

Foraging

Foraging time includes

- a commute ($t_0 \rightarrow$ constant),
- a visit to each patch (nt_p)



Foraging

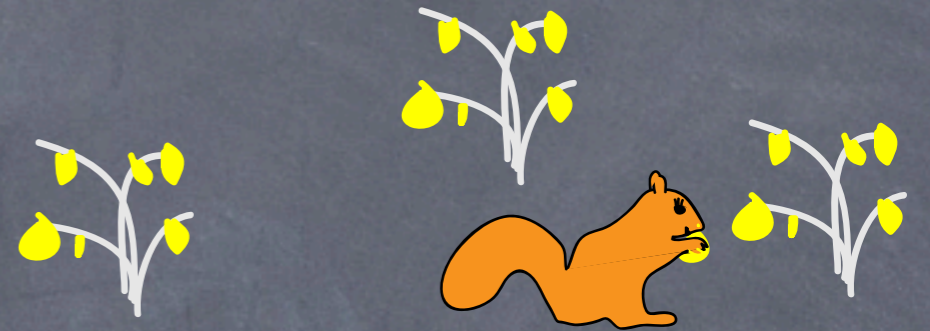
Foraging success is characterized by $f(t_p)$ = resource extracted from a single patch after a time t_p spent in the patch.



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.



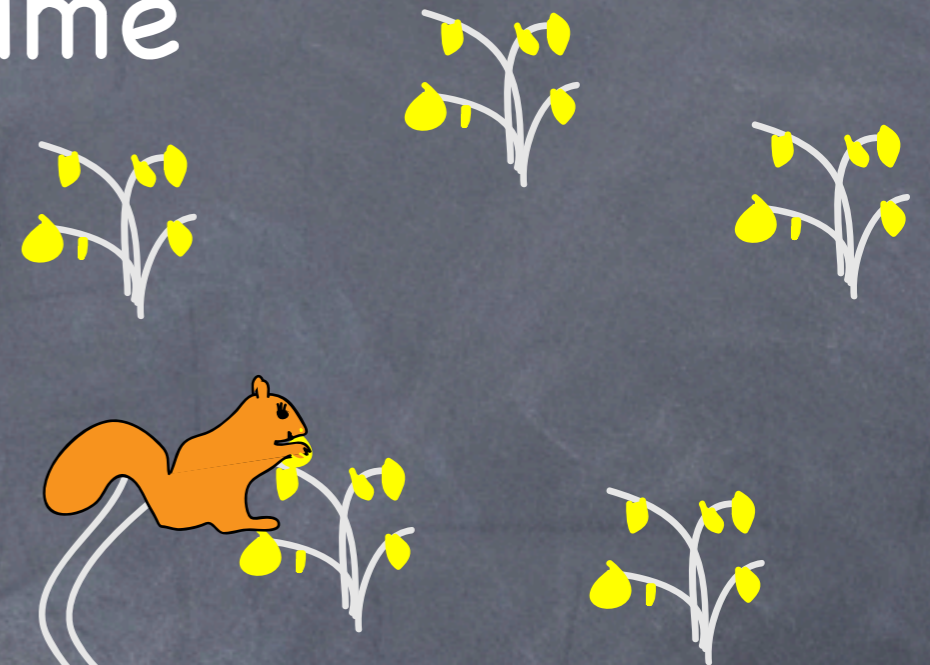
If the squirrel visits n patches, each for t_p minutes, total time spent foraging is...

