Foraging

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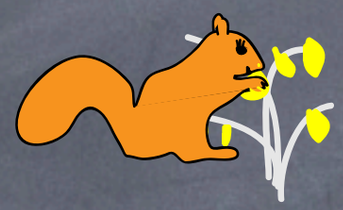


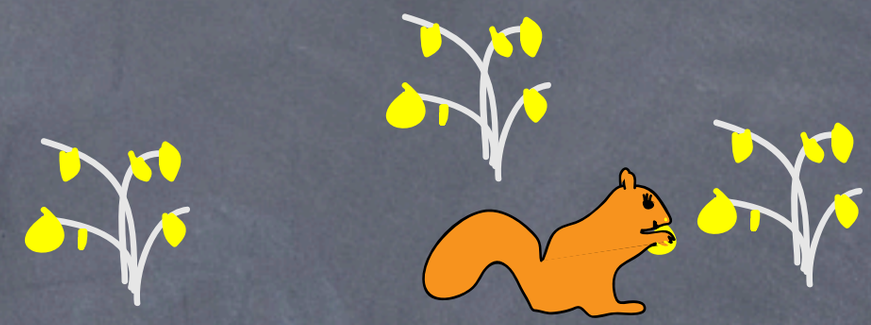
Foraging time includes
- a commute (t_0 --> constant),
- a visit to each patch (nt_p)

Foraging

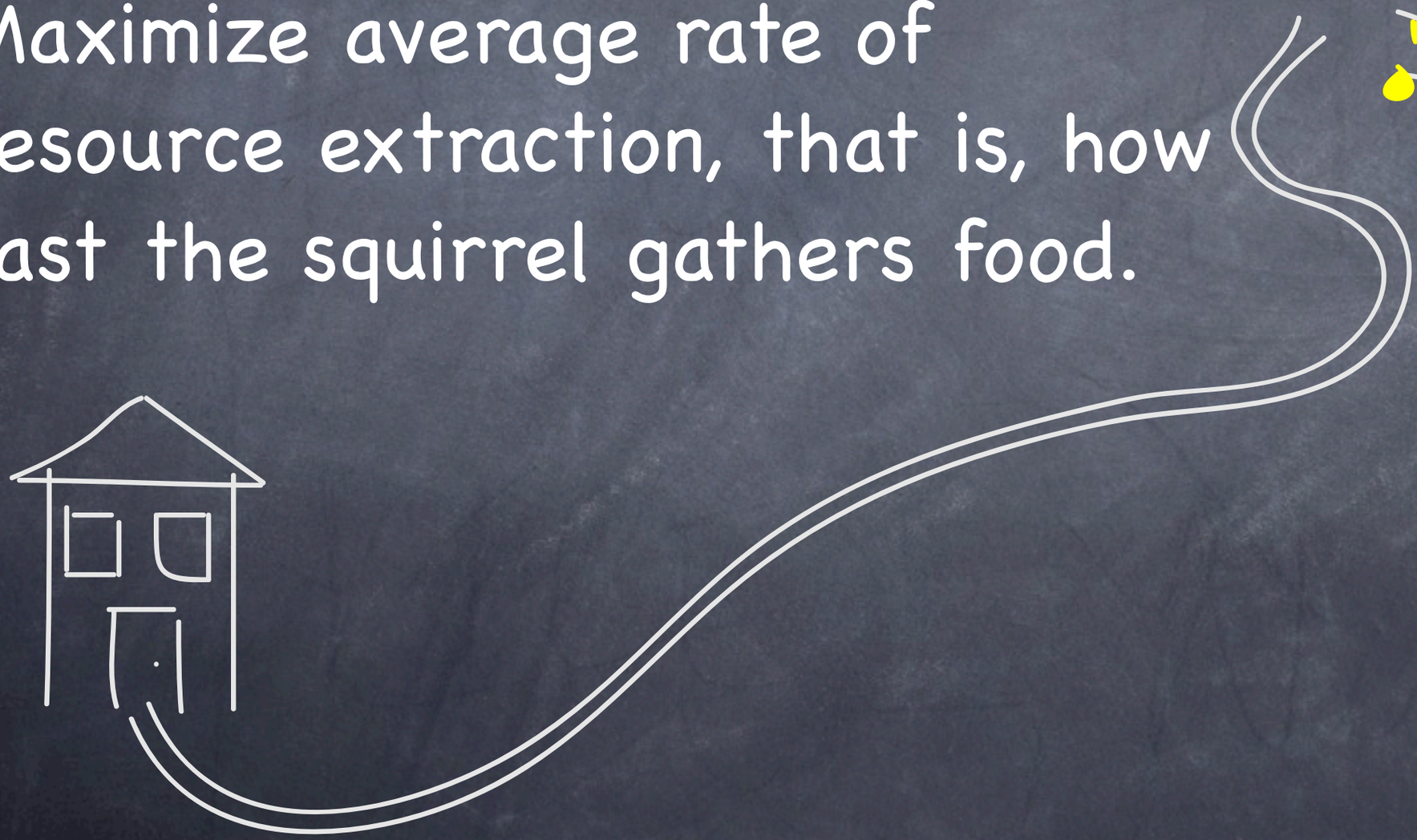
Foraging success is characterized by $f(t_p)$ = resource extracted from a single patch after a time t_p spent in the patch.

