1. Given amount function, $A(t) = 4t^2 + 8t + 4$. What is the interest earned in the second year

- [ ] 0.8
- [ ] 9
- [ ] 36
- [ ] 20

ignore, same like practice 1

$A(2) = 4(2)^2 + 8(2) + 4 = 36$.

$A(1) = 4(1)^2 + 8(1) + 4 = 16$.

Interest $= A(2) - A(1) = 20$.

2. An investor puts 100 into Fund X and 100 into Fund Y. Fund Y earns compound intere st at the annual rate of $j > 0$, and Fund X earns simple interest at the annual rate of $1.05j$. At the end of 2 years, the amount in Fund Y is equal to the amount in Fund X. Calculate the amount in Fund Y at the end of 5 years.

- [ ] 153
- [ ] 157
- [ ] 161
- [ ] 150

AV using simple vs compound interest

At the end of 2 years.

Fund X $= [1 + 1.05j \cdot (2)] \cdot 100$

Fund Y $= (1 + j)^2 \cdot 100$.

So $1 + 2.1j = (1+j)^2 \Rightarrow j = 0.1$

At the end of 5 years.

Fund Y $= 100(1+j)^5 = 161$.

3. Smith lends Jones \$900. After 6 months, Jones settle the debt for \$960. Calculate the annual effective rate of discount.

- [ ] 2/17
- [ ] 1/15
- [ ] $31/16^2$
- [ ] $31/15^2$

ignore, same like practice 1

$d_1 = \frac{960 - 900}{960} = \frac{1}{16}$. It is the semi-annual effective discount rate.

Then, $1 - d_2 = (1 - d_1)^2$. $\Rightarrow d_2 = 1 - (1 - d_1)^2 = \frac{31}{16^2}$

Method: $900(1 - d)^{-0.5} = 960$. $d = \frac{31}{16^2}$.

Definition: the ratio of the amount of interest (amount of discount) earned during the period to the amount invested at the end of the period.

$$d = \frac{AV_{t+1} - AV_t}{AV_{t+1}}.$$

4. PV of $750 due 7 years from now, at a nominal annual rate of interest of 6% compounded monthly.

- [ ] 493.30
- [ ] 492.27
- [ ] 706.43
- [ ] 498.79

find PV using nominal interest rate

$$PV = 750\left(1+\frac{6\%}{12}\right)^{-12\times 7} = 493.30.$$

5. Emma deposits 1000 into a fund that credits interest at a nominal discount rate of 6% compounded once every 2 years. What is the value of the fund 7 years from now?

- [ ] 1500
- [ ] 1564.27
- [ ] 2556.93
- [ ] 2210

find AV using nominal discount rate

$$AV = 1000\left(1-\frac{d^{(\frac{1}{2})}}{\frac{1}{2}}\right)^{-3.5} = 1564.27.$$

6. $1,000 is deposited into a savings account at-time t = 0. No other amounts are deposited. The accumulated amount in the account at any time, t, is given by

$$A(t) = \$1,000 \cdot (1 + 2t/35)^2$$

At time t_1 the force of interest equals .04. What is t_1 ?

- [ ] 32.5
- [ ] 29.5
- [ ] 35.5
- [ ] 41.5

find force of interest

$$\delta(t) = \frac{A'(t)}{A(t)} \Rightarrow \delta(t) = \frac{d}{dt}\ln A(t)$$

$$A(t) = 1000\left(1+\frac{2t}{35}\right)^2. \quad \ln A(t) = \ln\left[1000\cdot\left(1+\frac{2t}{35}\right)^2\right] = \ln 1000 + 2\ln\left(1+\frac{2t}{35}\right).$$

$$\delta(t) = \frac{d}{dt}\ln A(t) = 2\cdot\frac{\frac{2}{35}}{1+\frac{2t}{35}} = 0.04.$$

$$t = \frac{35}{2}\left[\left(\frac{4}{35}/0.04\right)-1\right] = 32.5$$

7. At time 2, 100 is deposited into Fund X. Fund X accumulates at a force of interest

$\delta_t = 0.5(1 + t)^{-2}$

Find the accumulated value of Fund X at time 9.

