

Assignment #1 – VGP200

1. A car accelerates from rest at a rate of 2 m/s^2 .
How long does it take to reach the speed of 30 m/s ?
2. How far has the car in problem 1. traveled by the time it has reached the speed of 30 m/s ?
3. According to Wikipedia, the 2006 Renault R26) accelerates at the following rates:
 - 0 to 100 km/h : 1.7 seconds
 - 0 to 200 km/h : 3.8 seconds
 - 0 to 300 km/h : 8.6 secondsCompute the average accelerations of this car as it goes from 0 to 100 km/hr , from 100 km/hr to 200 km/hr and from 200 km/hr to 300 km/hr . Provide your answer in SI units.
In each case, how many g's does the driver experience? ($1 \text{ g} = 9.8 \text{ m/s}^2$)
4. An object is dropped from a certain height and hits the ground with speed 20 m/s .
 - a) From what height was it dropped?
 - b) How fast is it going when it is 5 m from ground?
5. An object is launched at a 50° angle measured upward from level ground, with initial speed 40 m/s .
 - a) How long does it spend in the air?
 - b) How far does it go horizontally?

~~12-19~~ ⁶ The acceleration of a rocket traveling upward is given by $a = (6 + 0.02s) \text{ m/s}^2$, where s is in meters. Determine the rocket's velocity when $s = 2 \text{ km}$ and the time needed to reach this attitude. Initially, $v = 0$ and $s = 0$ when $t = 0$.



Prob. 12-19

~~12-14.~~ A train starts from rest at station A and accelerates at 0.5 m/s^2 for 60 s . Afterwards it travels with a constant velocity for 15 min . It then decelerates at 1 m/s^2 until it is brought to rest at station B . Determine the distance between the stations.

8. A golf ball is struck with a velocity of 80 ft/s as shown. Determine the distance d to where it will land.