(A) $t_{\text{tot}} = nt_p$

(B) $t_{\text{tot}} = nt_0$

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

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



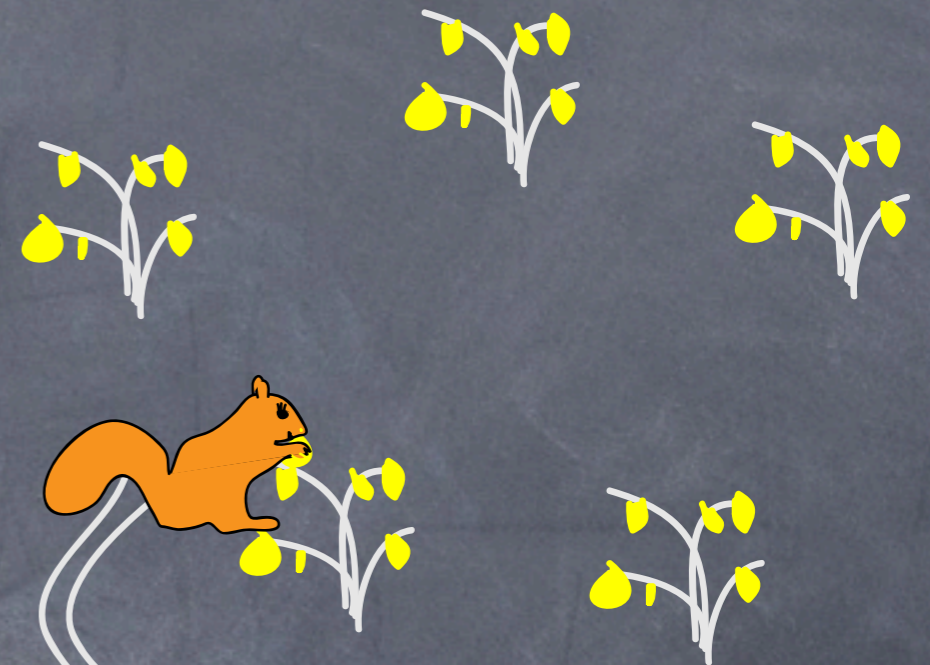
If the squirrel visits n patches,
each for t_p minutes, total
resource extracted is...

(A) $r = nf(t_p)$

(B) $r = f(nt_p + t_0)$

(C) $r = f(nt_0 + t_p)$

(D) $r = nf(t_p + t_0)$



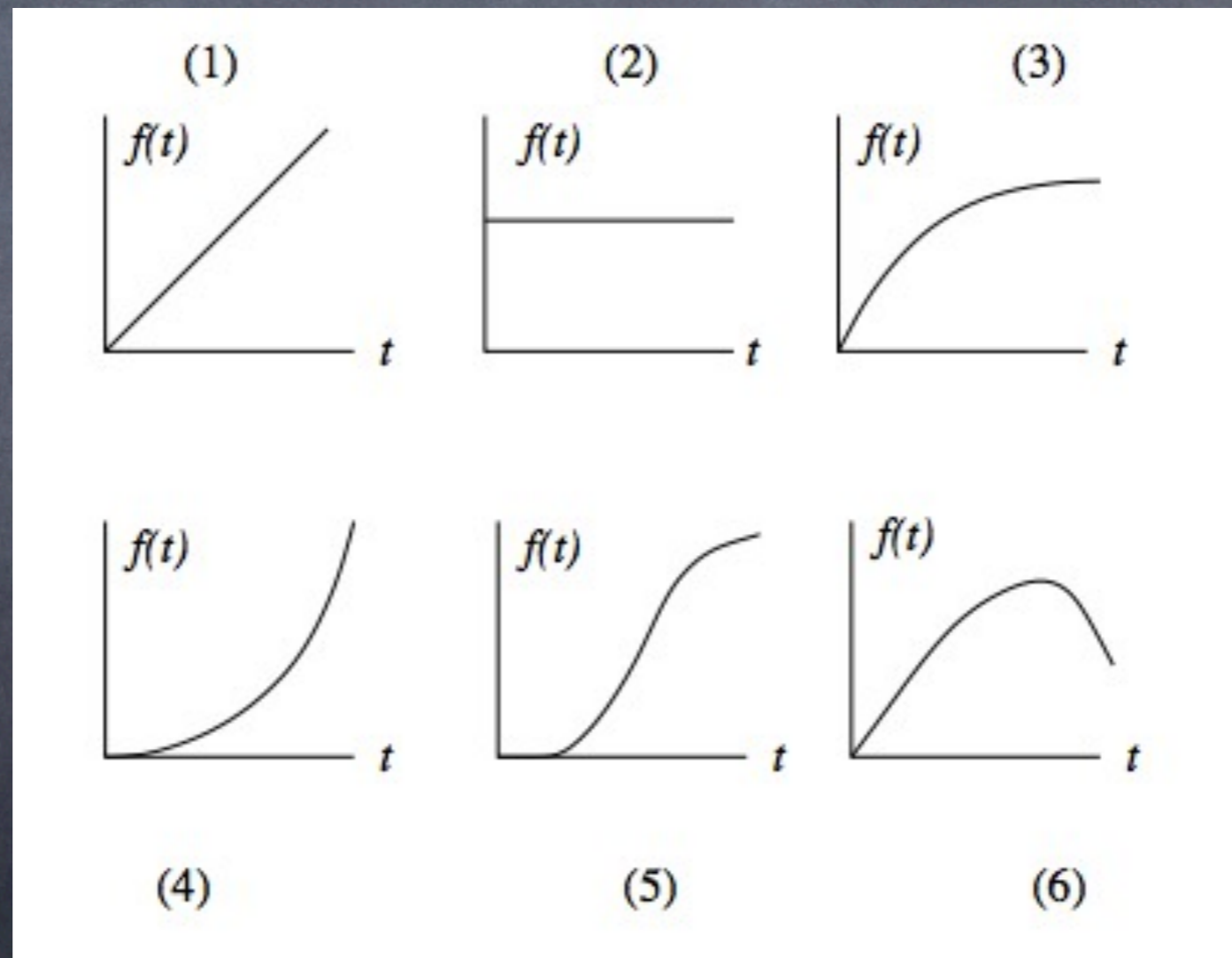
Average rate of resource
extraction:

