

Ch.5 Applications of the Integral

* pg. 176 #13 → object is dropped from height of 180m. Find mean velocity

• Root Mean formulae → $\frac{1}{b-a} \int_a^b f(x) dx$

$$f_{av} = \frac{1}{4-1} \int_1^4 (1-x) dx = \frac{1}{3} \left(x - \frac{1}{2}x^2 \right) \Big|_1^4 = \frac{1}{3} \left[\left(4 - \frac{1}{2}(4)^2 \right) - \left(1 - \frac{1}{2}(1)^2 \right) \right] = -\frac{1}{3}$$

④ $y = \frac{1}{\sqrt{x+2}}$ $[-1, 3]$

$g = -10 \text{ m/s}^2$ $t=0$ $v=0$

$S=180$

$V = -10t$ $S = -5t^2 + 180$

mean value

$$\frac{1}{b-a} \int_a^b f(x) dx$$

root mean square

$$\sqrt{\frac{1}{b-a} \int_a^b f(x) dx}$$

⑮ $t=0, t=4$ $i(\text{current}) = 1.0t + 1.0\sqrt{t}$

$$\frac{1}{4} \int_0^4 (1.0t + 1.0t^{1/2}) dt = \frac{1}{4} \left[\frac{t^2}{2} + \frac{2}{3}t^{3/2} \right]_0^4 = \frac{1}{4} \left[8 + \frac{16}{3} \right]$$

$$= \frac{1}{4} \left[\frac{(4)^2}{2} + \frac{2}{3}(4)^{3/2} \right] = \frac{1}{4} \left[8 + \frac{16}{3} \right]$$

⑰ $i_{rms} = \sqrt{\frac{1}{3-0} \int_0^3 (1-t^2)^2 dt}$

root mean square

foi it

$$(1-t^2)(1-t^2)$$

$$1-t^2-t^2+t^4$$

$$1-2t^2+t^4$$

$$= \left[\frac{1}{3} \int_0^3 (1-2t^2+t^4) dt \right]^{1/2} = \left[\frac{1}{3} \left(t - \frac{2t^3}{3} + \frac{t^5}{5} \right) \right]_0^3$$

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Page 1 of 1