Remember the definition of $f(t_p)$ for an upcoming clicker Q.

Foraging



Maximize average rate of resource extraction, that is, how fast the squirrel gathers food.



If the squirrel visits n patches, each for t_p minutes, total time spent foraging is...

(A) $t_{tot} = nt_p$

(B) $t_{tot} = nt_0$

(C) $t_{tot} = nt_0 + t_p$

(D) $t_{tot} = nt_p + t_0$

If the squirrel visits n patches, each for t_p minutes, total resource extracted is...

(A) $r = nf(t_p)$

(B) $r = f(nt_p+t_O)$

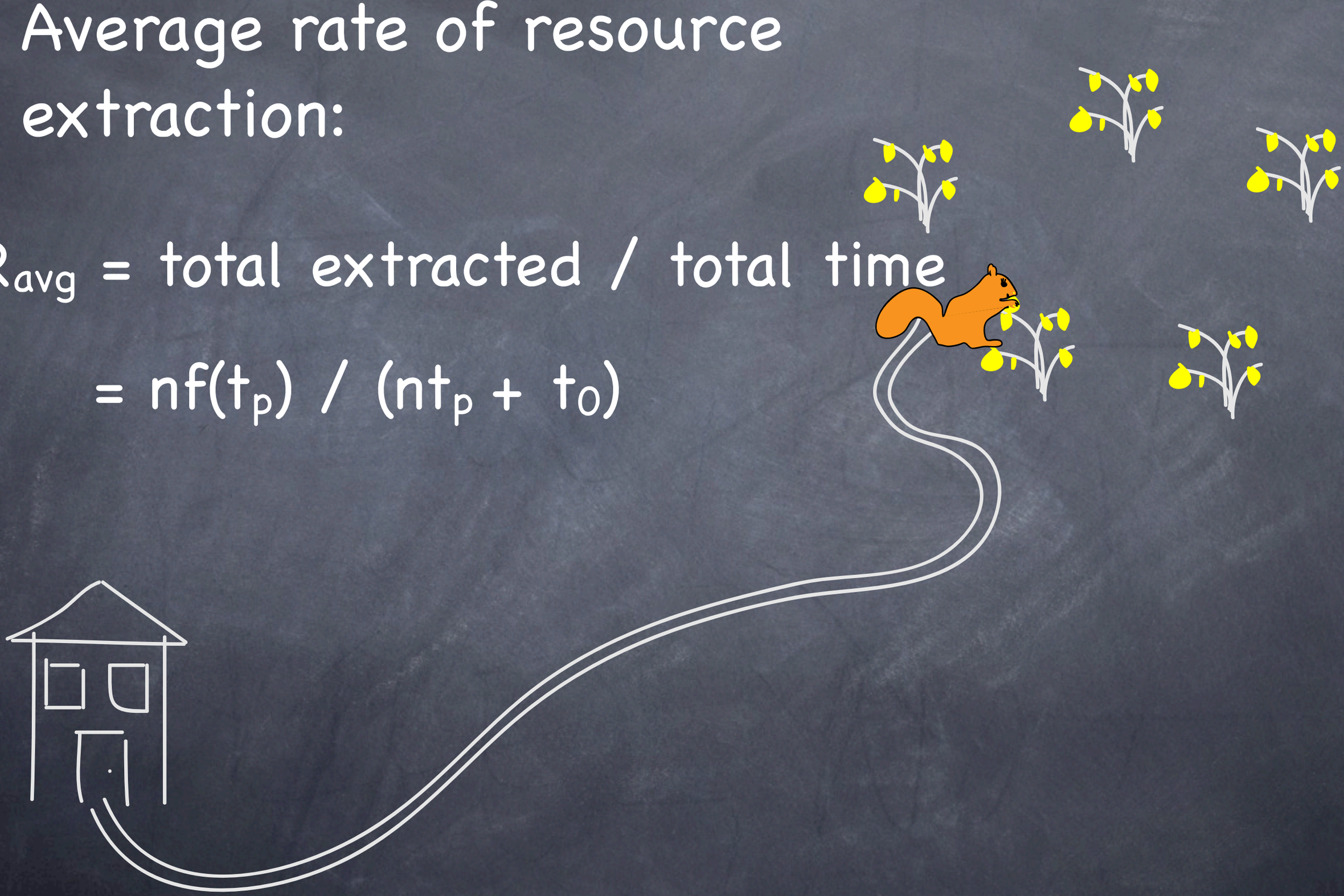
(C) $r = f(nt_O+t_p)$

(D) $r = nf(t_p+t_O)$

Average rate of resource extraction:

