3.1 Checking Accounts

Secret Service: 1865 to combat widespread counterfeiting

→ If you receive a counterfeit bill you will lose than value of the money.

Check: Written orch used to tell the bank to pay money.

Checking account: allws customrs to clyposit money, make withdrawals, & make transfers of funds

Electronic funds transfer: (EFT) moving monies from one accomt to anothr

payee: receiver of transfer funds

drawer: the accounA ownr

clear checking: Whm check gets processed

deposit slip: paper work to make deposits

direct deposit: deposit payroll or gov't checks (verification of funds must be provided b/4 funds are allowed)

hold: time spent while amount is received into bank accounts.

endorse: written signature with pen or electronic

cancelled: what happens to a check once money is paid

insufficient funds: returned check due to insufficient funds

overdraft protection: pay checks even if not enough funds fee charged to customer

Atm: get money, deposit funds 24 access

PIN: special #'s to obtain money from accounts

Maintenance fee: a monthly cost to customers

interest: % of $ on the account deposits

Accounts:

Basic Checking: widely used. do not pay interest

Interest-bearing checking accounts: minimum balance required

Free checking accts: no min. bal. and no maintence fees.

Joint checking: more than 1 person on the account

Express checking: electronic accounts (not traditional banks)

NOW acctr: negotiable order of withdrawal. have interest connected to them

Lifeline checking: low-income consums.

fees: min. balances are low or nonexistent

Ex1: pg. 118

2,300.00
+ 425.33
+ 20.00
+ 550.00
- 995.33
200 cash received
$1795.33

2300.00
+ 795.33
$3095.33
new balance

Ex 2 Check Registers (written record of accounts)

- debits - (withdrawals)
- Credit - (deposits)

Show pg. 119 regist

3672.27

—

—

—

+

+

Balance $ 2499.90

3.1 Hwk pgs. 120-121 #1-7 ; 8-15 (skip 12)

1.) Bank Accounts are essential to daily life

2) 865.98
+623.00
+ 60.00
+130.00
+278.91

$1957.89
balance

3.) $t + w + h + v = k$

4.) $630
− 150 ($50)
− 360 ($20)

$120 $10

20
18

160
20

360

12 $10 bills

10 | 120

5.) $9145.87
+2783.71
+ 11.15

11940.73
− 4883.90

$7056.83

Subtract
$4871.90
12.00

$4883.90

3.2 FA Reconcile a Bank Statement

Account #: appears on checks, dep. slips, bank statements

Start balance

end balance

outstanding deposits: do not appear on statements

outstanding checks do not appear on statement

Reconciling a bank statement: balancing the numbers

Ex 1 pg. 124 talk about it

discuss outstanding dep & checks & balance out.

Ex 2 pg. 126

Key balance

$3839.25

+2000.00 dep out

+135.67

+254.77

+188.76

$2579.20

Bank balance

3450.10

1000.00

$567.89

23.83

598.33

$2190.05

3450.10

+2579.20 dep bal

$6029.30

2190.05 – checks

$3839.25

Bank

3450.10

+2579.20 deposit

$6418.45

– 2190.05 checks not clear

$4228.40

(2)

3.3 FA Savings Accounts

→ banks pays interest for use of the money

Interest based on interest rate (%) and principal (balance).

Simple interest: calc. on principal only

$I = PRT$

I - interest
P - principal
R - rate
T - time

FORMULA

FDIC - Guarantees $250,000 per depositer

Statement Savings: receive monthly statement of money & interest

min bal. to not get charged a fee

money market: high interest rate, req. greater deposit & min balance.

CD: fixed rate until maturity (end of time)

cost of deposit		
	6 month	2 year
	1 year	5 year

Ex 1 $5000.00 2 yrs.

