ROOT MEAN SQUARE

→ useful for calculating DC equivalent for AC voltage/current.

<u>method:</u>

1) Square $f(x)$ to make everything positive
2) find average value under curve
3) Sqrt to cancel square.

ex. find rms voltage of $V = 6\cos(2000\pi t)$

$$V^2 = 36\cos^2(2000\pi t) \Rightarrow T = 1 \times 10^{-3} s$$

$$V_{eff}(t) = \sqrt{\frac{1}{T}\int_0^T 36\cos^2(2000\pi t)\,dt}$$

$$= \sqrt{10^3 \cdot \frac{36}{2}\int_0^T 1 + \sin(4000\pi t)}$$

$$= \sqrt{10^3 \cdot 18\left(T + \frac{1}{4000\pi}\cos(4000\pi t)\Big|_0^T\right)}$$

$$= \sqrt{10^3 \cdot 18\,(10^{-3})}$$

$$= \sqrt{18}$$

$$= 3\sqrt{2}$$

4π

$1 \quad -1$