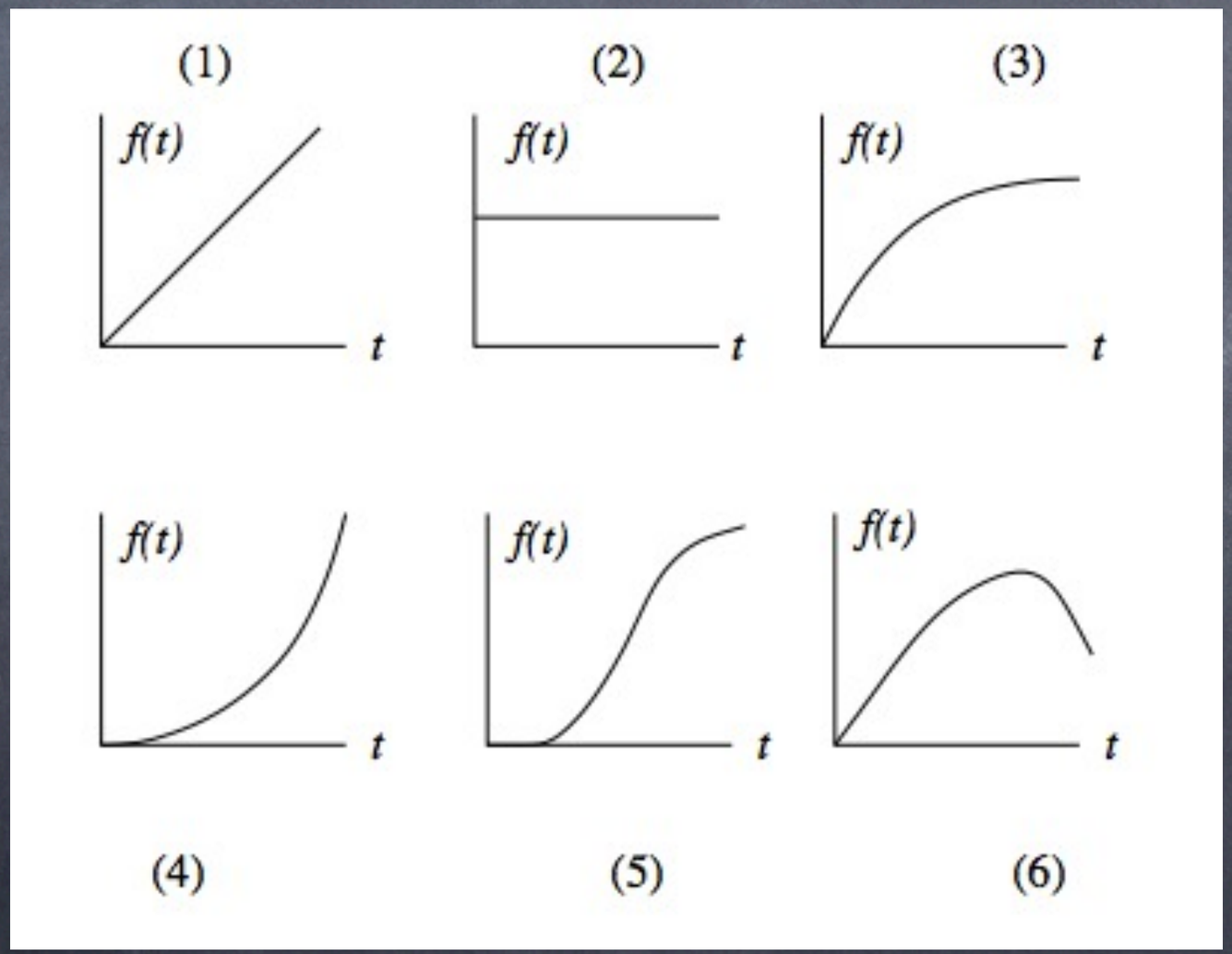
R_{avg} = total extracted / total time

= $nf(t_p) / (nt_p + t_0)$



What should $f(t_p)$ be?

Six options. Let's interpret what each one means.



Choose $f(t_p)$=constant=C

Find t_p that maximizes $R_{avg} = nC / (nt_p + t_0)$

(A) $t_p = -t_0/n$

(B) $t_p = 0$

(C) Never leave.

Think and/or sketch before you calculate.

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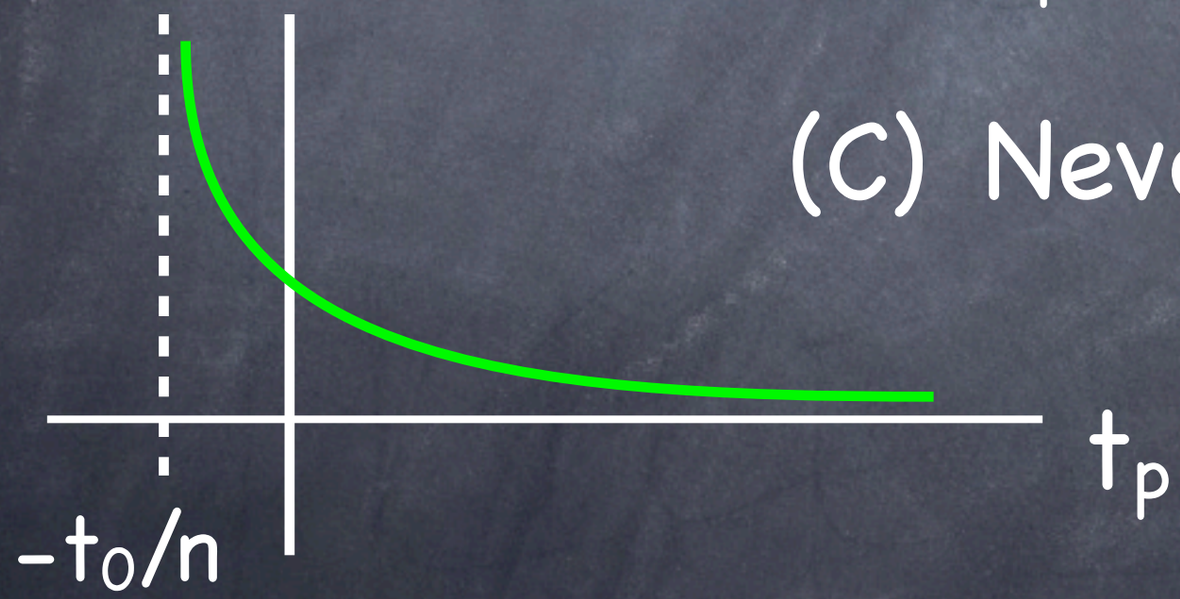