5000.00 × 4.25%

5000 × 4.375% ← largest %

5000 × 4.22%

5000 × 4.3%

Ex2

$716.23
-225.00
$491.23
-4.00
$\$487.23$

Ex3

$1,200
4.5%

$I = 1200(0.045)(3)$

$I = \$162$

$162 + 1200 = \$1362$

Ex4 $2,000 5% 7 months

$I = prt$

$I = 2000(0.05)\left(\frac{7}{12}\right)$

$I = \$58.33$

Ex5 $1,000 int. 2 yrs. 5%

$I = prt \rightarrow 1000 = \frac{p(0.05)(2)}{0.05(2)}$

$\frac{1000}{(0.05)(2)} = p$

$p = \$10,000$

Ex6 4.1%, $910 → $1000

$I = 1000 - 910 = \$90$

$I = PRT$

$\frac{90}{1000(0.041)} = \frac{1000(0.041)T}{1000(0.041)}$

$T = 26.4$

T = 27 months

Ex7 5000 - 6000 5yrs x%

$6000 - 5000 = 1000$

$I = prt$

$1000 = 5000(x)5$

$\frac{1000}{30000} = \frac{25000x}{30000}$

$x = 0.04$

4%

3.4 Compound Interest

Compound Interest: money earned on the money deposited plus previous interest

→ Annual Compounding: Compounded 1 X per year

→ SemiAnnual: Compounded every 6 months

→ Quarterly: four times a year compounding

→ Daily Compunding: every day compounding

Crediting an account: record interest earned and add it into the account monthly or quarterly.

Ex 1 $1,000 @ 6% compounded annually

$I = PRT$

$I = 1,000(.06)(1)$

$I = \$60$ per year

Balance 1 yrs

$1000 + 60 = \$1060$

Ex 2 $1,000 @ 6% Compounded semiannually

2 x per year

$I = PRT$

0.5 yrs

$I = 1000(.06)\left(\frac{1}{2}\right)$

$I = \$30$

$1000 + 30 = \$1030$

$1,030 @ 6\%$ com semi

$I = 1030(.06)(0.5)$

$I = \$30.90$

$1030 + 30.90 = \$1060.90$

$0.90 more per year LOL!

Ex3 1,000 6% quarterly .25 year

$I = PRT$

$I = 1000(.06)(.25)$

$I = \$15$ → $1000 + 15 = \$1015$ balance

~~$I = 1015(.06)(.25)$~~

Ex4 1,000 x 6% daily daily $\frac{1}{365}$

$I = PRT$

$I = 1000(.06)\left(\frac{1}{365}\right)$

$I = \$0.16$ → $1000 + 0.16 = \$1000.16$

3.4 FA HWK pgs. 141-142 #1-13 skip 10, 11

1.) Compound Interest is better than Simple interest

2) 3700 @ 6.5% Annually

$I = PRT$

$I = 3700(.065)(1)$

$I = \$240.50$

3) 4000 @ 6.75% 1yr

$I = PRT$

$I = 4000(.0675)(1)$

$I = \$270$

$4000 + 270 = \$4270$

4) 9000 @ 8% Semiannually

$I = PRT$

$I = 9000(.08)(.5)$

$I = \$360$

$9000 + 360 = \$9360$

5) $X @ 2.2% quarterly (0.25)

$I = X(0.022)(0.25)$

6) $3500(.075)(.5)$

a) $131.25

b) $3631.25

c) $(3631.25)(.075)(0.5) = 136.17$

d) $3767.42

e) $267.42

f) $3500(.075)(1) = \$267.42$

g) $14.92

3.5 FA Compound Interest Formula

→ relates principal, interest rates, the number of times interest is compounded per year, & the number of years the money will be on deposit, & the ending balance.

- used on annually, semiannually, monthly, weekly, daily, & so on

APR: annual % rate

APY: annual % yield : rate that takes into effect of compounding

Ex 1) P rate 5% quarterly

$I = PRT$

$I = P(0.05)\left(\frac{1}{4}\right)$

1st Qtr $B_1 = P$ + interest

$B_1 = P + \frac{0.05}{4}P$

$B_1 = P\left(1 + \frac{0.05}{4}\right)$

2nd Qtr $B_2 = B_1 + \left(\frac{0.05}{4}\right)B_1$

$B_2 = B_1\left(1 + \frac{0.05}{4}\right)^2$

Formulas $B = P\left(1 + \frac{r}{m}\right)^{mt}$

B = ending balance (future yield)

P = principal

r = annual % rate

m = number of compound periods a yr.

t = # of years

Ex 1 $1650 for 3 yr. @ 3% (compounded daily)

$P = 1650$ $r = 0.03$ $n = 365$ $t = 3$

$$B = 1650\left(1 + \frac{0.03}{365}\right)^{365(3)}$$

$B = \$1805.38$

ex 2 $2350 3.1% monthly 5 yr.

