UGWUOKE CHUKWUDUMEBI
18/ENG04/074
ELECT/ELECT

1) For figure 12.3(1)

$v = (4t - 3t^2)$ m/s

$s = \int v\,dt$

$s = \int (4t - 3t^2)\,dt$

$= 2t^2 - t^3$

when $t = 4$s

$s = 2(4)^2 - (4)^3$

$= 32 - 64$

$s = -32$m

when $t = 2$, $p = 20$, $k = -2$

$-20 = \frac{1}{3}(2)^4 - 2^2 + c(2) - 2$

$-20 = -0.7 + 2c$

$c = -9.7$

$p = \frac{1}{3}t^4 - t^2 - 9.7t - 2$

when $t = 4$

$p = \frac{1}{3}(4)^4 - 4^2 - (9.7 \times 4) - 2$

$p = 28.7$m

2) for figure 12.4(2)

$v = (0.5t^3 - 8t)$ m/s

$A = dv/dt$

$dv/dt = 3(0.5)t^2 - 8$

$= 1.5t^2 - 8$

$A = dv/dt$ / $t = 2$

$= 1.5(2)^2 - 8$

$= 6 - 8 = -2$ m/s

3) for figure 12.7(3)

$A = (4t^2 - 2)$ m/s^2

$v = \int A\,dt$

$v = \int 4t^2 - 2$

$= \frac{4t^2}{3} - 2t + c$

$s = \int v\,dt$

$= \int \frac{4t^2}{3} - 2t + c$

$= \frac{4t}{12} - \frac{2t^2}{2} + ct$

$p = \frac{1}{3}t^4 - t^2 + ct + k$

When $t = 0$, $p = 2$

$-2 = \frac{1}{3}(0)^4 - (0)^2 + c(0) + k$

$k = -2$

4) For figure 12.8(4)

$v = (20 - 0.5s)$ m/s

$dt = ds/v$ and $dt = dv/a$

$a = dv/dt$, $dv/dt = dv/ds \cdot ds/dt$

$dv/ds = -0.15$, $ds/dt = (20 - 0.5s^2)$

$A = (-0.13)(20 - 0.05s^2)$

when $s = 15$

$A = (-0.1 \times 15)(20 - 0.05(15^2)$

$A = -13.125$m/s^2