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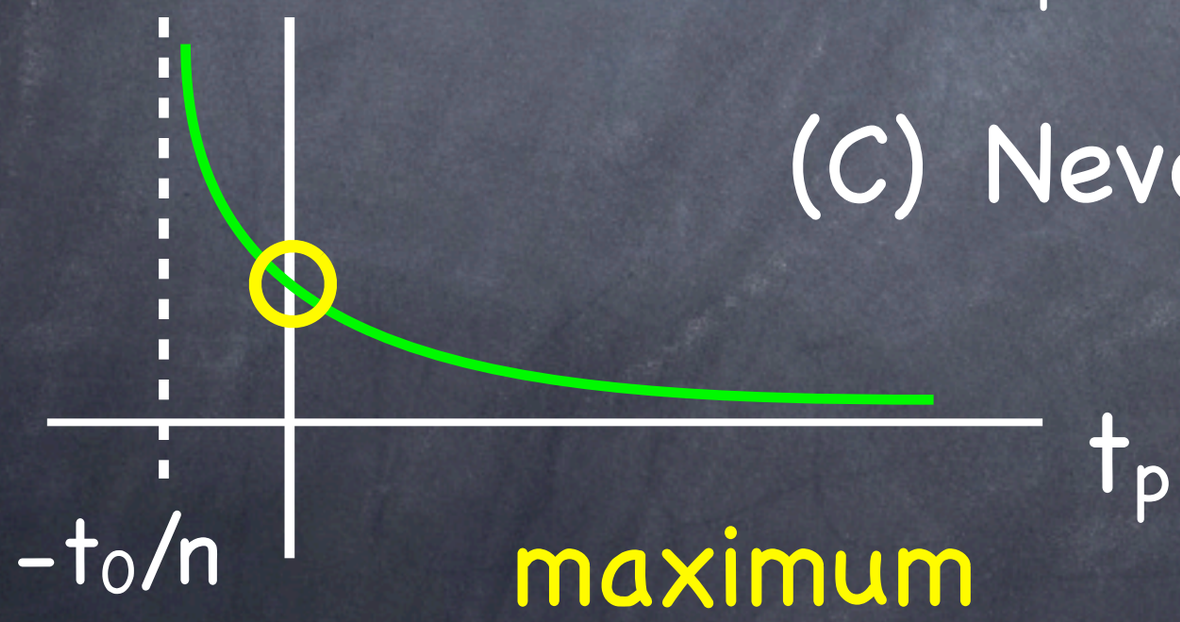

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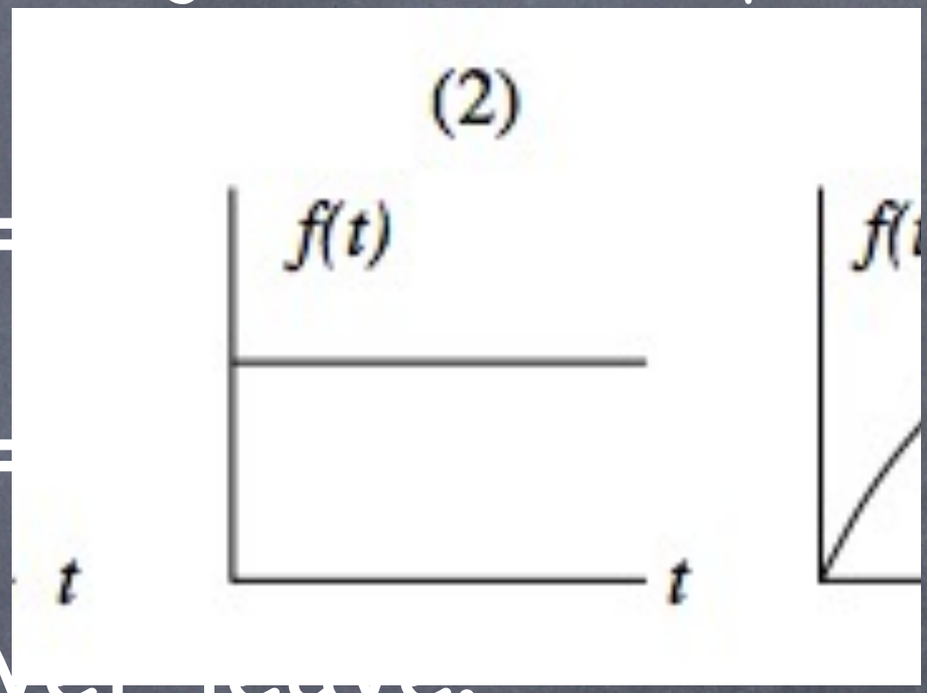

