

64. (a) The 63.00 ns arrival times are consistent with the top of the tomb being 31.50 ns (pulse travel time) away from the surface. Since the pulses travel at 10.0 cm/ns in the soil, this travel time corresponds to a distance equal to 315 cm = 3.15 m.
- (b) We are told that the locations in Fig. 34-54 are 2.0 m apart. Return pulses are registered at stations 2 through 7, but the returns from stations 2 and 7 are not “robust.” The tomb’s horizontal length is therefore at least 9 m long, and very probably less than 12 m in length.
- (c) As demonstrated in part (a), we divide the travel times by 2 to infer depth. Thus, at station 3: the top of the tomb is 31.50 ns (pulse travel time in soil) from the surface; the top stone slab is 1.885 ns thick (pulse travel time in stone); the interior of the tomb is 8.00 ns high (pulse travel time in air); and the bottom stone slab is 1.885 ns thick (pulse travel time in stone). Since the pulse travels at 30 cm/s in the air, the interior of the tomb under station 3 (at the west end of the tomb) is 240 cm = 2.40 m high. At the east end (under, say, station 5), the corresponding time difference is

$$\frac{74.77 \text{ ns} - 66.77 \text{ ns}}{2} = 4.00 \text{ ns}$$

which corresponds to an interior height equal to $(4.00 \text{ ns})(30 \text{ cm/s}) = 120 \text{ cm/s} = 1.20 \text{ m}$.