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Assignment.

(2) $v = (0.5t^3 - 8t)$

acceleration = 2s.

$$a = \frac{dv}{dt}$$

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

$$= 3 \times 0.5t^2 - 8$$

$$3 \times 0.5(2)^2 - 8$$

$$\frac{3 \times 4^2}{2} - 8$$

$$6 - 8 = \underline{\underline{-2m/s^2}}$$

(1) $v = (4t - 3t^2)$ $t = 4$

~~$v = \frac{ds}{dt}$~~ $v = \frac{ds}{dt}$

$$ds = v dt$$

$$\int ds = \int v dt$$

$$s|_0^4 = \int_0^4 (4t - 3t^2) dt$$

$$s|_0^4 = \frac{4t^2}{2} - \frac{3t^3}{3} \Big|_0^4$$

$$s = 2t^2 - t^3$$

where $t = 4s$

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

$$= 32 - 64$$

$$s = -32m$$

\Rightarrow 32m to the left of the origin.

$$s = \frac{1}{3}t^4 - t^2 + C_1t + C_2$$

$$\text{At } t=0, s = -2\text{m}$$

$$s = \frac{1}{3}t^4 - t^2 + C_1t + C_2$$

$$-2 = \frac{1}{3}(0)^4 - (0)^2 + C_1(0) + C_2$$

$$C_2 = -2$$

$$\text{At } t=2, s = -20\text{m}$$

$$s = \frac{1}{3}t^4 - t^2 + C_1t - 2$$

$$-20 = \frac{1}{3}(2)^4 - (2)^2 + C_1(2) - 2$$

$$-20 = \frac{16}{3} - 4 + 2C_1 - 2$$

$$-20 = -\frac{2}{3} + 2C_1$$

$$2C_1 = -20 + \frac{2}{3}$$

$$2C_1 = -19.33$$

$$C_1 = -19.33/2 = -9.67$$

$$C_2 = -2$$

$$s = \frac{1}{3}t^4 - t^2 + C_1t + C_2$$

$$s = \frac{1}{3}t^4 - t^2 + 9.67t - 2$$

$$\text{At } t=4\text{s}, s = ?$$

$$s = \frac{1}{3}(4)^4 - (4)^2 - 9.67(4) - 2$$

$$s = \frac{256}{3} - 56.6668$$

$$s = \underline{\underline{28.667\text{m}}}$$

$$(4) \quad v = (20 - 0.05s^2)$$

$$\text{at } s = 15 \text{ m}$$

$$\frac{dv}{dt} = \frac{dv}{ds} \times \frac{ds}{dt}$$

$$= \frac{dv}{ds} \times v$$

$$a = v \frac{dv}{ds}$$

$$\frac{dv}{ds} = -0.15$$

$$\therefore a = (20 - 0.05s^2)(-0.15)$$

$$\text{At } s = 15 \text{ m}$$

$$a = (20 - 0.05(15)^2)(-0.15)$$

$$a = (20 - 11.25)(-0.15)$$

$$a = (8.75)(-0.15)$$

$$a = -1.3125 \text{ m/s}^2$$

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$$(5) \quad a = (4t^2 - 2)$$

$$a = \frac{dv}{dt} = (4t^2 - 2)$$

$$\frac{dv}{dt} = (4t^2 - 2)$$

$$\int dv = \int (4t^2 - 2) dt$$

$$v = \left(\frac{4t^3}{3} - 2t + c \right) \text{ m/s}$$

$$v = \frac{ds}{dt} = \left(\frac{4t^3}{3} - 2t + c \right)$$

$$\frac{ds}{dt} = \left(\frac{4}{3}t^3 - 2t + c \right)$$

$$\int ds = \int \left(\frac{4}{3}t^3 - 2t + c \right) dt$$

$$s = \left[\frac{4}{3} \left[\frac{t^4}{4} \right] - \frac{2t^2}{2} + ct + c_2 \right]$$