

**Example 7.10** (Time-domain shifting property). Find the Laplace transform  $X$  of

$$x(t) = u(t - 1).$$

table of LT pairs

*Solution.* From Table 7.2, we know that

$$u(t) \xleftrightarrow{\text{LT}} 1/s \text{ for } \text{Re}(s) > 0. \quad \leftarrow \text{from LT table}$$

Using the time-domain shifting property, we can deduce

$$x(t) = u(t - 1) \xleftrightarrow{\text{LT}} X(s) = e^{-s} \left( \frac{1}{s} \right) \text{ for } \text{Re}(s) > 0.$$

multiply by  $e^{-s}$       ROC unchanged  
 shift by 1

Therefore, we have

$$X(s) = \frac{e^{-s}}{s} \text{ for } \text{Re}(s) > 0. \quad \blacksquare$$