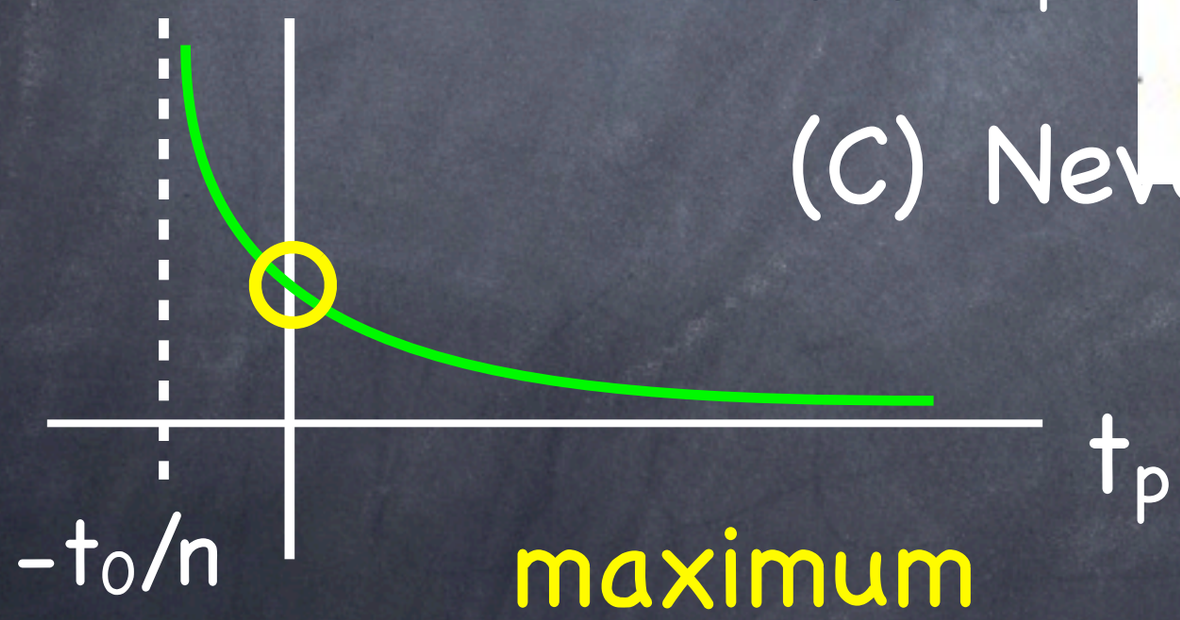

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Choose $f(t_p) = t_p^2$

Find t_p that maximizes $R_{avg} = nt_p^2 / (nt_p + t_0)$

(A) $t_p = -2nt_0$

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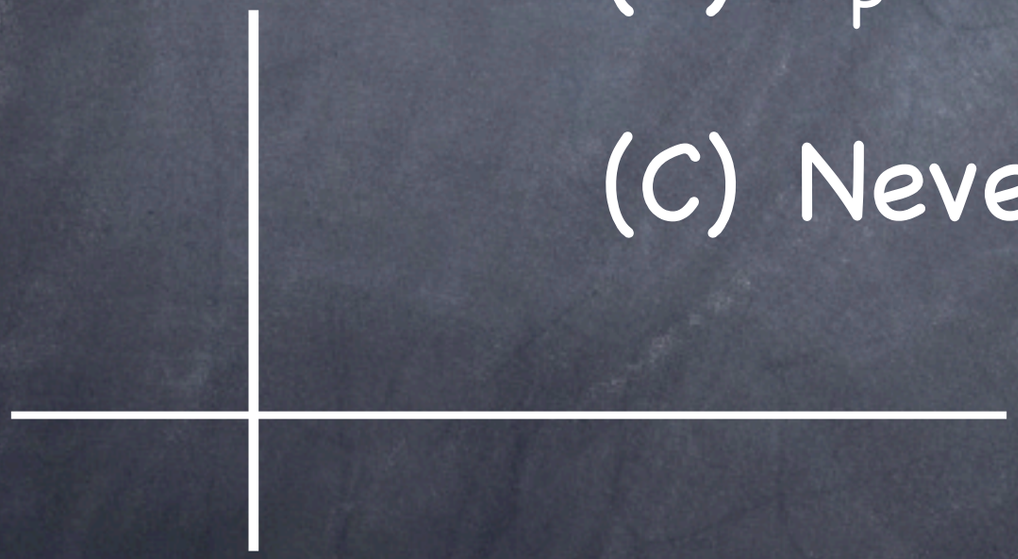