- [ ] 112.37
- [ ] 156.83
- [ ] 9002
- [ ] 105.71

find AV using varuing delta

$$A(t_1, t_2) = C\cdot\exp\left(\int_{t_1}^{t_2}\delta_r\,dr\right).$$

$$= 100\cdot\exp\left(\int_2^7 0.5(1+t)^{-2}\,dt\right) \qquad 0.5\int_2^7 (1+t)^{-2}dt = -0.5\,\frac{1}{1+t}\Big|_2^7$$

$$= 100\cdot e^{0.1042} = 110.98. \qquad = -0.5\left(\frac{1}{8}-\frac{1}{3}\right)$$

$$= 0.1042.$$

8. John is 35 years old. What is the present value of a perpetuity paying 3000 at the end of each month forever. The first payment is a month after his 60th birthday and the effective interest rate is 5%.

- [ ] 736,354
- [ ] 217,448
- [ ] 17,718
- [ ] 60,000

monthly perpetuity

Method 1:

			3000
month	0	300	301
age	(35)	(60)	

$PV|_{t=0} = v^{300}\cdot\frac{1}{i}\cdot 3000$ where i is the effective interest rate of month.

$(1+i)^{12} = 1.05$. $i = 0.0041$.

$PV|_{t=0} = (1.0041)^{-300}\cdot\frac{3000}{0.0041} = 214411.1049.$

Method 2: $PV|_{t=0} = v^{25}\cdot 3000\cdot a^{(12)}_{\overline{\infty}|5\%}\cdot 12 = (1.05)^{-25}\cdot 3000\cdot 12\cdot\frac{1}{0.0492} = 216075.1988$

$\left(1+\frac{i^{(m)}}{12}\right)^{12} = 1.05$. $i^{(m)} = 0.0041\times 12 = 0.0492$.

9.

End of Year	Annuity X	Annuity Y
1–10	1	K
11–20	2	0
21–30	1	K

Annuities X and Y provide the payments as per table on the left. Annuities X and Y have equal present values at an effective annual interest rate i such that v^{10} = 1/2.

Determine K

- [ ] 5/3
- [ ] 4/3
- [ ] 9/5
- [ ] 7/4

X: $PV|_{t=0} = a_{\overline{30}|} + a_{\overline{20}|} - a_{\overline{10}|}$

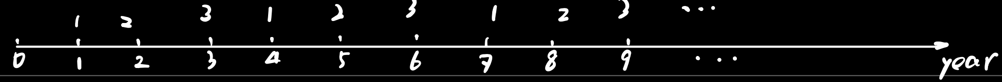
Y: $PV|_{t=0} = K\cdot a_{\overline{30}|} - K\,a_{\overline{20}|} + K\cdot a_{\overline{10}|}$

$PV|^{X}_{t=0} = PV|^{Y}_{t=0}$. $v^{10} = \frac{1}{2}$. $K = \frac{9}{5}$.

10. A loan is to be repaid by annual payments continuing forever, the first one due one year after the loan is made.
Find the amount of the loan if the payments are 1, 2, 3, 1, 2, 3, ... assuming an annual effective interest rate of 10%.

- [ ] at least 22
- [ ] at least 19, but less than 20
- [ ] less than 19
- [ ] at least 20, but less than 21

interesting annuity



Method : Let X, Y, Z be the payment of 1, 2, 3, respectively.

d_j is the effective discount rate of 3 years.

$d_j = \frac{j}{1+j}$. j is the effective interest rate of 3 years

$(1+j)^3 = 1+i$. $j = 0.331$

X : $PV|_{t=0} = 1 \cdot \ddot{a}_{\overline{\infty}|j} \cdot (1+i)^{-1} = \frac{1+j}{j} \cdot (1.1)^{-1} = (4.0211) \cdot (1.1)^{-1} = 3.6555$.

