11. Average Rate of Change: $159mi/2h = 79.5 mi/hr$

The trucker covered 159 mi in 2 hrs. Her average rate of change of position is 79.5 mi/hr. Position is continuous and differentiable, so there must have been a time when her velocity was 79.5 mi/hr which is over 65 mi/hr (MVT)

12. Average Rate of change: $\frac{212-0 \ ^{\circ}F}{20 sec} = 10.6 \ ^{\circ}F/sec$

Temperature changes continuously and differentiably. The average rate of change is 10.6°F/sec. By the MVT, there must be a time when the instantaneous rate of change was 10.6° F/sec

13. Average Rate of Change: $\frac{184 \ sea \ miles}{24hr} = 7.\overline{6} \ knots$

Position is continuous and differentiable. The ships average rate of change was 7.$\overline{6}$ knots. By the MVT, there must have been a time that the instantaneous velocity was 7.6 knots. Velocity is continuous. By the IVT velocity must have been 7.5 knots at some point [start at 0 knots → 7.$\overline{6}$ knots].

14. Average rate of change: $26.2 mi/2.2 hr = 11.9 mi/hr$.

Position and velocity are both continuous and differentiable. There must be a time when the instantaneous velocity of the runner is 11.9 mi/hr (MVT). Because the runner probably started at 0 mi/hr, by the IVT, there must be a time when the runner was going 11 mi/hr. (0 mi/hr → 11.9 mi/hr)