

**tec 3.** Students measure the speed of sound in the laboratory by creating a sound pulse that travels down a 1-m tube and reflects back so that both the initial and reflected pulses are detected by the same microphone. The signals are recorded and the pulse amplitudes versus time are displayed on a monitor. The students measure the time intervals for ten such pairs of pulses on the monitor and record the following transit times in milliseconds:

Trial	1	2	3	4	5	6	7	8	9	10
Transit times	5.77	5.78	5.74	5.80	5.78	5.83	5.76	5.78	5.76	5.78

- (a) Examine the data and try to estimate the spread in the data, that is, their standard deviation.
- (b) Calculate the mean transit time, the standard deviation of the sample, and the standard error (error in the mean).
- (c) One of the time measurements differs from the mean by more than 2 standard deviations. In a ten-event sample, how many measurements are predicted by Gaussian statistics to differ from the mean by 2 or more standard deviations? Appendix A may be helpful.