Y : $PV|_{t=0} = 2 \cdot \ddot{a}_{\overline{\infty}|j} \cdot (1+i)^{-2} = 2 \cdot (4.0211) \cdot (1.1)^{-2} = 6.6464$.

Z : $PV|_{t=0} = 3 \cdot \ddot{a}_{\overline{\infty}|j} \, (1+i)^{-3} = 9.0633$.

$PV|_{t=0} = (PV|_{t=0})_{X+Y+Z} = 19.3652$.

Method 2 : Using $a_{\overline{\infty}|j}$. j is 0.331 for the effective interest rate of 3 years.

X : $PV|_{t=0} = 1 \cdot a_{\overline{\infty}|j} \cdot (1+i)^2 = 3.6555$.

Y : $PV|_{t=0} = 2 \cdot a_{\overline{\infty}|j} \cdot (1+i) = 6.6464$.

Z : $PV|_{t=0} = 3 \cdot a_{\overline{\infty}|j} = 9.0634$.

$PV|_{t=0} = (PV|_{t=0})_{X+Y+Z} = 19.3653$.

Notice that the difference from $a_{\overline{\infty}|}$ and $\ddot{a}_{\overline{\infty}|}$ with j.

(since the evaluation time is different from $a_{\overline{\infty}|}$ and $\ddot{a}_{\overline{\infty}|}$).

Method 3 :

Let the first payment be 1, 2, 3 for a cycle.

$X = 1 \cdot v + 2 \cdot v^2 + 3v^3 = 4.8159$.

That is, the annuity payments are

$1+j = (1+i)^3$. $j = 0.331$. $d_j = \frac{j}{1+j} = \frac{0.331}{1.331}$

$PV|_{t=0} = X \cdot \ddot{a}_{\overline{\infty}|j} = \frac{4.8159}{d_j} = 19.3655$.

11. A man turns 40 today and wishes to purchase perpetuity at age 65 with a price of RM300,000 that will give him some retirement income.
Starting today, he makes monthly contributions of X to a fund for 25 years. The fund earns a nominal rate of 9% compounded monthly. Find X.

similar with tuto

- [ ] 267.59
- [ ] 2,517.59
- [ ] 2498.85
- [ ] 265.60

RM300,000.

$X\cdot\ddot{s}_{\overline{300}|j} = 300000.$ j is effective interest rate of monthly.

$j = \frac{9\%}{12} = 0.0075.$

$$X\cdot\frac{(1.0075)^{300}-1}{0.0075}\cdot(1.0075) = 300000.$$

$X = 265.5971.$

12. The present value of a 5-year annuity immediate, with payments of $1,000 each 6 times per year, is $20,930. Determine the force of interest.

need to solve with calculator

- [ ] t least 14.75%, but less than 14.85%
- [ ] at least 14.65%, but less than 14.75%
- [ ] at least 14.85%
- [ ] Less than 14.65%

$PV|_{t=0} = 1000\cdot a_{\overline{30}|j}.$ j is the effective interest rate for 2 Months.

$j = 2.5001\%$ $(1+j)^6 = 1+i.$ $i = 15.97\%.$

$\delta = \ln(1+i) = 14.82\%.$

13. If i = 3.25%, what is the PV of the annual perpetuity immediate payments as follows: 1, 2, 3, … , 10, 11, 11, 11, …

- [ ] 280.79
- [ ] 390.30
- [ ] 289.92
- [ ] 338.46

increasing annuity then perpetuity

Method:
$$PV|_{t=0} = (Ia)_{\overline{10}|i} + v^{10}\cdot 11\cdot a_{\overline{\infty}|i}$$
$$= \frac{\ddot{a}_{\overline{10}|} - 10v^{10}}{i} + v^{10}\cdot 11\cdot\frac{1}{i}$$

Method 2:
$$PV|_{t=0} = 11\cdot a_{\overline{\infty}|i} - a_{\overline{10}|} - a_{\overline{9}|} - \cdots - a_{\overline{1}|}$$
$$= 11\cdot a_{\overline{\infty}|i} - (a_{\overline{10}|} + a_{\overline{9}|} + \cdots + a_{\overline{1}|})$$
$$= 11\cdot a_{\overline{\infty}|i} - (Da)_{\overline{10}|}.$$

14. Barbara purchases an increasing perpetuity with payments occurring at the end of every 2 years. The first payment is 3, the second one is 4, the third one is 5, etc. The price of the perpetuity is 110. Calculate the annual effective interest rate.