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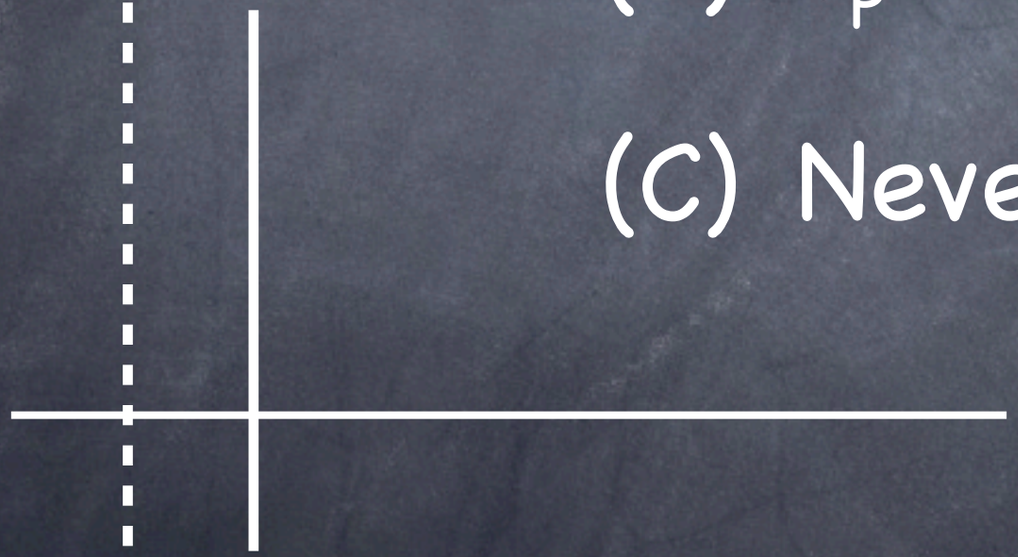

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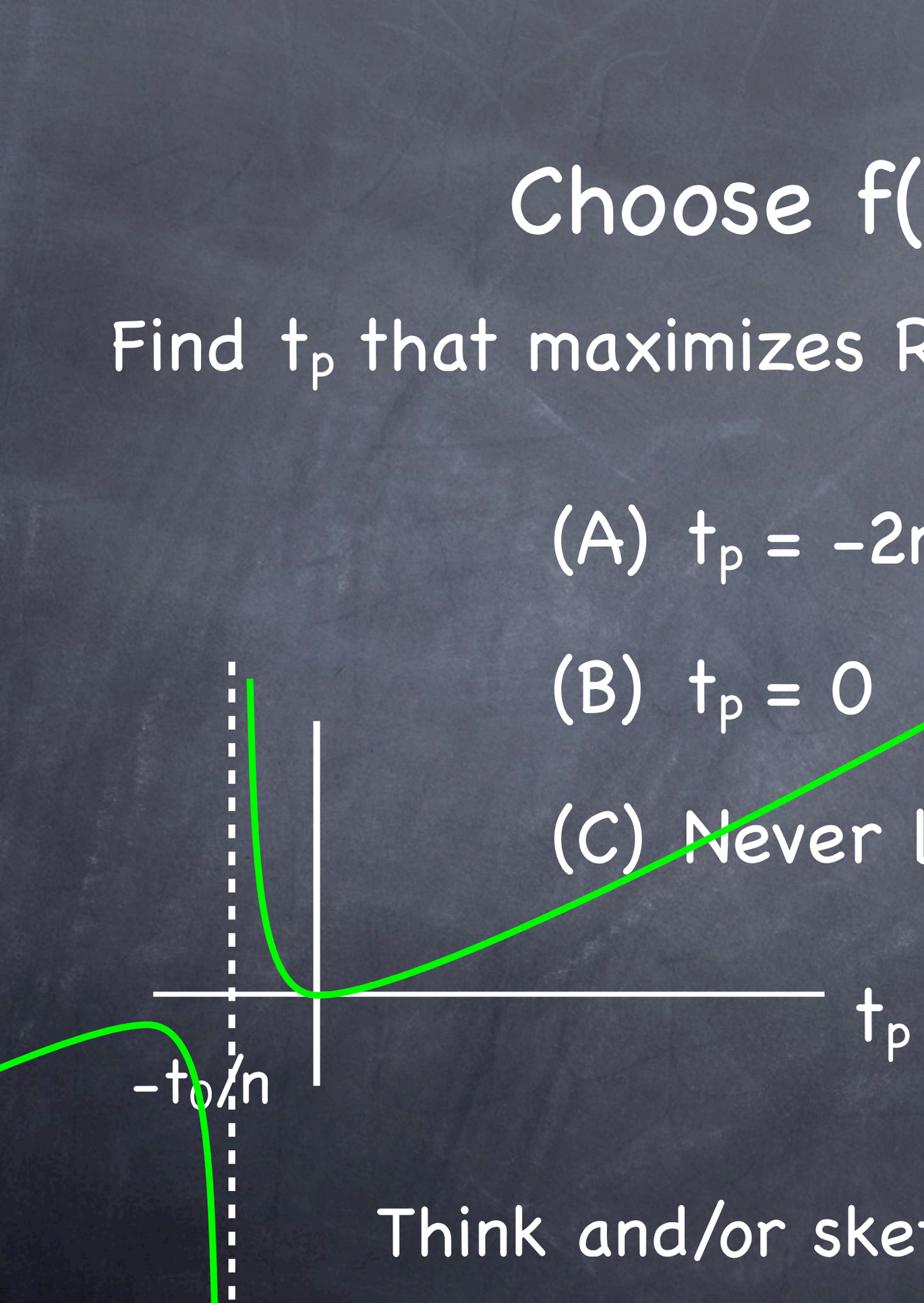

