Physics 11 U1 - Kinematics Worksheet 4 – Four Equations

solutions

Name: _____ Date: _____

1. A runner accelerates from 2 m/s to 8 m/s at a rate of $4 m/s^2$. How much distance does the runner cover while accelerating?

$$V_f^2 = V_i^2 + 2ad$$

$$8^2 = 2^2 + 2(4)d \rightarrow 64 = 4 + 8d$$

$$60 = 8d$$

$$d = 7.5$$

distance: _____

2. A truck parked on a slope slips it's parking brake and accelerates downhill at $2 m/s^2$. How fast is the truck going after 6 seconds?

$V_f = ?$

$t =$

$$V_f = V_i + at$$

$$V_f = 0 + (2)(6) = 12 m/s$$

velocity: _____

3. A car travelling initially at 3 m/s accelerates at 3.5 m/s^2 for 6 seconds. How much distance does it cover?

$d = V_i t + \frac{1}{2} a t^2$

$= (3)(6) + \frac{1}{2}(3.5)(6)^2$

$= 18 + 63 = 81 m$

V_f

4. A runner initially travelling at 4 m/s accelerates to 7 m/s during a 4 second run. How far did the runner travel?

$d = \left(\frac{V_i + V_f}{2}\right) t$

$= \left(\frac{4+7}{2}\right)(4) = (5.5)(4) = 22 m$

$\div 3.6 = 33.\overline{3}$ m/s

5. A car travelling at 120 km/hr can brake at 6.8 m/s^2 on dry pavement. If the reaction time of the driver is 0.9 seconds, what is the total distance needed to stop? (challenging problem!)

$d_1 = V \cdot t = 33.\overline{3} m/s \cdot 0.9 = 30 m$

$\rightarrow$ distance travelled before brakes are applied.

d_2 (don't have t)

$V_f^2 = V_i^2 + 2ad$ slowing down.

$0 = (33.\overline{3})^2 + 2(-6.8)(d)$

$\frac{1111.1}{13.6} = 81.69 m$

$d_{TOT} = d_1 + d_2$

$= 30 + 81.69$

$= 111.7 m$