$P = \$2350$

$r = 0.031$

$n = 12$

$t = 5$

$$B = \$2350\left(1 + \frac{0.031}{12}\right)^{12(5)}$$

$B = \$2743.45$

Ex3 $8,000 3.2% daily (APY) 1 yr

$$B = P\left(1 + \frac{r}{n}\right)^{nt}$$

$$B = 8000\left(1 + \frac{0.032}{365}\right)^{365(1)}$$

$$B = \$8260.13$$

$$I = \$8260.13 - \$8000.00$$

$\$260.13$ Interest

Ex4 ~~3000 4.1% daily~~

~~$B = P\left(1 + \frac{r}{n}\right)^{nt}$~~

~~$B = 3000\left(1 + \frac{0.041}{365}\right)^{365(1)}$~~

~~$B =$~~

3.5 HWK: pgs. 148-149 #1-12

1.) Less risk on savings accounts

2) 4000 @ 5% semiannually for 10 yrs.

$$B = P\left(1 + \frac{r}{n}\right)^{nt}$$

$$B = 4000\left(1 + \frac{0.051}{2}\right)^{2(10)}$$

$$B = \$6554.47$$

3.) $2000 4.75% monthly 8 yrs

$$B = 2000\left(1 + \frac{0.0475}{12}\right)^{12(2)}$$

$$B = \$2198.91$$

4.) $1500 4.12% daily

$$B = 1500\left(1 + \frac{0.0412}{365}\right)^{365(3)}$$

$$B = \$1697.33$$

5.) 4300 @ 4.3% daily

$$B = 4300\left(1 + \frac{0.043}{365}\right)^{365(1)}$$

a) $B = \$4488.92$

b) $\$188.92$

c) 4.39%

3.6 Continuous Compounding

Limits: finite time (it ends)

infinite Limit: never ends

Continuous Compounding: infinite compounding

Ex 1 $x^2+3x+5 = f(x)$

Squaring: mult. by 3

x	y
100	10305
1,000	1,003,005

Ex 2 $f(x) = \frac{6x-1}{3x+2}$ ← put in calc.

x	y
100	1.98
1000	1.99
90000	1.99

$$\lim_{x \to \infty} f(x) = 2$$

← discuss this

Lim limit → approaching ∞ infinity

Ex3 $f(x) = 2^x$; find $\lim_{x \to \infty} f(x)$

↑ put in calculator

$f(x)$ = limit undefined

Ex4 $f(x) = \left(1 + \frac{1}{x}\right)^x$, find $\lim_{x \to \infty} f(x) =$

$\lim_{x \to \infty} 1^x = 1 \quad + \quad \lim_{x \to \infty} \left(\frac{1}{x}\right)^x = 0$

$1 + 0 = 1$

$\lim_{x \to \infty} \left(1 + \frac{1}{x}\right)^x = e \approx 2.718$ ← press on calculator

2nd e^ 1

* e = exponential base abbreviated e +

x	y
100	2.7
1000	2.71
10000	2.718
900000	2.71828

Ex5 $1000 at 100% comp. continuous 1 yr.

$$\lim_{x\to\infty} 1000\left(1+\frac{1}{x}\right)^x = 1000e \approx 1{,}000(2.7182818) =$$

$2,718.28

FORMULA- Compounded Continuous Interest

$$f(x) = P\left(1+\frac{1}{x}\right)^{x \cdot \text{rate}}$$

* Exact formula

$$A = P \cdot e^{rt}$$

principal = P

$$e = \left(1+\frac{1}{x}\right)^x$$

r = rate t = time

Ex6 1,0000 4.3% comp continuously 5yrs.

$$B = pe^{rt}$$

$$B = 1000e^{0.043(5)}$$

B = $1239.86

3.7 FA (Future Value of Investments)

continuous deposit over a period of time

FORMULA: $$B = \frac{P\left(\left(1 + \frac{r}{n}\right)^{nt} - 1\right)}{\frac{r}{n}}$$

