Revision Sheet – Integer Indices and Scientific Notation

1. Write out the 8 laws for integer indices

2. Evaluate the following without a calculator:
   a. 2^6
   b. 5^1
   c. 9^0
   d. 3^{-2}
   e. $(-2)^4$
   f. -2^4
   g. -3^{-3}

3. Simplify the following where possible:
   a. $a^3 \times a^5$
   b. $v^3 + v^6$
   c. $c^7 \div c^2$
   d. $c^3 \div c^{10}$
   e. $w^{-4} \times w^{-6}$
   f. $h^2 \div h^{-5}$
   g. $(h^3)^4$
   h. $(s^3t)^5$

4. Simplify the following leaving no negative powers
   a. $\frac{d^3f^{-2}}{d^4f^0}$
   b. $(\frac{r^2g}{r^5g^0})^4$

5. Express in decimal notation:
   a. 4×10^5
   b. 2.6×10^3
   c. 1.05×10^{-4}
   d. 5.4962×10^2

6. Express in scientific notation
   a. 500 000
   b. 347 000 000
   c. 0.000 002
   d. 0.0436
   e. 145 billion
   f. 6.7 million

Challenge

There are about 8×10^{23} protons in 1 gram of matter. The Earth has a mass of about 5×10^{21} tonnes. The Earth's core makes up about a quarter the mass of the Earth Roughly how many protons are there in the Earth's core? Show full working and give the answer in scientific notation.

Show working and answer on back of sheet.