- [ ] 4.88%
- [ ] 5.35%
- [ ] 10%
- [ ] 11%

non standard perpetuity

$P = 3.$ $Q = 1.$

$PV|_{t=0} = 3\cdot a_{\overline{\infty}|j} + 1\cdot\frac{a_{\overline{\infty}|j}}{j} = \frac{3}{j} + \frac{1}{j^2} = 110.$ j is the effective interest rate of 2 years.

$(1+j) = (1+i)^2$. $\quad i =$ ______.

$$\lim_{n\to\infty}\left(P a_{\overline{n}|} + Q\frac{a_{\overline{n}|} - nv^n}{i}\right) = P\cdot\frac{1}{i} + Q\frac{\frac{1}{i}}{i} = \frac{P}{i} + \frac{Q}{i^2}.$$

15. You are given $\delta_t = \frac{1}{(1+t)}$ for $0 \le t \le 5$. Calculate "s angle 5"

- [ ] 8.7
- [ ] 13.7
- [ ] 7.5
- [ ] 10.5

ignore this, same like practice 2

$$a(t) = \exp\left(\int_0^t \frac{1}{1+r}dr\right) = \exp\left(\ln(1+r)\Big|_0^t\right) = 1+t.$$

0 1 2 3 4 5 year

$$s_{\overline{5}|} = a(5)\left[\frac{1}{a(1)} + \frac{1}{a(2)} + \frac{1}{a(3)} + \frac{1}{a(4)} + \frac{1}{a(5)}\right]$$

$$= 6\left(\frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \frac{1}{6}\right) = 8.7.$$

$$a_{\overline{n}|} = \frac{1}{a(1)} + \frac{1}{a(2)} + \cdots + \frac{1}{a(n)}. \qquad s_{\overline{n}|} = a(n)\cdot a_{\overline{n}|}$$

(Continuous Force of Interest, but Discrete Payments).

16. $\int_0^n \bar{a}_{\overline{t}|}dt = 100$ You are given the equation on the left. Calculate "a angle n bar"

- [ ] $n\delta$
- [ ] $100n\delta$
- [ ] $100 - n\delta$
- [ ] $n - 100\delta$

tricky, need to recognize this is D-bar a-bar angle n
Remember a relationship in chapter 3 slide 10.

This is decreasing continuous annuities.

Assuming $f(t) = n-t$. and δ denotes the constant force of interest.

The PV is denoted by $(\bar{D}\bar{a})_{\overline{n}|}$.

$$(\bar{D}\bar{a})_{\overline{n}|} = \int_0^n (n-t)\cdot v^t dt = \frac{n-\bar{a}_{\overline{n}|}}{\delta} = 100. \qquad \bar{a}_{\overline{n}|} = n - 100\delta.$$

Note: (1). $(Ia)_{\overline{n}|} = \sum_{t=0}^{n-1} v^t\cdot a_{\overline{n-t}|}$

$$(Da)_{\overline{n}|} = \sum_{t=1}^{n} a_{\overline{t}|}.$$

(2). $PV = \int_0^n f(t)\exp\left(-\int_0^t \delta_r dr\right)dt = \int_0^n f(t)\cdot v^t dt$

$$(\bar{I}\bar{a})_{\overline{n}|} = \int_0^n t\cdot v^t dt$$

$$(\bar{D}\bar{a})_{\overline{n}|} = \int_0^n (n-t)\cdot v^t dt = n\cdot\bar{a}_{\overline{n}|} - (\bar{I}\bar{a})_{\overline{n}|} = \int_0^n \bar{a}_{\overline{t}|}dt.$$

17. For a given interest rate i > 0, the present value of a 20-year continuous annuity of one dollar per year is equal to 1. 5 times the present value of a 10-year continuous annuity of one dollar per year.
Calculate the accumulated value of a 7-year continuous annuity of one dollar per year.