B = balance of end of investments

P = periodic deposit amount

r = annual rate

n = # times interest compounded annually

t = length of investments in yrs

Biweekly: every 2 weeks
∴ is common schedule for paychecks

EX 1 $5,000 4.5% comp. annually for 20 yrs.

$$B = 5000\frac{\left(\left(1 + \frac{.045}{1}\right)^{1(20)} - 1\right)}{\frac{0.045}{1}}$$

$$B = \$156,857.11$$

Ex 2 20 yr. period (interest)

5,000 per year
× 20 yrs
100,000

156,857.11
− 100,000.00
$56,857.11 interest

Ex 3 3.6% annual compounded monthly $1200 every month after 10 yrs

$$B = \frac{P\left(\left(1+\frac{r}{n}\right)^{nt}-1\right)}{\frac{r}{n}}$$

$$B = 1200\,\frac{\left(\left(1+\frac{.036}{12}\right)^{12(10)}-1\right)}{\frac{.036}{12}}$$

$B = \approx 173,022.87$ after 10 yrs

3.8 Present Value of Investments

Present value: Current value of deposit

present value of a single deposit investment:
one-time deposit should earn @ a specific interest rate

present value of periodic deposit investment:
money in an account later on to meet given expense.

Ex 1) 6 yrs $20,000 5% $P = ?$

$$B = P\left(\left(1 + \frac{r}{n}\right)^{n/t}\right.$$

$$B = P\left(1 + \frac{.05}{1}\right)^{1(6)}$$

$$20{,}000 = \frac{P\left(1 + \frac{.05}{1}\right)^{1(6)}}{\left(1 + \frac{0.5}{1}\right)^{6}}$$

$$\left(1 + \frac{0.5}{1}\right)^{6}$$

$P = 14,924.31$

approx $15,000

Ex 2 $B = 100{,}000$ (want); 10 yrs, 3.8% comp. daily

$$B = P\left(1 + \frac{r}{n}\right)^{nt}$$

$$\frac{100{,}000}{\left(1 + \frac{.038}{365}\right)^{365(10)}} = \frac{P\left(1 + \frac{.038}{365}\right)^{365(10)}}{\left(1 + \frac{.038}{365}\right)^{365(10)}}$$

$$P = \frac{100{,}000}{\left(1 + \frac{0.38}{365}\right)^{(365)(10)}} = \$\,68{,}387.49$$

Ex 3 — 3 yrs. @ 15,000 4% interest (comp. monthly)

deposit monthly (?)

$$B = \frac{P\left(\left(1+\frac{r}{n}\right)^{nt}-1\right)}{\left(\frac{r}{n}\right)}$$

periodic formula

$$15{,}000 = \frac{P\left(\left(1+\frac{.04}{12}\right)^{12(3)}-1\right)}{\left(\frac{.04}{12}\right)}$$

$\div \frac{.04}{12}$ → Keep Change Flip → $\times \frac{12}{.04}$

$\frac{.04}{12}\cdot\frac{12}{.04}$

$\frac{600}{12}$

$$50 = \frac{P\left(\left(1+\frac{.04}{12}\right)^{36}-1\right)}{\left(\left(1+\frac{.04}{12}\right)^{36}-1\right)}$$

$P = \$392.86 \approx 400$ per month

Ex 4 do not deal 200,00 4.5% monthly period deposit

X = months

$$B = \frac{P\left(\left(1+\frac{r}{n}\right)^{nt}-1\right)}{\frac{r}{n}}$$

reciprocal

$$B = P\left(\left(1+\frac{r}{n}\right)^{nt}-1\right)\cdot\left(\frac{n}{r}\right)\left[\frac{r}{n}\right]$$

reciprocal

$$\frac{\frac{.045}{12}\left(200{,}000\right)}{\left(1+\frac{0.45}{12}\right)^{12X}} = \frac{P\left(\left(1+\frac{.045}{12}\right)^{12(X)}\right)}{\left(1+\frac{0.45}{12}\right)^{12X}}$$

$$\frac{750}{\left(1+\frac{0,45}{12}\right)^{12X}} = P$$