Q 13 One car travels five miles in five minutes, the other travels ten miles in ten minutes; thus, they both average one mile per minute.

Q 35 The bicycle’s speed changes the most, so it has the greatest acceleration.

Q 38 Over a fixed amount of time, the greater change in speed represents the greater acceleration; thus, the change from 55 to 65 mph.

E 5 \[ s = \frac{d}{t} = \frac{143 \text{ miles}}{24 \text{ h}} = 5.96 \text{ mph}. \]

E 9 Between nine and noon you cover 15 miles, and from noon to two you cover none; thus, in five hours you cover 15 miles, for an average speed of 3 mph.

E 15 The car’s speed changes by 15 m/s in 5 seconds; thus, \[ a = \frac{15 \text{ m/s}}{5 \text{ s}} = 3 \text{ m/s}^2. \]

Q 41 The ball slows down by about ten meters per second every second. In two seconds, it will slow down by about twenty meters per second and thus be traveling at ten meters per second.

Q 47 Without the air resistance of the atmosphere, both objects fall at the same rate under the influence of gravity and hit the ground at the same time.

Q 59 Owing to the name ‘resistance’, I would expect the falling object to feel some force that resists its downward fall and decreases its acceleration.

E 19 \[ v_f = v_i + at = 5 \text{ m/s} + (2 \text{ m/s}^2)(4 \text{ s}) = 13 \text{ m/s}. \]

E 20 The change in velocity is 30 m/s, and the acceleration, due to gravity, is about 10 m/s per second; thus, it should take about 3 seconds.

E 21 \[ d = \frac{1}{2}at^2 = \frac{1}{2}(10 \text{ m/s}^2)(3 \text{ s})^2 = 45 \text{ m}. \]