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Number (1) Fig 12.4

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

$A = \frac{dV}{dt}$

$\frac{dV}{dt} = 3(0.5)t^3 - 8$

$= 1.5t^2 - 8$

$A = \frac{dV}{dt}\Big|_{t=2} = 1.5(2)^2$

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

Number (2) Fig 12.3

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

$S = \int V\,dt$

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

$= 2t^2 - t^3$

When $t = 4s$

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

$= 32 - 64$

$S = -32\ m$

Number (3) Fig 12.8

$V = (20 - 0.5s^2)\ m/s$

$A = \frac{dV}{dt}$

$\frac{dV}{dt} = \frac{dV}{ds} \cdot \frac{ds}{dt}$

$\frac{dV}{dt} = -0.1s$, $\frac{ds}{dt} = (20 - 0.5s^2)$

$A = (0.1s)(20 - 0.5s^2)$

When $s = 15$

$A = (-0.1 \times 15)(20 - 0.5 \times (15)^2)$

$A = -13.125\ m/s^2$

Number (4) Fig 12.7

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

$V = \int A\,dt$

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

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

$S = \int V\,dt$

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

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

$P = \frac{1}{3}t^4 - t^2 + Ct + K$

When $t = 0$, $P = 2$

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

$K = -2$

When $t = 2$, $P = -20$, $K = -2$

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

$-20 = -0.7 + 2C$

$C = -9.7$

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

When $t = 4$

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

$P = 28.7\ m$