18. We denote the pulsar rotation rate f (for frequency).

$$f = \frac{1 \text{ rotation}}{1.55780644887275 \times 10^{-3}\,\text{s}}$$

(a) Multiplying f by the time-interval $t = 7.00$ days (which is equivalent to 604800 s, if we ignore *significant figure* considerations for a moment), we obtain the number of rotations:

$$N = \left(\frac{1\,\text{rotation}}{1.55780644887275 \times 10^{-3}\,\text{s}}\right)(604800\,\text{s}) = 388238218.4$$

which should now be rounded to 3.88×10^8 rotations since the time-interval was specified in the problem to three significant figures.

(b) We note that the problem specifies the *exact* number of pulsar revolutions (one million). In this case, our unknown is t, and an equation similar to the one we set up in part (a) takes the form

$$\begin{aligned} N &= ft \\ 1 \times 10^6 &= \left(\frac{1 \text{ rotation}}{1.55780644887275 \times 10^{-3}\,\text{s}}\right) t \end{aligned}$$

which yields the result $t = 1557.80644887275$ s (though students who do this calculation on their calculator might not obtain those last several digits).

(c) Careful reading of the problem shows that the time-uncertainty *per revolution* is $\pm 3 \times 10^{-17}$ s. We therefore expect that as a result of one million revolutions, the uncertainty should be $(\pm 3 \times 10^{-17})(1 \times 10^6) = \pm 3 \times 10^{-11}$ s.