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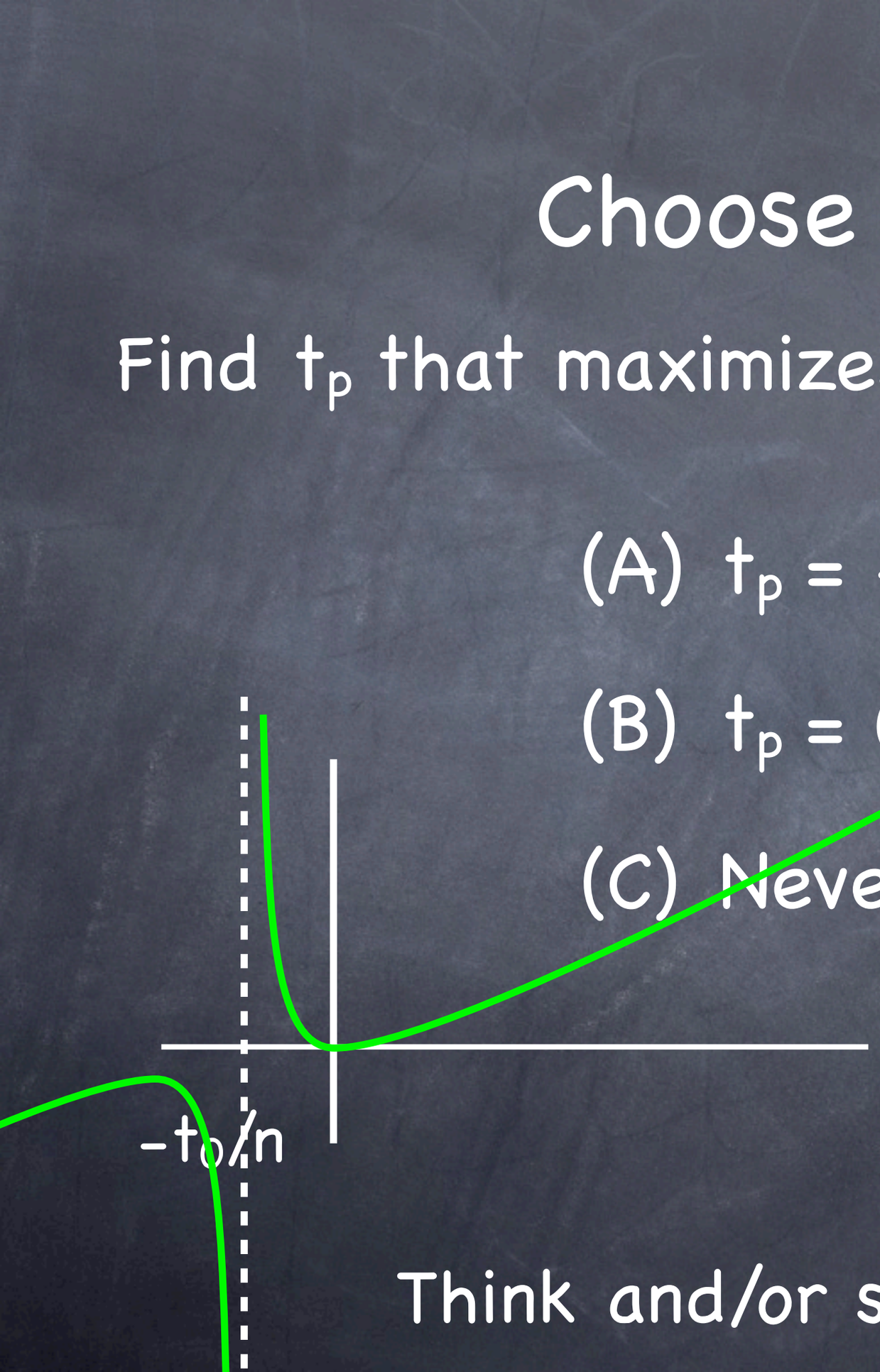