- [ ] 5.36
- [ ] 5.55
- [ ] 8.70
- [ ] 9.01

relationship between n and 2n annuity

$PV|_{t=0} = \bar{a}_{\overline{20}|i} = 1.5\,\bar{a}_{\overline{10}|i}$

$\frac{\bar{a}_{\overline{20}|i}}{\bar{a}_{\overline{10}|i}} = 1+v^{10} = 1.5$. $\delta = 0.0693$. $i = e^{\delta} - 1 = 0.0718$.

$AV|_{t=0} = \bar{s}_{\overline{7}|i} = \frac{(1+i)^7 - 1}{\delta} = 9.0157.$

18. Joan has won a lottery that pays 1,000 per month in the first year, 1,100 per month in the second year, 1,200 per month in the third year, etc. Payments are made at the end of each month for 10 years. Using an effective interest rate of 3% per annum, calculate the present value of this prize.

- [ ] 123,000
- [ ] 114,000
- [ ] 107,000
- [ ] 148,000

non standard

Method: $P = 1000$. $Q = 100$. $n = 120$. $1+j = (1+i)^{12}$. $i = (1.03)^{\frac{1}{12}} - 1 = 0.00247$.

$PV|_{t=0} = 1000 \cdot a_{\overline{120}|i} + 100 \cdot \frac{a_{\overline{120}|i} - 120v_i^{120}}{i}$

Method 2: The first year: $X = 1000 \cdot s_{\overline{12}|i}$

The second year: $Y = 1100\, s_{\overline{12}|i}$

So $P = 1000 \cdot s_{\overline{12}|i}$. $Q = 100\, s_{\overline{12}|i}$.

$PV|_{t=0} = 1000 \cdot s_{\overline{12}|i} \cdot a_{\overline{10}|j} + \frac{a_{\overline{10}|j} - 10v_j^{10}}{j} \cdot 100 \cdot s_{\overline{12}|i}$.

19. $(I^{(2)}a)^{(2)}_{\overline{3}|}$ The present value of a series of payments is represented by the expression.
Find the sum of the series of payments (ignore discounting)

- [ ] 2.625
- [ ] 7.875
- [ ] 10.50
- [ ] 5.25

recognizing double m notation

For this expression, $m=2$. the first payment is $\frac{1}{m^2} = \frac{1}{4}$.

and with each subsequent payment increasing by $\frac{1}{4}$.

$\frac{1}{4} + \frac{1}{4}\times 2 + \frac{1}{4}\times 3 + \cdots + \frac{1}{4}\times 6 = \frac{1}{4}(1+2+\cdots+6) = 5.25$.

20. You are given an annuity-immediate paying 10 for 10 years, then decreasing by one per year for nine years and paying one per year thereafter, forever. The annual effective rate of interest is 4%. Calculate the present value of this annuity.

- [ ] 123
- [ ] 119
- [ ] 121
- [ ] 125

decreasing then level

10	10	10	...	10	9	8	...	1	1	1	...
1	2	3	...	10	11	12	...	19	20	21	...

(time 0 at the start of the time line)

Method 1: $PV|_{t=0} = \frac{1}{i} + a_{\overline{18}|} + a_{\overline{17}|} + \cdots + a_{\overline{11}|} + a_{\overline{10}|}$

$= \frac{1}{i} + \sum_{t=1}^{18} a_{\overline{t}|} - \sum_{t=1}^{9} a_{\overline{t}|}$.

