b) $a = \dfrac{v_f - v_0}{t}$

$-9.80 \text{ m/s}^2 = \dfrac{v_f - 9.0 \text{ m/s}}{1.5 \text{ s}}$

$v_f = -5.7 \text{ m/s}$

5.

v_0	v_f	a	d	t
?	0	-9.80 m/s^2	?	1.6 s

a) Find v_0 first (Do b first)

$d = \left(\dfrac{v_f + v_0}{2}\right)t$

$= \left(\dfrac{0 + 16 \text{ m/s}}{2}\right)(1.6 \text{ s})$

$= 13 \text{ m}$

b) $a = \dfrac{v_f - v_0}{t}$

$-9.80 \text{ m/s}^2 = \dfrac{0 - v_0}{1.6 \text{ s}}$

$v_0 = 16 \text{ m/s}$

6. Acceleration:

v_0	v_f	a	d	t
0	14 m/s	1.3 m/s^2	?	X

$v_f^2 = v_0^2 + 2ad$

$(14 \text{ m/s})^2 = 2(1.3 \text{ m/s}^2)d$

$d = 75 \text{ m}$

Uniform velocity

$v = \dfrac{d}{t}$

$d = vt$

$= (14 \text{ m/s})(3.0 \text{ min} \times 60 \text{ s/min})$

$= 2.5 \times 10^3 \text{ m}$

Deceleration:

v_0	v_f	a	d	t
14.0 m/s		-1.6 m/s^2	?	2.9 s

$v_f^2 = v_0^2 + 2ad$

$0 = (14 \text{ m/s})^2 + 2(-1.6 \text{ m/s}^2)(d)$

$d = \dfrac{-(14 \text{ m/s})^2}{2(1.6 \text{ m/s}^2)}$

$= 61 \text{ m}$

Total displacement is 2.7×10^3 m

7.

v_0	v_f	a	d	t
8.0 m/s	?	-9.80 m/s^2	–25 m	?

a) Find v_f first (Do b first)

$a = \dfrac{v_f - v_0}{t}$

$-9.80 \text{ m/s}^2 = \dfrac{-23.5 \text{ m/s} - (-8.0 \text{ m/s})}{t}$

$t = 1.6 \text{ s}$

b) $v_f^2 = v_0^2 + 2ad$

$= (-8.0 \text{ m/s})^2 + 2(-9.80 \text{ m/s}^2)(-25 \text{ m})$

$v_f = -23.5 \text{ m/s}$

$v_f = -24 \text{ m/s}$

8.

v_0	v_f	a	d	t
0	?	3.0 m/s^2	?	4.3 s

a) $a = \dfrac{v_f - v_0}{t}$

$3.0 \text{ m/s}^2 = \dfrac{v_f - 0}{4.3 \text{ s}}$

$= 13 \text{ m/s}$

b) $d = v_0 t + \dfrac{1}{2}at^2$

$= \dfrac{1}{2}(3.0 \text{ m/s}^2)(4.3 \text{ s})^2$

$= 28 \text{ m}$

$v_f^2 = v_0^2 + 2ad$

$0 = (12.9 \text{ m/s})^2 + 2(-9.80 \text{ m/s}^2)d$

$d = 8.5 \text{ m}$

Total displacement: 28m + 8.5 m = 37 m

9.

v_0	v_f	a	d	t
0	101 km/h	?	X	8.0 s

Change 101 km/h to m/s

$101 \text{ km/h} \times 1000 \text{ m/km} \times \dfrac{1}{3600} \text{ h/s} = 28 \text{ m/s}$