The space **Q** of [rational numbers](http://en.wikipedia.org/wiki/Rational_number), with the standard metric given by the [absolute value](http://en.wikipedia.org/wiki/Absolute_value) of the [difference](http://en.wikipedia.org/wiki/Subtraction), is not complete. Consider for instance the sequence defined by \scriptstyle x_1 \;=\; 1and \scriptstyle x_{n+1} \;=\; \frac{x_n}{2} \,+\, \frac{1}{x_n}. This is a Cauchy sequence of rational numbers, but it does not converge towards any rational limit: If the sequence did have a limit *x*, then necessarily *x*2 = 2, yet no rational number has this property. However, considered as a sequence of [real numbers](http://en.wikipedia.org/wiki/Real_number), it does converge to the [irrational number](http://en.wikipedia.org/wiki/Irrational_number) √2.

The [open interval](http://en.wikipedia.org/wiki/Interval_(mathematics)) (0,1), again with the absolute value metric, is not complete either. The sequence defined by *xn* = 1/*n* is Cauchy, but does not have a limit in the given space. However the closed interval [[0,1]](http://en.wikipedia.org/wiki/Unit_interval) is complete; for example the given sequence does have a limit in this interval and the limit is zero.