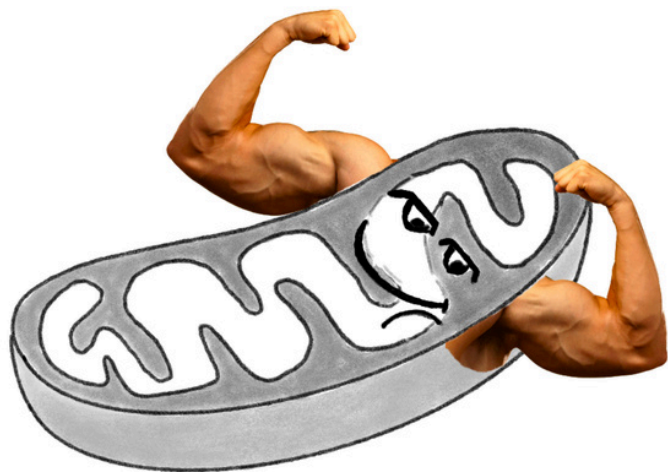


AP CALC

CHAIN RULE

REVIEW



GENERAL RULE

$$f(x) = h(g(x))$$

$$f'(x) = h'(g(x)) \cdot g'(x)$$

→ derivative of outside function
times derivative of inside function

→ whenever what's inside isn't x ,
use chain rule

INSIDE VS OUTSIDE

Examples:

$$\sin(x^2)$$

outside: $\sin(x)$
inside: x^2

$$(3x+1)^5$$

outside: x^5
inside: $3x+1$

$$\tan^2(x)$$

outside: x^2
inside: $\tan(x)$

NESTED CHAINS

→ when you spot a nested chain (more than 2 functions), work from outside in

→ multiply derivative of e/ layer/ derivative as you go

Example: $f(x) = \sin(e^{x^2})$

functions: $\sin(x)$, e^x , x^2

$$f'(x) = \cos(e^{x^2}) \cdot e^{x^2} \cdot 2x$$

MORE EXAMPLES

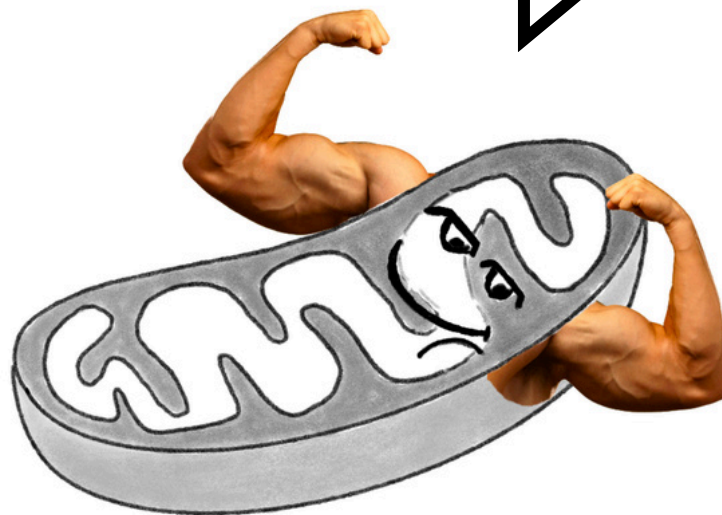
$$f(x) = (x^2 + 5)^3 \rightarrow x^3, x^2 + 5$$

$$f'(x) = 3(x^2 + 5)^2 \cdot (2x + 0)$$

$$f(x) = \sin^3(4x) \rightarrow x^3, \sin(x), 4x$$

$$f'(x) = 3\sin^2(4x) \cdot \cos(4x) \cdot 4$$

**follow for
more!**



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