

**YOU & MATHS** Several subsets Given the set

$A = \left\{ (-2)^5, \left(-\frac{1}{2}\right)^{-2}, \pi + 1, 0, 1^{-3}, 4^{-3}, \sqrt{2}, \frac{\sqrt{3}}{4}, -\frac{1}{2} \right\}$ , write down the elements of its subsets:

- a.  $B$ , made up of all the natural numbers belonging to  $A$ ;
- b.  $C$ , made up of all the integer numbers belonging to  $A$ ;
- c.  $D$ , made up of all the rational numbers belonging to  $A$ ;
- d.  $E$ , made up of all the real numbers belonging to  $A$ .

It is helpful to do some calculations in order to write all elements in a suitable form:

$$(-2)^5 = -32, \quad \left(-\frac{1}{2}\right)^{-2} = 4, \quad 1^{-3} = 1, \quad 4^{-3} = \frac{1}{64}.$$

We notice that, according to the given definitions,  $B \subseteq C \subseteq D \subseteq E$ . We can then write down the subsets as follows:

$$B = \left\{ 0, 1^{-3}, \left(-\frac{1}{2}\right)^{-2} \right\},$$

$$C = \left\{ 0, 1^{-3}, \left(-\frac{1}{2}\right)^{-2}, (-2)^5 \right\},$$

$$D = \left\{ 0, 1^{-3}, \left(-\frac{1}{2}\right)^{-2}, (-2)^5, 4^{-3}, -\frac{1}{2} \right\},$$

$$E = \left\{ 0, 1^{-3}, \left(-\frac{1}{2}\right)^{-2}, (-2)^5, 4^{-3}, -\frac{1}{2}, \pi + 1, \sqrt{2}, \frac{\sqrt{3}}{4} \right\} = A.$$