



Given

$$2^y = \frac{1}{16} \quad 2^{-4} = \frac{1}{16}$$

Find y

$$y = -4$$

Show the equation  $x^2 - 5x + 1 = 0$  can be written in the form

$$x = 5 - \frac{1}{x} \quad x^2 = 5x - 1$$

$$x = 5 - \frac{1}{x}$$

Starting with  $x_0 = 3$ , use the iteration formula

$$x_{n+1} = 5 - \frac{1}{x_n}$$

twice to find an estimate of the solution of  $x^2 - 5x + 1 = 0$

$$x_1 = 5 - \frac{1}{3} = 4.\bar{6}$$

$$x_2 = 5 - \frac{1}{4.\bar{6}} = \frac{67}{14}$$

$$4.785714286$$

A logo is made from a square and three semi-circles.

The area of the logo is  $ky^2$

Find the exact value of k.

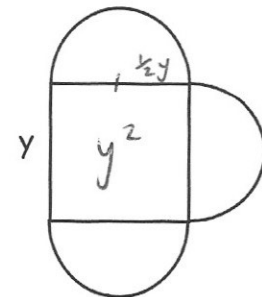
$$k = 1 + \frac{3}{8}\pi$$

$$\frac{1}{2} (\pi \times (\frac{1}{2}y)^2)$$

$$\frac{1}{2} (\pi \times \frac{1}{4}y^2)$$

$$\frac{1}{8}\pi y^2$$

$$y^2 + \frac{3}{8}\pi y^2$$



A solid metal cube has side length 8cm. The density of the metal is  $11.3\text{g/cm}^3$

The cube is melted down and the metal is used to make spheres of radius 1cm. As many spheres as possible are made.

$$8 \times 8 \times 8 = 512 \text{ cm}^3$$

Work out the mass of the metal that is wasted.

$$\frac{4}{3} \times \pi \times 1^3 = 4.18879\dots$$

$$512 \div 4.18879\dots = 122.23\dots$$

$$512 - 122 \times 4.18879\dots = 0.9675\dots \text{cm}^3$$

$$11.3 \times 0.9675\dots = 10.93\text{g}$$