

$$c = \sqrt{37.87}$$

$$c = 6.11$$

$$s = \frac{14}{3} - t + \frac{c^2}{2}$$

where  $t = 4s$

$$s = \frac{(4s)^2}{3} - 4s + \frac{56}{3}$$

$$\frac{16s}{3} - 12 + \frac{56}{3}$$

$$s = 88m/s$$

3.  $V = (0.5t^3 - 8t) \text{ m/s}$   
 $a = \frac{dv}{dt}$

$$a = 1.5t^2 - 8$$

where  $t = 2s$

$$a = 1.5(2)^2 - 8$$

$$a = 6 - 8$$

$$a = -2 \text{ m/s}^2$$

4.  $V = (20 - 0.05s^2) \text{ m/s}$

at  $s = 15$

$$V = 20 - 0.05(15)^2$$

$$V = 20 - (0.05 \times (15)^2)$$

$$V = 20 - 11.25$$

$$V = 8.75 \text{ m/s}$$

$$V^2 = u^2 + 2as$$

$$8.75^2 = 0^2 + (2 \times a \times 15)$$

$$\frac{76.5625}{30} = \frac{30a}{30}$$

$$a = 2.55 \text{ m/s}^2$$

FINDING CONSTANT OF INTEGRATION EXERCISE

1.  $V = (4t - 3t^2) \text{ m/s}$   
 $v = \frac{ds}{dt}$   
 $ds = V dt$   
 $\int ds = \int_0^4 (4t - 3t^2) dt$   
 $s \Big|_0^4 = \frac{4t^2}{2} - \frac{3t^3}{3} \Big|_0^4$   
 $s = 2t^2 - t^3$   
 where  $t = 4$   
 $s = 2(4)^2 - (4)^3$   
 $s = 32 - 64$   
 $s = -32 \text{ m}$  to the x-axis

2.  $a = 4t^2 - 2$   
 $v = \int a dt$   
 $v = \frac{4t^3}{3} - 2t + c$   
 $ds = \int v dt$   
 $= \frac{4t^4}{4} - \frac{2t^2}{2} + \frac{c^2}{2}$   
 $s = \frac{t^4}{3} - t^2 + \frac{c^2}{2}$   
 where  $t = 2$  and  $s = 20$   
 $20 = \frac{(2)^4}{3} - (2)^2 + \frac{c^2}{2}$   
 $20 = \frac{16}{3} - 4 + \frac{c^2}{2}$   
 $\frac{56}{3} = \frac{c^2}{2}$

$$c^2 = \frac{112}{3} = 37.33$$