}$

7g) $2460 = 2.46 \times 10^{3}$

7h) $0.076 = 7.6 \times 10^{-2}$

7i) $0.00076 = 7.6 \times 10^{-4}$

7j) $0.999 = 9.99 \times 10^{-1}$

7k) $234.56 = 2.3456 \times 10^{2}$

7l) $98.7654 = 9.87654 \times 10^{1}$

7m) $0.0006 = 6 \times 10^{-4}$

7n) $0.00567 = 5.67 \times 10^{-3}$

7o) $56.0045 = 5.60045 \times 10^{1}$