$= \frac{1}{i} + (Da)_{\overline{18}|} - (Da)_{\overline{9}|}$

$= \frac{1}{i} + \frac{18 - a_{\overline{18}|}}{i} - \frac{9 - a_{\overline{9}|}}{i}$

$\frac{a_{\overline{18}|}}{a_{\overline{9}|}} = 1 + v^9$

$i = 0.04$. $a_{\overline{18}|} = 12.6593$. $a_{\overline{9}|} = \frac{a_{\overline{18}|}}{1+v^9} = 7.4353$.

$PV|_{t=0} = 119.4$.

Method 2: $PV|_{t=0} = 10 \cdot a_{\overline{9}|} + (Da)_{\overline{10}|} \cdot v^9 + \frac{1}{i} \cdot v^{19}$.

21. fission method on perpertuity: Perpetuity Y has annual payments of q, q, 2q, 2q, 3q, 3q, ... at the end of each year. The present value of perpetuity Y is equal to 110, at an annual effective interest rate of 10%. Calculate q.

- [ ] 1.9
- [ ] 0.59
- [ ] 0.488
- [ ] 1.7

q	q	2q	2q	...	Y
1	2	3	4	...	X

(time 0 at the start of the time line)

the first 2 payments of q in perpetuity Y is equivalent to the payment of P at time 2 in perpuity X.

$P_1 = S_{\overline{2}|i} \cdot q$. where $S_{\overline{2}|i} = \frac{(1.1)^2 - 1}{0.1} = 2.1$

the Second 2 payments of q ...

$P_2 = S_{\overline{2}|i} \cdot 2q$.

So the perpuity X has payments of $q \cdot S_{\overline{2}|i}$, $2q \cdot S_{\overline{2}|i}$, ... at the end of 2 years.

Using P-Q formula.

$PV|_{t=0} = q \cdot S_{\overline{2}|i} \cdot a_{\overline{\infty}|j} + q \cdot S_{\overline{2}|i} \cdot \frac{a_{\overline{\infty}|j}}{j}$. j is the effective interest rate of 2 years.

$(1+j) = (1+i)^2$.

$j = 0.21$.

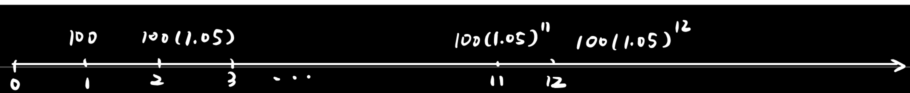
$= q \cdot S_{\overline{2}|i} \cdot \frac{1}{j} + q \cdot S_{\overline{2}|i} \cdot \frac{1}{j^2}$

$= q \cdot (2.1) \cdot \left(\frac{1}{0.21} + \frac{1}{(0.21)^2}\right) = 110$.

$g = 1.9091.$

22. geometric annuity: An annuity provides for 12 annual payments. The first payment is $100, paid at the end of the first year, and each subsequent payment is 5.0% more than the one preceding it. Calculate the present value of this annuity if i = 0.07.

- [ ] At least $1000, but less than $1,100
- [ ] At least $11,00
- [ ] At least $990, but less than $1,000
- [ ] Less than $990



$PV|_{t=0} = 100 \cdot \frac{1}{1.05} \cdot a_{\overline{12}|i'}$. $\quad i' = \frac{0.07-0.05}{1.05} = \frac{0.02}{1.05}$.

23. Mary is to receive an annuity with 30 annual payments. The first payment of $1,000 is due immediately and each successive payment is 5% less than the payment for the preceding year. Interest is 12% compounded annually. Determine the present value of the annuity.

- [ ] At least $6,600
- [ ] At least $6,400 but less than $6,500
- [ ] Less than $6,400
- [ ] At least $6,500 but less than $6,600

$$PV|_{t=0} = P_1 + \frac{P_2}{1+i} + \cdots + \frac{P_{30}}{(1+i)^{29}}.$$

P_1 — the first payment. $P_2 = P_1(1-d)$. $\cdots$ $P_{30} = P_1(1-d)^{29}$.

$$PV|_{t=0} = P_1 \sum_{k=0}^{29} \frac{(1-d)^k}{(1+i)^k} \qquad d = 0.05.\ i = 0.12.$$

$$= P_1 \sum_{k=0}^{29} \left(\frac{1-d}{1+i}\right)^k = P_1 \cdot \frac{1-\left(\frac{1-d}{1+i}\right)^{29}}{1-\left(\frac{1-d}{1+i}\right)} = 6541.04.$$

24. A continuously increasing annuity with a term of n years has payments payable at an annual rate t at time t.
The force of interest is equal to 1/n. Calculate the present value of this annuity.

