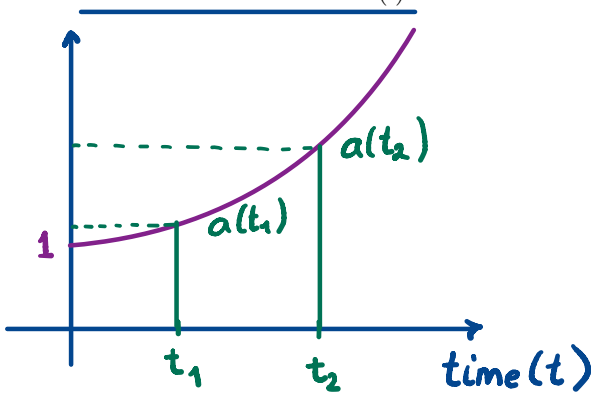
M339D: January 13th, 2023.

UNIVERSITY OF TEXAS AT AUSTIN

Problem set #2

Prerequisites. Conventions.

Problem 2.1. Write down the **definition** of the **effective interest rate** for the time period $[t_1, t_2]$ in terms of the accumulation fuction $a(\cdot)$.



$$i_{[t_1, t_2]} := \frac{a(t_2) - a(t_1)}{a(t_1)}$$

i ... annual effective

$$a(t) = (1+i)^t$$

Problem 2.2. A 5-year loan for 10,000 is charged an effective interest rate of 6% per half-year period. The loan is to be repaid so that interest is repaid at the end of every 6 month period as it accrues and the principal is repaid in total at the end of the 5 years.

Denote the total amount of interest paid on this loan by I. Then,

(a) $I \approx 2,750$
(b) $I \approx 3,000$
(c) $I \approx 3,250$
(d) $I \approx 3,500$
(e) None of the above

OLB_k ... outstanding loan balance after k^{th} period after the payment is made

We keep current on the interest

$\Rightarrow$ $OLB_k = L = 10000$

$\Rightarrow$ amt of every interest pmt: $(0.06)(10,000) = 600$

total # of pmts $= 5 \cdot 2 = 10$

answer: 6,000

Problem 2.3. *Source: Exam FM/2, May 2005, Problem #7.*
Mike receives cash flows of 100 today, 200 in one year, and 100 in two years. The net present value of these cash flows is 364.46 at an annual effective interest rate i.
Calculate i.

(a) About 10%
(b) About 11%
(c) About 12%
(d) About 13%
(e) None of the above