14 A cube contains a solid metal sphere.
The sphere touches all the faces of the cube.
The side length of the cube is 8 cm.

(a) Show that the volume of the sphere is $\frac{256}{3}\pi\,\text{cm}^3$.

[1]

(b) Calculate the percentage of the cube that is **not** occupied by the sphere.

..... % [3]

(c) The density of the metal of the sphere is $7.86\,\text{g/cm}^3$.

Calculate the mass of the sphere.
Give your answer in kilograms.
[Density = mass ÷ volume]

..... kg [2]

(d) The sphere is melted down and made into a solid cylinder with radius 3.1 cm.

Calculate the **total** surface area of the cylinder.

..... cm^2 [4]