- [ ] $n^2\left(1-2e^{-\frac{1}{n}}\right)$
- [ ] $n^2\left(1-e^{-1}\right)$
- [ ] $n^2\left(1-e^{-\frac{1}{n}}\right)$
- [ ] $n^2\left(1-2e^{-1}\right)$

$$PV|_{t=0} = \int_0^n t \cdot e^{-\delta t} dt = \int_0^n t \cdot e^{-\frac{t}{n}} dt$$

Let $u = t$. $e^{-\frac{t}{n}} dt = dv$. $v = -ne^{-\frac{t}{n}}$.

$$PV|_{t=0} = -nte^{-\frac{t}{n}}\Big|_0^n + \int_0^n ne^{-\frac{t}{n}} dt = n^2(1-2e^{-1})$$

25. Bill purchases an annuity at a price of 10,000. The annuity makes payments of 500 at the end of every 6 months for 20 years. The payments are reinvested in a fund, which earns interest at an annual effective rate j. Bill realizes an overall effective annual yield of 7% on his original investment over the 20-year period. Calculate j

- [ ] 6.1%
- [ ] 6.7%
- [ ] 6.5%
- [ ] 6.3%

this is chapter 5,

Yield 2 calculation

Annuity: 500 500 ... 500 500

0 1 2 3 ... 39 40 times

Interest: $500i$ $1000i$ ... $19500i$

i is the effective interest rate of semi-annual.

$$10000(1.07)^{20} = 500\cdot(40) + 500i\cdot(Is)_{\overline{40}|i}$$

$$= 20000 + 500i\cdot\frac{s_{\overline{40}|} - 40}{i}$$

$$\Rightarrow 10000(1.07)^{20} = 500\cdot s_{\overline{40}|i} \qquad i = 3.1148\%.$$

$$(1+i)^2 = 1+j. \qquad j = 0.06327.$$

· Understanding here $10000(1.07)^{20} = 500\, s_{\overline{40}|i}$.

26. Susan invests 100 at the end of each year for seven years at an annual effective interest rate of 5%. The interest credited is reinvested at an annual effective rate of 6%. The accumulated value at the end of seven years is X. Calculate X.

- [ ] 878
- [ ] 898
- [ ] 828
- [ ] 858

you can do this one. concept of growing money in 2 funds.

payments 100 100 100 100 100 100 100

0 1 2 3 4 5 6 7 year

Interests $100i$ $200i$ $300i$ $400i$ $500i$ $600i$ $700i$

$$X = AV|_{t=7} = 700 + 100i\,(Is)_{\overline{7}|j} = 700 + 100\cdot 5\%\cdot\frac{\ddot{s}_{\overline{7}|} - 7}{6\%} = 858.1223.$$

27. Table show info for an investment account. Calculate the absolute difference in the yield rates by dollar-weighted and time-weighted methods

	1/1/91	5/1/91	9/1/91	1/1/92
Account Value (Before deposit or withdrawal)	50,000	75,000	90,000	67,000
Deposit		15,000		
Withdrawal			25,000	

- [ ] 12.3%
- [ ] 2.3%
- [ ] 6.4%
- [ ] 9.8%

last part of chapter 5, belum belajar

DWRR. $50000(1+i) + 15000(1+\frac{2}{3}i) - 25000(1+\frac{1}{3}i) = 67000.$ $i = 52.2581\%.$

TWRR. $1+i = \frac{75000}{50000}\cdot\frac{90000}{(75000+15000)}\cdot\frac{67000}{(90000-25000)} \Rightarrow i = 54.6154\%$