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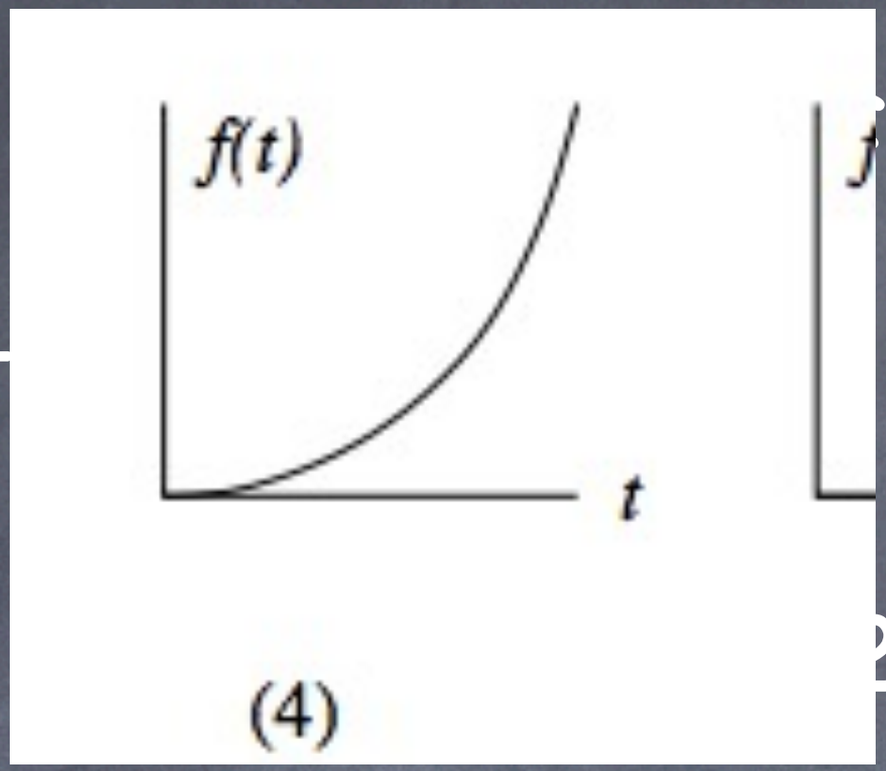


Find t

$f(t_p) = t_p^2$

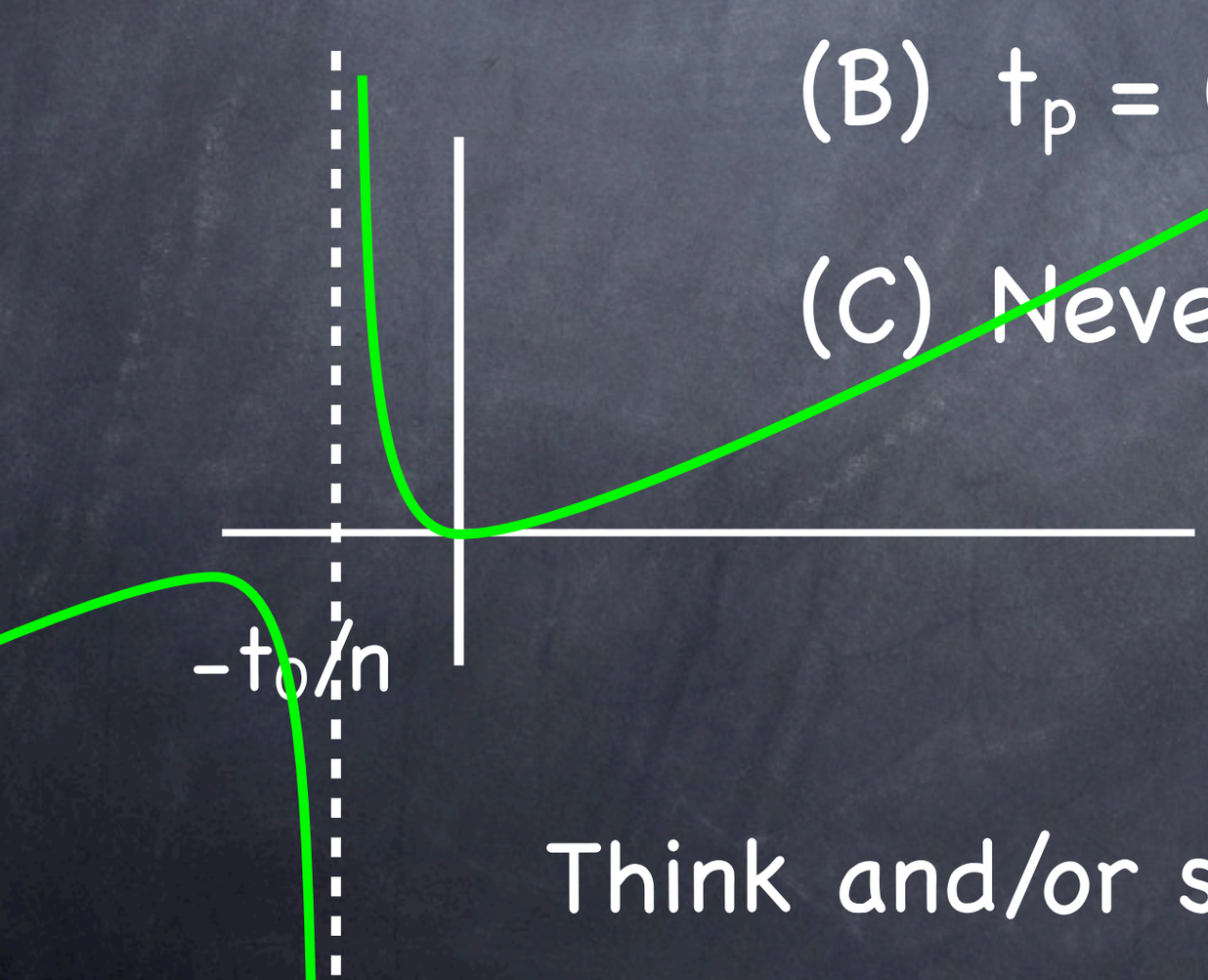
$R_{avg} = nt_p^2 / (nt_p + t_0)$

$2nt_0$

(B) $t_p = 0$

(C) Never leave.

"maximum"



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