Answer **all** the questions in the spaces provided.

**1** **(a)** Distinguish between systematic errors and random errors.

systematic errors .....

.....

random errors .....

..... [2]

**(b)** A cylinder of length $L$ has a circular cross-section of radius $R$, as shown in Fig. 1.1.

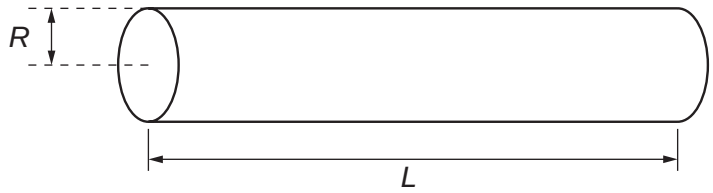


**Fig. 1.1**

The volume $V$ of the cylinder is given by the expression

$$V = \pi R^2 L .$$

The volume and length of the cylinder are measured as

$V = 15.0 \pm 0.5\,\text{cm}^3$
$L = 20.0 \pm 0.1\,\text{cm}$.

Calculate the radius of the cylinder, with its uncertainty.

radius = ..... ± ..... cm [5]