

Source: Hughes-Hallett, Gleason, McCallum, et al., *Calculus, 2nd ed.*

The Montgolfier brothers (Joseph and Etienne) were eighteenth-century pioneers in the field of hot-air ballooning. Had they had the appropriate instruments, they might have left us a record of one of their early experiments, like that shown in Figure 3.55. The graph shows their vertical velocity, v , with upward as positive.

- Over what intervals was the acceleration positive? Negative?
- What was the greatest altitude achieved, and at what time?
- At what time was the upward acceleration greatest?
- At what time was the deceleration greatest?
- What might have happened during this flight to explain the answer to part (d)?
- This particular flight ended on top of a hill. How do you know that it did, and what was the height of the hill above the starting point?

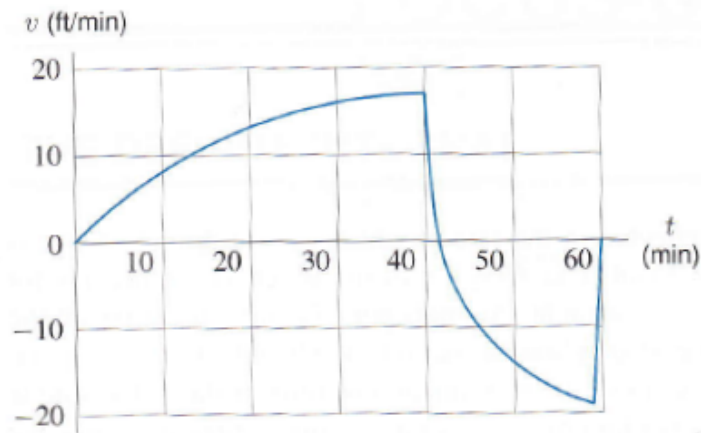


Figure 3.55