$$R_{\text{avg}} = \text{total extracted} / \text{total time}$$
$$= nf(t_p) / (nt_p + t_0)$$



What should $f(t_p)$ be?

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



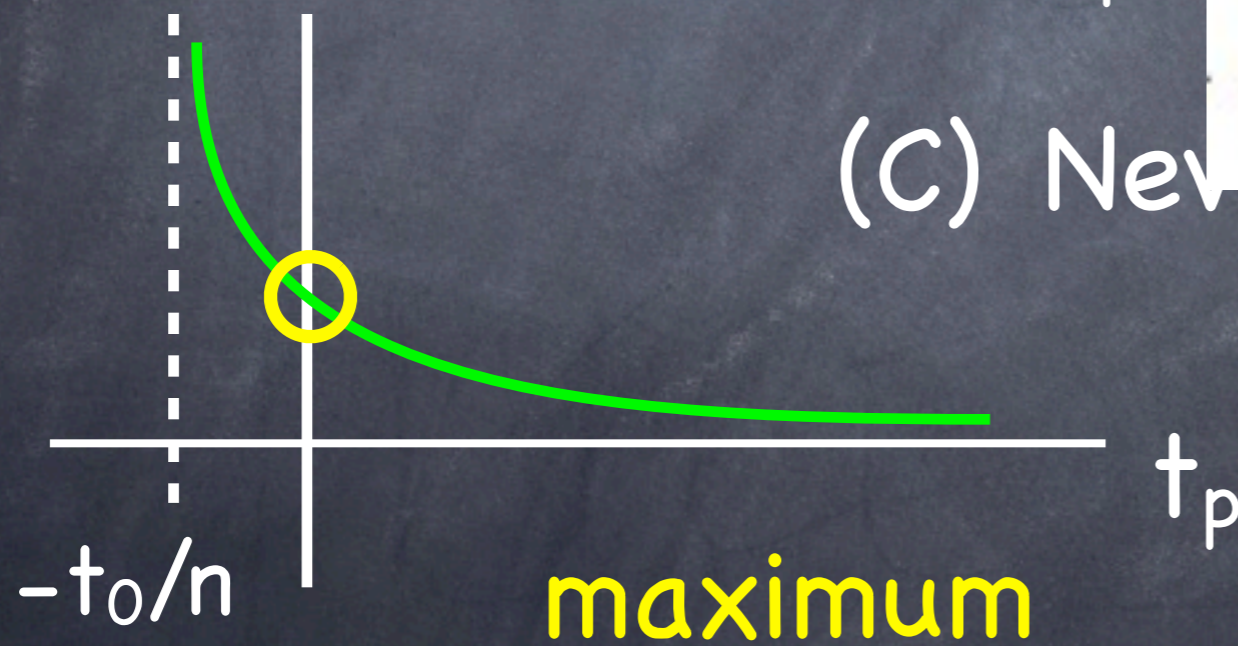
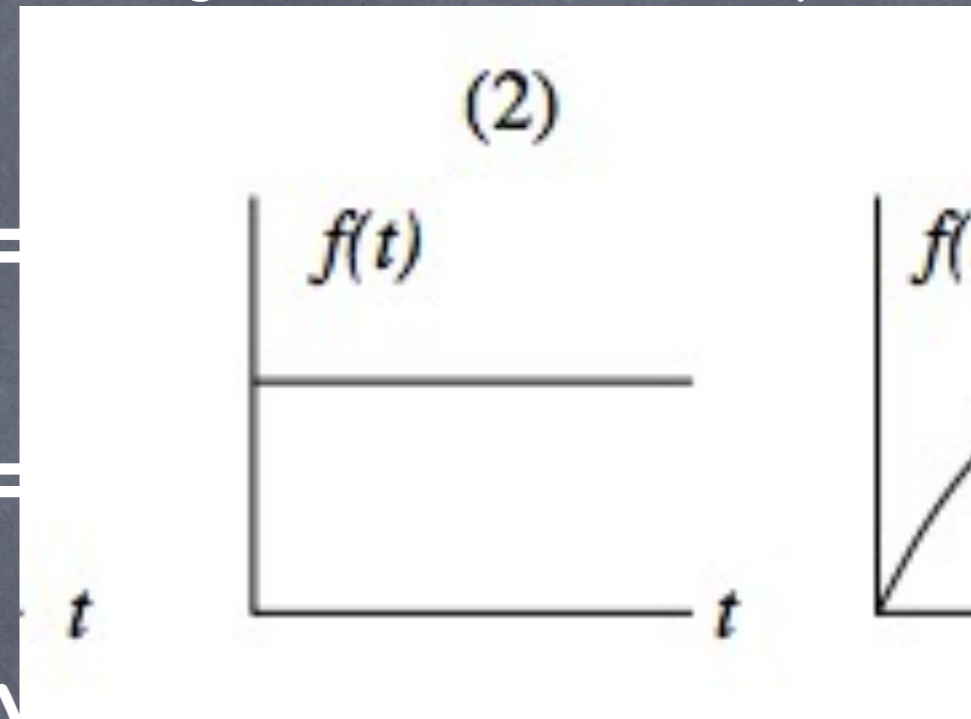
Choose $f(t_p) = \text{constant} = C$

