**Example 3.1:** A driver with w visual acuity of 20/30 can just decipher a sign a distance 20 ft. from a sign. Determine the maximum distance from the sign at which drivers with the following visual acuity will be able to see the same sign: ***[Ans. 40, 12 ft.]***

1. 20/15
2. 20/50

**Example 3.2:** A driver with a perception reaction time of 2.5 sec is driving at 65 mph when she observes that an accident has blocked the road ahead. Determine the distance the vehicle would move before the driver could activate the brakes. The vehicle to continue to move at 65 mph during the perception reaction time of 2.5 sec. ***[Ans. 238.9 ft.]***

**Example 3.3:** A 5 axle truck traveling on an interstate highway has the following axle characteristics.

* Distance bet ween the front single axle and the front set of tandem axles = 20 feet.
* Distance between the front single axle and the back set tandem axle = 65 feet.
* Distance between the front set of tandem axles and the back set of tandem axles = 48 feet.
* Load carried by front set of single axles = 10000 lb
* Load carried by each axle of the tandem-axles = 16000 lb

Determine whether this truck satisfies federal weight regulations. ***[Ans. Satisfies]***

**Example 3.4:** The acceleration of a vehicle can be represented by the following equation

$$\frac{du}{dt}=3.3-0.025\*u$$

Where $u$ is the vehicle speed in ft/sec. if the maximum allowable speed of an urban interstate highway is 55 mph at the vicinity of a signal controlled ramp, determine the minimum total length of the ramp and acceleration lane from the signal stop line to the freeway that will allow a driver starting at the stop line to achieve the allowable speed on the interstate when her vehicle enters the freeway. ***[Ans. 1774 ft.]***

**Example 3.5:** Determine the horsepower produced by a passenger car traveling at a speed of 65 mph on a straight road of 5% grade with a smooth pavement. Assume the weight of the car is 4000 lb and the cross-sectional area of the car is 40 ft2. ***[Ans. 77.3 hp]***

**Example 3.6:** A student trying to test the braking ability of her car determined that she needed 18.5 ft more to stop her car when driving downhill on a road segment of 5% grade than when driving downhill at the same speed along another segment of 3% grade. Determine the speed at which the student conducted her test and the braking distance in the 5% grade if the student is traveling at the test speed in the uphill direction. ***[Ans. 51.4 mph, 220 ft.]***

**Example 3.7:** A motorist travelling at 65 mph on an expressway intends to leave the expressway using an exit ramp with a maximum speed of 35 mph. At what point on the expressway should the motorist step on her brakes in order to reduce her speed to the maximum allowable on the ramp just before entering the ramp, if this section of the expressway has a downgrade of 3%? ***[Ans. 312 ft.]***

**Example 3.8:** A motorist traveling at 55 mpg down a grade of 5% on a highway observes a crash ahead of him, involving an overturned truck that is completely blocking the road. If the motorist was able to stop his vehicle 30 ft. from the overturned truck, what was his distance from the truck when he first observed the crash? Assume perception-reaction time = 2.5 sec. ***[Ans. 568 ft.]***