

1. The metric prefixes (micro, pico, nano, ...) are given for ready reference on the inside front cover of the textbook (see also Table 1-2).

(a) Since $1 \text{ km} = 1 \times 10^3 \text{ m}$ and $1 \text{ m} = 1 \times 10^6 \mu\text{m}$,

$$1 \text{ km} = 10^3 \text{ m} = (10^3 \text{ m})(10^6 \mu\text{m}/\text{m}) = 10^9 \mu\text{m}.$$

The given measurement is 1.0 km (two significant figures), which implies our result should be written as $1.0 \times 10^9 \mu\text{m}$.

(b) We calculate the number of microns in 1 centimeter. Since $1 \text{ cm} = 10^{-2} \text{ m}$,

$$1 \text{ cm} = 10^{-2} \text{ m} = (10^{-2} \text{ m})(10^6 \mu\text{m}/\text{m}) = 10^4 \mu\text{m}.$$

We conclude that the fraction of one centimeter equal to $1.0 \mu\text{m}$ is 1.0×10^{-4} .

(c) Since $1 \text{ yd} = (3 \text{ ft})(0.3048 \text{ m}/\text{ft}) = 0.9144 \text{ m}$,

$$1.0 \text{ yd} = (0.91 \text{ m})(10^6 \mu\text{m}/\text{m}) = 9.1 \times 10^5 \mu\text{m}.$$