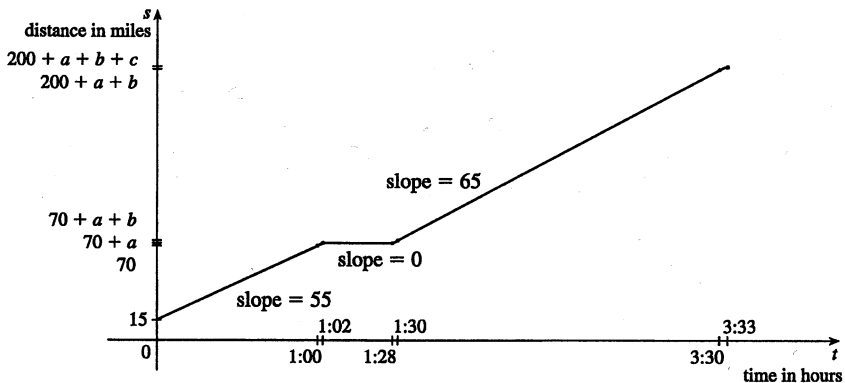


13. (a) Since the slope of the tangent at $t = 0$ is 0, the car's initial velocity was 0.
- (b) The slope of the tangent is greater at C than at B , so the car was going faster at C .
- (c) Near A , the tangent lines are becoming steeper as x increases, so the velocity was increasing, so the car was speeding up. Near B , the tangent lines are becoming less steep, so the car was slowing down. The steepest tangent near C is the one at C , so at C the car had just finished speeding up, and was about to start slowing down.
- (d) Between D and E , the slope of the tangent is 0, so the car did not move during that time.
14. Let a denote the distance traveled from 1:00 to 1:02, b from 1:28 to 1:30, and c from 3:30 to 3:33, where all the times are relative to $t = 0$ at the beginning of the trip.



15. Let $s(t) = 40t - 16t^2$.

$$\begin{aligned} v(2) &= \lim_{t \rightarrow 2} \frac{s(t) - s(2)}{t - 2} = \lim_{t \rightarrow 2} \frac{(40t - 16t^2) - 16}{t - 2} = \lim_{t \rightarrow 2} \frac{-16t^2 + 40t - 16}{t - 2} = \lim_{t \rightarrow 2} \frac{-8(2t^2 - 5t + 2)}{t - 2} \\ &= \lim_{t \rightarrow 2} \frac{-8(t - 2)(2t - 1)}{t - 2} = -8 \lim_{t \rightarrow 2} (2t - 1) = -8(3) = -24 \end{aligned}$$

Thus, the instantaneous velocity when $t = 2$ is -24 ft/s.