

# General Physics I

## Classnotes

Jonathan Henrique Maia de Moraes (ID: 1620855)

02/01/2016

# February 01

## 1 Summary

Iff  $a = \text{constant}$ ?

(1)	$v = v_0 + at$	$v(t)$
(2)	$x = x_0 + v_0t + \frac{1}{2}at^2$	$x(t)$
(3)	$x = x_0 + \frac{1}{2}(v_0 + v)t$	No a
(4)	$2a(x - x_0) = v^2 - v_0^2$	No t

## 2 Gravity

In the absence of air resistance ( $\alpha = 0$ ) gravity produces a constant acceleration of  $g = 9.80 \text{ m/s}^2 = 32.2 \text{ ft/s}^2 = 22.0 \frac{\text{mi/h}}{\text{s}}$ .

Example: Drop an object from a height. What is the velocity and the distance fallen after 0 s, 1 s, 2 s, and 3 s?

$$\text{speed} = |v| \tag{1}$$

$$x_0 = 0$$

$$v_0 = 0$$

$$a = +g$$

$$v = v_0 + at$$

$$= 0 + gt$$

$$= (9.80 \text{ m/s}^2) t$$

$$= (32.2 \text{ ft/s}^2) t$$

$$= \left( 22 \frac{\text{mi/h}}{\text{s}} \right) t$$

$$x = x_0 + v_0 t + \frac{1}{2} at^2$$

$$= 0 + (0)t + \frac{1}{2} gt^2$$

$$= \frac{1}{2} (9.80 \text{ m/s}^2) t^2 = (4.90 \text{ m/s}^2) t^2$$

$$= \frac{1}{2} (32.2 \text{ ft/s}^2) t^2 = (16.1 \text{ ft/s}^2) t^2$$

$$= \frac{1}{2} \left( 22 \frac{\text{mi/h}}{\text{s}} \right) t^2 = \left( 11 \frac{\text{mi/h}}{\text{s}} \right) t^2$$

$t$	$v$	$v$	$v$	$x$	$x$
(s)	(m/s)	(ft/s)	(mi/h)	m	ft
0	0	0	0	0	0
1	9.80	32.2	22	4.9	16.1
2	19.6	64.4	44	19.6	64.4
3	29.4	96.6	66	44.1	144.9

→ Example 3 - PH1300 Examples (Dr. Rex Joyner) - 2015-2016