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

(A) $t_p =$

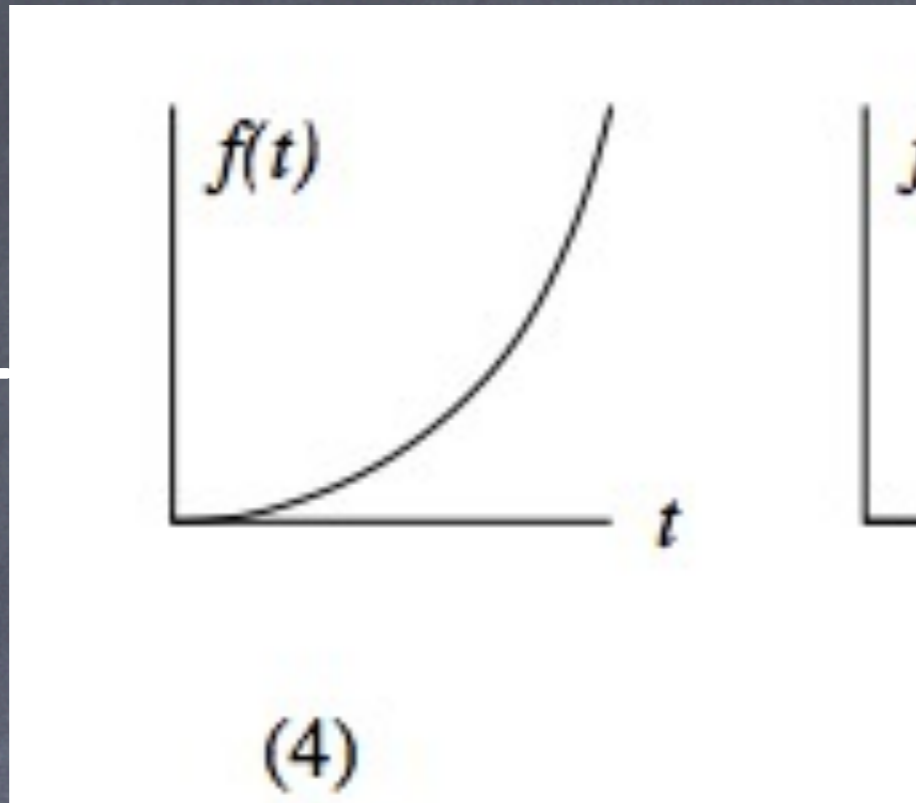
(B) $t_p =$

(C) Never leave.



Think and/or sketch before you calculate.

Find t_p



$$f(t_p) = t_p^2$$

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

$2nt_0$

(B) $t_p = 0$

(C) Never leave.

"maximum"



Think and/or sketch before you calculate.